The archaeologist as ethnographer: a case from the Western Desert of Australia

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The general idea of archaeology as a kind of anthropology has had widespread and long-standing acceptance, particularly in New World studies. This attitude underlies statements like, 'American archaeology is anthropology or it is nothing (Willey and Phillips 1958: 2)', and methods like the 'conjunctive approach' to archaeology proposed by Taylor (1948). Recent discussions of the anthropological interpretation of archaeological data have tended to distinguish between earlier culture–historical approaches and the culture process approach in which the study of ancient cultural systems is of paramount interest (Flannery 1967: 119–22). One attribute of the approach favored by the 'culture process'-oriented archaeologists is a tendency to question ethnographic analogy as a way of interpreting archaeological evidence, on grounds that the application of such analogies may cause the archaeologist to risk assuming the very thing he should be trying to find out. In such cases, L. Binford has observed:

> 'The archaeologist would be performing a role analagous to that of a historical critic who attempts to translate data of the past into the context of relatively contemporary or culturally prescribed experience.' (Binford 1967: 10)

Analogies of this kind are scientifically dangerous, since they can blind the archaeologist to alternative interpretations of his data.

The archaeologist as ethnographer

How, then, can the archaeologist make valid use of ethnographic evidence? Obviously he must avoid the dangers of making naïve analogies of the sort mentioned above. Archaeologists do in fact use ethnographic data almost constantly – for example, every use of the word 'arrow-head' by archaeologists is based on a set of assumptions resting ultimately upon ethnographic observations. As archaeologists we are dependent upon all sorts of ethnographic observations, and the problem stated in its simplest terms is one of seeking out the best ways for making use of ethnographic evidence for archaeological purposes.

Many archaeologists, however, regard ethnography as simply a corpus of observed data on human behavior from which they may draw suitable hypotheses to compare with

features observed in their excavations and to patterns observed in the course of analyzing archaeological materials. This is fine provided the ethnographic data itself is sufficiently detailed in certain specific ways so as to make such comparisons valid. In most cases archaeologists who wish to make detailed comparisons between certain ethnographic cultures and their excavated materials are eventually frustrated by a lack of detail in certain crucial areas of the ethnographic accounts which they use. Several expressions of this frustration were voiced in discussions published in the volume, *Man the Hunter* (Lee and DeVore 1968); and experiments like the examination of the structure of an Apache wickiup with correlated observations of the behaviour of the occupants with regard to the functions and spatial organization of different classes of artefacts (Longacre and Ayres 1968: 151–9) have proceeded from an awareness that most published ethnographies do not contain this kind of information. This problem has been particularly acute in the study of cultures based on hunting-and-gathering economies.

Perhaps because of the apparent simplicity of toolkits, housing arrangements, and other aspects of the material culture in so many cases, there has been a tendency for ethnographers studying hunting-and-gathering cultures to focus their attention more on descriptions of social and ceremonial organization, mythology, ritual and belief systems and other less tangible or materialistic aspects of the culture. Within the last ten years there has been an increase in ecological studies by ethnographers, and these, because of their detailed quantitative descriptions of different aspects of food-collecting, land-use, butchering and distribution of game, and other matters of direct or indirect importance to archaeology, have proven invaluable. R. Lee's recent work among the !Kung Bushmen of the Kalahari Desert is an example of this ecological approach applied to an important hunting-and-gathering society (Lee 1968 and 1969). But there is still a need for reliable data on house and camp arrangements, including detailed maps showing exact locations and characteristics of hearths, structural features, activity areas of different kinds (particularly those connected with tool-making and economic activities), and census information correlated with dwellings and camps of different kinds. There is a need for butchering studies which include information of the disposal of bones and other refuse in the camps, and there is a need for studies of lithic technology whenever possible to determine the manufacture, functions and classification of various tool types along with studies of use-wear and resharpening patterns, quarrying behavior, and trade and transport of lithic materials. The same is true of pottery when it occurs and the practice of rock and cave painting and related phenomena like rock alignments.

These, however, are merely examples of a more general proposition which is the main subject of this paper, namely that *the quality which more than perhaps any other distinguishes the archaeologist as ethnographer from other ethnographers is his concern for specific sites as the foci for different aspects of human behavior.* Instead of being concerned primarily with the nature and transformations of whole cultural institutions, the archaeologist as ethnographer (or ethno-archaeologist) is concerned with sites as particular cases of patterned behavior. Because other ethnographers have not generally used this approach (there are some notable exceptions, but they are rare), the archaeologist interested in these questions must in many cases be prepared to do his own ethnography, or else he must motivate other ethnographers to supply this kind of information. Speaking personally now, this author has generally found it easier and more rewarding to make his own

ethnographic observations than to rely on others for them, but there is no necessary reason to view this as the only practical approach. Cultural institutions and changes in them may be inferred archaeologically, but these inferences must ultimately be based upon data collected under controlled conditions at particular sites. Thus the archaeologist as ethnographer studies the sites occupied and used by people in living societies in such a way as to render his ethnographic evidence strictly comparable to evidence collected at excavated sites. This paper is devoted mainly to showing how such ethnographic evidence was applied to archaeological excavations at the Puntutjarpa Rockshelter site near the Warburton Ranges Mission in the Western Desert of Australia.

The Western Desert aborigines and Puntutjarpa Rockshelter

In 1966–70, when the field research discussed here was carried out,[1] the Western Desert of Australia offered a unique opportunity for ethno-archaeological studies applied to a hunting-and-gathering way of life. Other areas in addition to Australia were considered before the research was begun, and some of these offered the possibility of obtaining useful results. The !Kung Bushmen studied by R. Lee and his associates, for example, are a large, demographically viable hunting-and-gathering society where valid research in camp organization, settlement patterns, vital statistics, subsistence economics and other matters could be studied. Of particular interest in the case of the Bushmen was the possibility of observing the butchering and division of large game.[2] The Australian data, on the other hand, was inadequate on some of these points. Today the only desert Aborigines who continue to live a nomadic, full-time foraging existence are small, remnant groups which were not contacted by the numerous government patrols into the area or else groups which returned to the desert after becoming dissatisfied with conditions on the missions and other white settlements to which they had been transported (Gould 1969a: 253–8). Thus the demographic situation among these remaining groups cannot be viewed as an example of the situation under precontact conditions. Also the indigenous fauna of Australia is unique, with the largest game animals being the kangaroo and emu (neither is particularly large by world standards, nor are they gregarious). One cannot be sure how comparable the hunting and butchering data collected in Australia is with conditions in other parts of the world. Finally, and perhaps most important, is the fact that in terms of availability of rainfall and surface water, amounts and numbers of edible plant and animal species, and other factors like temperature and evaporation, the Western Desert of Australia is probably the most undependable and impoverished habitat anywhere in the world where people have succeeded in living entirely off the land. Data gathered so far indicates that the Aborigines there base their subsistence on thirty-

[1] The fieldwork in 1966–7 was done under the auspices of the Social Science Research Council (USA). Support for the 1969–70 fieldwork came from the Voss Fund for Anthropological Research, American Museum of Natural History, New York. On both occasions the Australian Institute of Aboriginal Studies assisted by providing a Land-Rover and related equipment.

[2] Detailed ethno-archaeological studies of Bushman butchering and disposal of animal bones have been completed recently by Mr John Yellen, Harvard University, Cambridge, Mass. (personal communication).

eight edible species of plants and forty-seven species of animals (including fleshy foods like grubs and insects). On most occasions their diet consists mainly of vegetable foods, with the principal source of protein appearing in the form of small game like goannas (desert lizards), rabbits, and feral cats (these latter two were, of course, European-introduced). In terms of overall resources, this compares unfavorably with the situation described for the Kalahari Desert Bushmen (Gould 1969a: 258–68). Owing to unpredictable rainfall and the generally unreliable nature of most water catchments, the desert Aborigines must move more frequently and over greater distances than the Bushmen, and their movements do not follow a regular seasonal round. All of these facts combine to form a general picture of marginality in resources which is so unique as to render it hard to compare with what is known about other present-day hunter-gatherer societies as well as with most prehistoric hunter-gatherers.

These negative points, however, were offset by other considerations which made the desert Aborigines a worthwhile subject for ethno-archaeological research. These people continued to make and use a full range of stone tools. The traditional structure and patterning of their camps could still be studied, particularly with reference to the manufacture and use of stone tools. Foraging (plate 9), the use of fire, hunting and butchering of game, and a full range of subsistence techniques could still be observed. The Aborigines also engaged in rock painting and in the veneration and maintenance of elaborate rock-piles and rock alignments. Detailed accounts of these aspects of Western Desert Aborigine culture appear in Gould 1967; 1968a; 1968b; 1969a; 1969b; 1970; and in Gould, Koster and Sontz 1971.

These studies were concerned primarily with obtaining specific information which would be useful in making archaeological interpretations, and it was realized early in the project that archaeological work in the area would be needed later on before the value of this new information could be assessed. Sites found on the surface were surveyed, and test-pits were dug whenever possible. By July 1970, a total of 122 sites had been found in an area extending from Curtin Springs, N.T., on the east to Well 35 on the Canning Stock Route and Pulykara, near Mt. Madley, W.A., on the west, and from Lake Percival, W.A., on the north to the Laverton–Sandstone area of W.A. on the south, encompassing a total area of roughly 200,000 square miles. Of course this is an inadequate sample for such a large area, and gaps remain which will require further survey. Surface collections were taken at all of these sites, and in most cases a sketch-map or detailed contour-map was made along with the taking of notes and photographs. Eleven of these sites were habitations where nomadic, desert-living people were observed at irregular intervals from June 1966–June 1967, and from November 1969–July 1970. Most of the other sites, however, were still visited by Aborigines then residing for the most part at the Warburton Ranges Mission, W.A., or at the Laverton Reserve, W.A. Four of these sites received intensive testing, and two, the Winburn Rocks Site (Winpuly) and Puntutjarpa Rockshelter, were subjected to extensive stratigraphic excavation.

Puntutjarpa, like most of the sites in these surveys, was found with the help of Aboriginal informants, in this case, by several Ngatatjara-speaking Aborigines who then lived at the Warburton Ranges Mission. One can, of course, locate sites in the Western Desert without aid of Aborigines, but with their aid it is possible to work more efficiently and at the same time to get accounts of the people who have lived at the site, their past

activities there, and the sacred traditions which may pertain to the place. Also Aborigines can often provide useful background information on the rock art or rock alignments and other sacred geography connected with the site (it is still possible to observe increase ceremonies being performed at some of these places). Puntutjarpa is a minor sacred site about 150 ft west of the rockshelter where the totemic goanna (Ngintaka) dug into the ground to escape pursuers in the Dreamtime. Texts of this story were collected and published by United Aborigines Mission linguists A. Glass and D. Hackett (in Gould 1968c: Appendix I, 182–4).

Preliminary excavations in 1967 showed Puntutjarpa Rockshelter to be one of the richest sites yet found in Australia in terms of quantity and variety of lithic remains. Radiocarbon samples collected at that time yielded a maximum date of 4790 ± 120 B.C. (from a hearth situated at a depth of 28–30 in., or roughly three-fifths of the way down in the deposit). The site was undisturbed and appeared to have been continuously inhabited from around 6,800 years ago right up to the present (the site is still visited by Aborigines, although it no longer serves as a habitation). A report on these preliminary excavations at this site has appeared (Gould 1968c) along with some additional notes (Gould 1969c). The results of these preliminary excavations encouraged the organization of a major project to excavate a wider portion of the site under more precisely controlled conditions. Major excavations were undertaken from November 1969, to February 1970. The results of this work went considerably beyond what was learned in the 1967 excavations, and analysis of materials from these recent excavations is currently in progress at the American Museum of Natural History and the Western Australian Museum, Perth. Rather than attempt a full report of the findings at this time, this paper is an interim report which will focus on certain aspects of the Puntutjarpa excavations which can be related to the ethnographic evidence obtained from the Western Desert Aborigines.

Excavation methods and stratigraphy at Puntutjarpa

The principal difficulties involved with excavating at Puntutjarpa were logistical. The site is situated only three miles from the Mission, but the next nearest settlement to the Mission is Laverton, 376 miles to the south-west. Thus nearly all supplies had to be brought in by truck, and regular supply trips were made throughout the field season. Fortunately the weather during the summer of 1969–70 was dry and generally favorable for this kind of activity. A field crew of eleven, mainly undergraduate students from the University of Western Australia, Perth, was employed. The physical difficulties and extra expense of maintaining a large field crew under these remote and rigorous conditions go far to explain why this stands as the first stratigraphic archaeological project ever undertaken in the Western Desert of Australia.

The site map in fig. 7 shows the areas excavated in 1967 and 1969–70. The work in the main excavated portion of the habitation area of the site (Trench 2) was done by a combination of 3-in. levels (following the contour of the site surface) and natural levels within a grid system of 3-ft × 3-ft squares. Artefacts, debitage and bone materials were segregated by natural units within each 3-in. level whenever soil color changes became visible. All

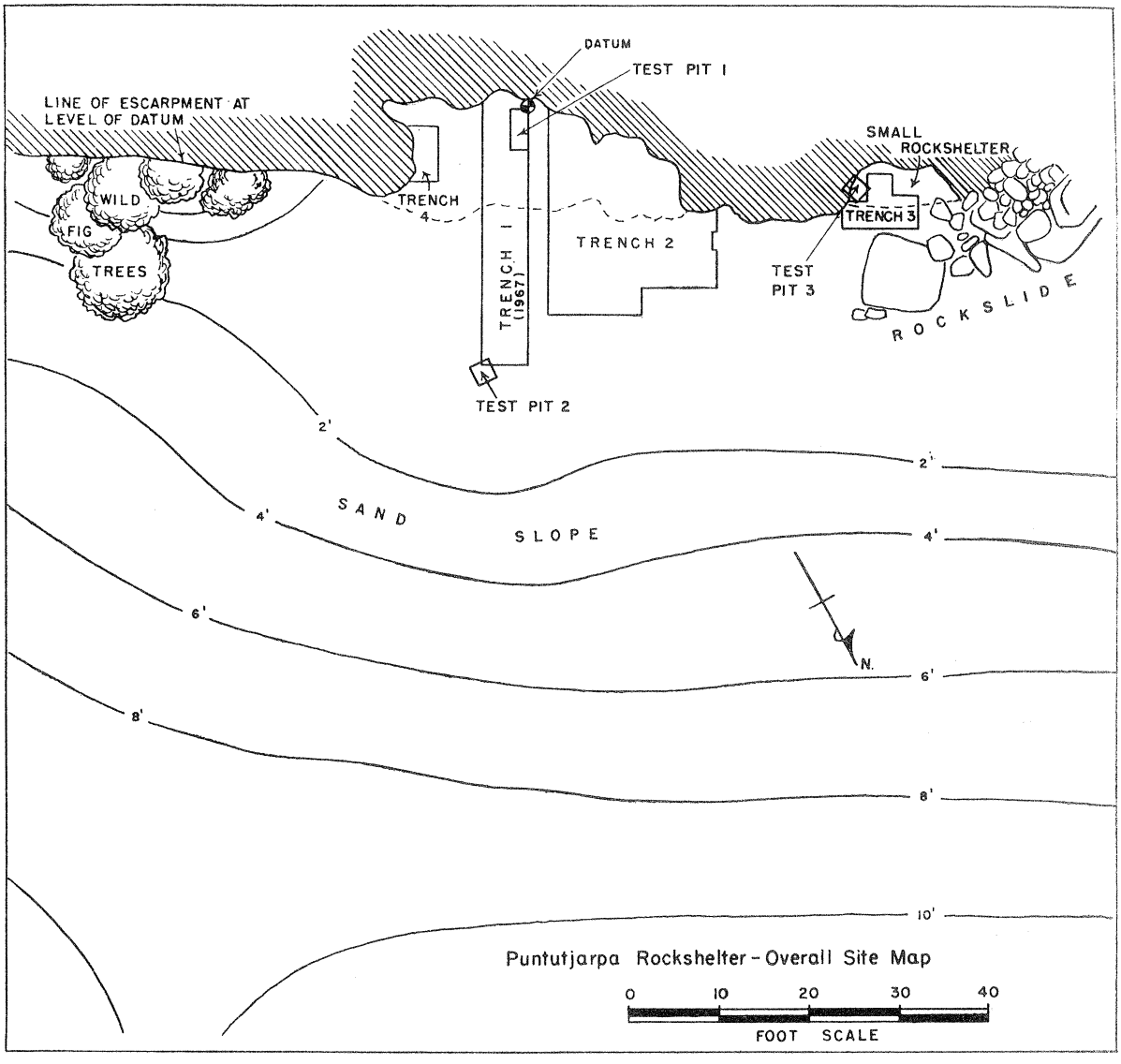


Figure 7 Site map of the Puntutjarpa Rockshelter

excavated soil was put through $\frac{1}{4}$-in. mesh sifter-screens, and a sample of sifted soil from each square was pH-tested and subjected to flotation (Streuver 1968: 353–62) to recover carbonized organic remains. Except in cases where heavy rocks were being removed, all excavating was done with trowels and brushes with special attention being given to the clearing and mapping of hearths and living surfaces. A total of sixteen charcoal samples were taken for radiocarbon analysis, and these are now being processed by Isotopes, Inc. of Westwood, New Jersey (the results on the first few samples in this new series have recently been obtained).

Vertical profiles and horizontal features such as living surfaces were drawn and mapped in detail. The Trench 2 profile (fig. 8) shows the soil units encountered during ex-

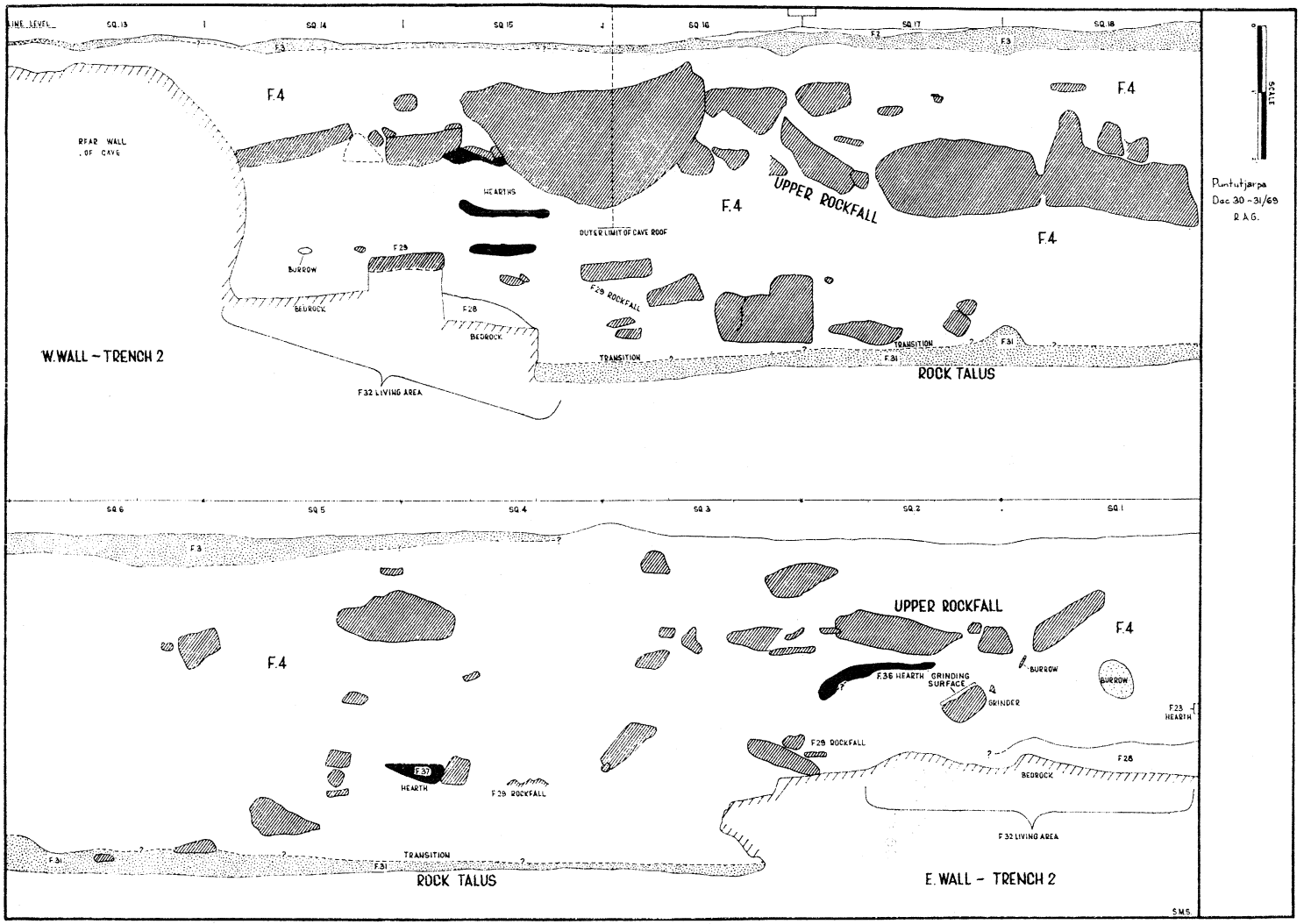


Figure 8 Trench 2 Profile at the Puntutjarpa Rockshelter

cavation. The uppermost unit (labelled as Feature 2) consisted of dark, ashy soil with some stone flakes and pieces of butchered bone. This, in fact, was a thin remnant of backdirt left over from the 1967 excavations in Trench 1. It was carefully separated from the underlying Feature 3 soil to avoid the possibility of mixing, since it contained some materials belonging to the early occupational levels at the site. The Feature 3 unit, a red, sandy soil containing some ash and cultural material, represented the natural surface of the site over most of Trench 2. It appeared to be a desert sand similar to that contained in the broad sand-talus which extends below the rockshelter in a northerly direction and was probably laid down by wind action at a time when the site was less intensively occupied. In the 1967 excavations (Trench 1) this unit was found to grade into the lower, Feature 4, soil, but in Trench 2 the line of separation between Features 3 and 4 was more definite. Whereas in the 1967 excavation the profile drawings showed this color and texture separation in an approximate manner (Gould 1968c; 164–5 and fig. 3), in Trench 2 the line of separation appeared exactly as shown in the fig. 8 profile presented in this paper. The clear character of this soil separation made it relatively easy for the excavators to segregate artefacts and other cultural remains by natural levels within the 3-in. arbitrary levels that served as the primary units of excavation.

Below Feature 3 a dark, homogeneous soil was encountered. This layer was designated as Feature 4, and it accounted for most of the fill in the excavated portions of the site. It showed little or no internal stratification, but was rich in stone tools, waste flakes and cores, ochre and faunal remains. Three principal lines of evidence indicate that the Feature 4 unit was undisturbed; 1. the presence of numerous intact hearths within the deposit, 2. the presence of intact and recognizable living surfaces (i.e. ancient camp-sites), and 3. the presence of two rockfall layers, each resting in its original position after falling.

The rockfall layers at Puntutjarpa were of considerable archaeological interest, since they affected the stratigraphic interpretation of the site more than any other features. The upper rockfall (plate 10) was first discovered in Trench 1, and it covered most of the main rockshelter. The presence of definite soil layers within parts of it indicated that this upper rockfall layer was the result of at least two (and probably three) distinct but fairly closely spaced falls of rock slabs from the cave ceiling. The cave and fall-rocks are Townshend Quartzite (Sofoulis 1962: 17), the predominant formation within the Brown Range in which Puntutjarpa Rockshelter lies. A glance at the Trench 2 profile shows; 1. the massive size of many of the rocks in the upper rockfall, 2. the fact that these rocks form an almost continuous layer within the site fill, effectively sealing the soil deposits underneath, and 3. that there is a slight but noticeable dip downward from S. to N. on a line along the bottoms of the rocks. The depth of the bottom of each rock shown in the profiles was plotted, and these readings showed that the rocks at the N. end of Trench 2 were $12\frac{1}{2}$ in. lower than those at the S. end, with the dip taking the form of a broad but continuous convex curve. Similar plots were taken along an E.–W. axis, but no tilt or dip of any kind was revealed. It appears that the rocks in the upper rockfall fell upon a soil surface which sloped downward out of the cave at a slightly steeper angle than the present-day soil surface. The difference between these two surfaces can be accounted for by the disproportionate filling action occasioned by the massiveness of the rocks in the upper rockfall. Thus the upper rockfall not only acted as a seal to minimize later disturbances to the underlying soil levels, but it also provided clues which enabled the excavators to

trace the slope of the original soil surface at the site. In the lithic and faunal analyses appropriate adjustments are being made for the levels below the upper rockfall to ensure that these materials are considered in terms of depths below the original surface rather than the present-day surface.

The lower rockfall, in contrast to the other, clearly fell as a single unit and was found over a considerably smaller area of the site. No trace of it was found in Trench 1 in 1967. Trench 2 was excavated in such a way as to reveal the entire extent of the lower rockfall, which was cleared and mapped *in situ* and appears in the Trench 2 plan (fig. 17). The rocks in the lower rockfall were small when compared with those of the upper rockfall, and they do not seem to have caused any significant displacement of the soil above. Note that in profile the lower rockfall shows the same dip as occurs along the bottom of the upper rockfall rocks.

The rear portion of the main cave had a roughly level rock floor which ended abruptly as a kind of 'step' of about 8–10 in. down to a hard rock-talus that formed the bottom for the rest of the excavated portion of the site. The same step-like configuration for the cave floor was observed in Trench 1, and as the site filled it was this which gave rise initially to the dipping slope of the surface noted above.

More Feature 4 fill was found below the lower rockfall along with one large and clearly-defined hearth and an abundance of cultural materials. In the rear of the cave Feature 4 fill continued down to the cave floor, but in the small dips and interstices of the rock floor a sterile red sand (similar in color and texture to Feature 3) was encountered. This was labelled as Feature 31, and it is interpreted as the original soil surface of the site upon which the first inhabitants of Puntutjarpa settled. Farther out, toward the front of the cave (i.e. below the 'step') the Feature 31 zone was thicker – in some cases as much as 6 to 7 in. – and tended in some places to intergrade with the Feature 4 soil above. It was sterile of cultural materials near the bottom. This lowest layer of sterile or near-sterile reddish sand was also encountered in Trench 1. A more detailed picture of the physical stratification at Puntutjarpa will be provided in the final excavation report, but this brief account should suffice as a general description.

The artefact sequence at Puntutjarpa

The excavations at Puntutjarpa both in 1967 and in 1969–70 revealed a continuous sequence of stone tool types leading directly up to the present-day toolkit of the Ngatatjara-speaking Aborigines of the Warburton Ranges region and their desert-living kin. The entire Puntutjarpa sequence fits into the 'hafted phase' of Australian prehistory first described at Kenniff Cave in Queensland (Mulvaney and Joyce 1965) and later expanded by Mulvaney to include all of Australia except Tasmania (Mulvaney 1966: 84–93 and 1969: 110). The results at Puntutjarpa generally have served to validate Mulvaney's original framework, though at the same time subjecting it to some modifications.

Two main tool-traditions can be recognized at Puntutjarpa; 1. a 'core and flake-tool tradition', the general characteristics of which have been described by Bowler, Jones *et. al.* (1970) in their report on the Lake Mungo Site in western New South Wales, and 2. a 'small-tool tradition', first described in this manner at Puntutjarpa (Gould 1969c: 233–5).

1 *The 'core and flake-tool tradition' at Puntutjarpa:*

The core and flake-tool tradition at Puntutjarpa consists of a wide variety of large and presumably hand-held flake tools, many of them identifiable through use-wear studies as woodworking scrapers. These have not yet been found to conform to any fixed types, although one may be safe in distinguishing tools with definite woodworking wear on an edge from those tools with edges showing only simple retouch.

A class of large, flake scrapers with deeply concave edges and use wear indicative of woodworking ('spokeshaves') also occurs as part of this tradition. Handaxes and large scraper-planes also occur, although these were more common in the 1967 excavations.

Along with these flake tools there occur large cores, many of which are classic examples of the so-called 'horsehoof core' first described by Tindale (1937: 39–60). Other large cores, some with multiple striking platforms and others with single striking platforms, also abound, but these lack the undercut striking platforms so characteristic of the 'horsehoofs'. In February 1970, the author was shown the artefacts excavated at Lake Mungo[1] and was impressed by the close visual resemblance between these, the earliest dated tools in Australia (at around 26,000 years ago), and artefacts of the core and flake-tool tradition at Puntutjarpa. This close resemblance adds weight to Mulvaney's earlier observations concerning the extremely long duration and unchanging character of large tools of this kind at Kenniff Cave.

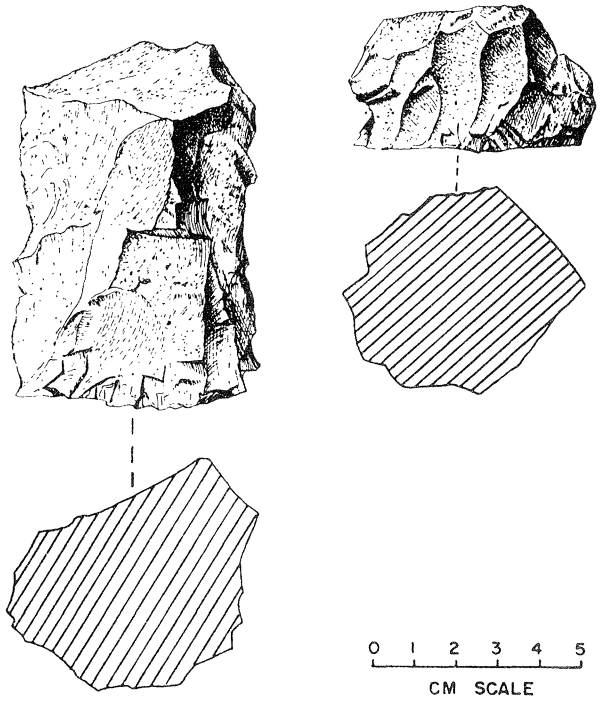


Figure 9 'Horsehoof' Cores excavated at Puntutjarpa (1967)

[1] Through the courtesy of R. Jones, Australian National University, Canberra.

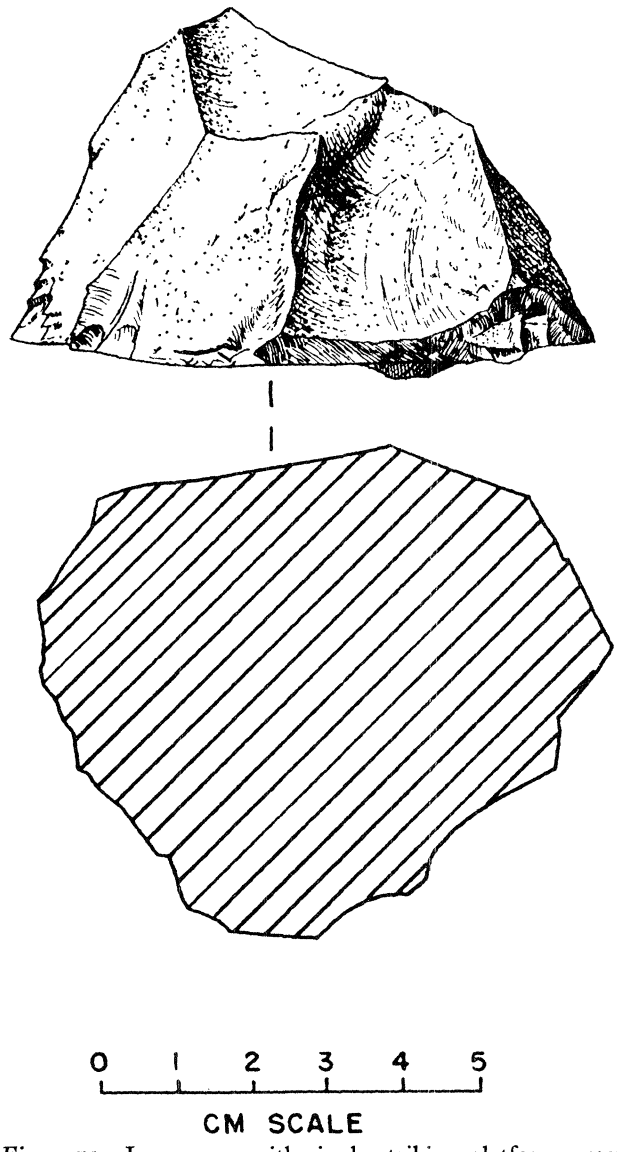


Figure 10 Large core with single striking platform excavated at Puntutjarpa (1967)

'Horsehoof' cores, the most diagnostic type within this tradition (fig. 9), occur in the lowest levels of the Feature 4 unit in both Trench 1 and Trench 2. They persist upwards throughout the deposit to within 13½–16 in. of the surface. Large cores with single and multiple striking platforms occur frequently at all levels above Feature 31 soil right to the surface, and the same is true of spokeshaves and other large flake scrapers (figs. 10 and 11).

2 *The 'small-tool tradition' at Puntutjarpa:*

The small-tool tradition at this site consists of four principal types and a number of sub-types. It must be understood that these are tentative formal types and do not necessarily

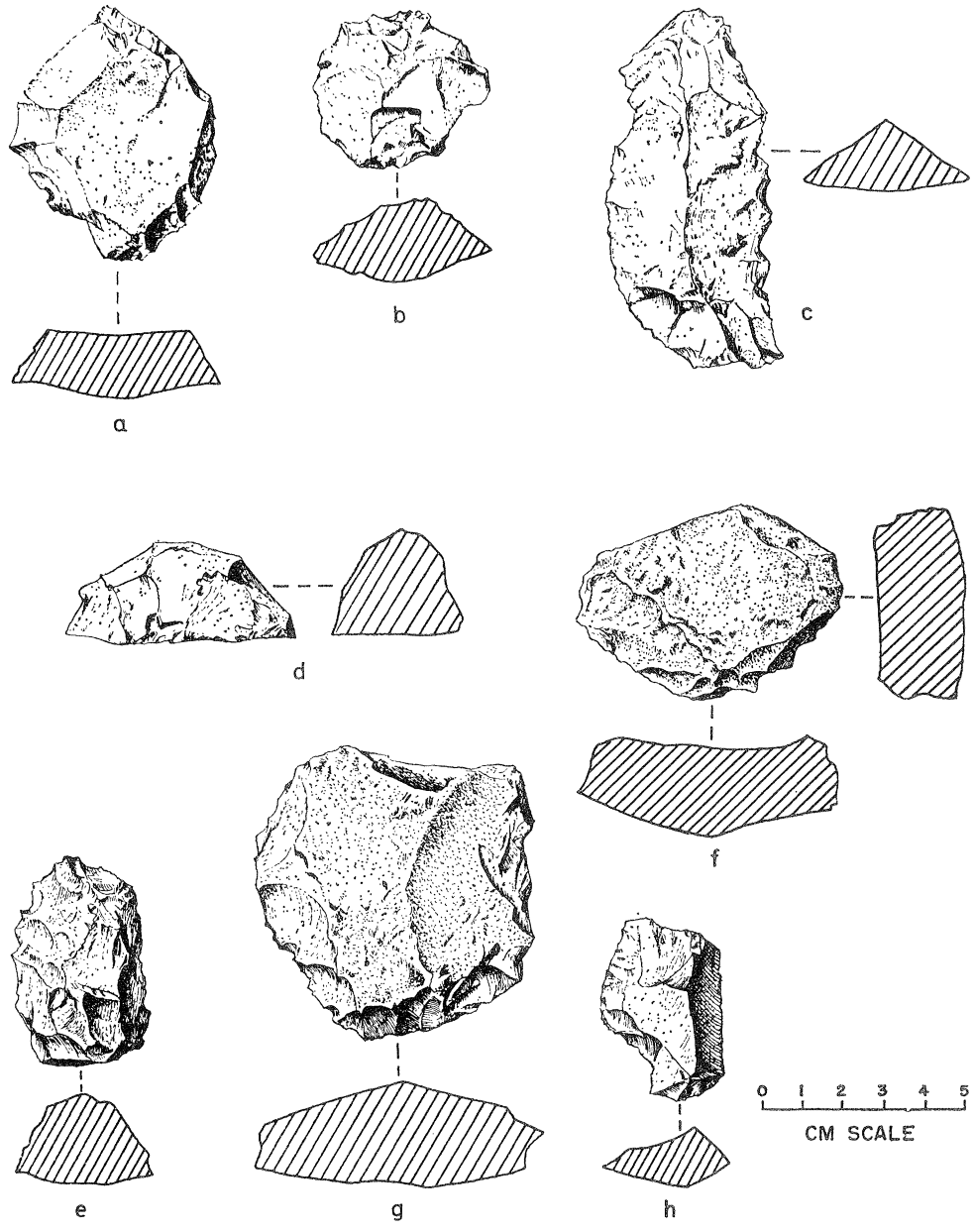


Figure 11 Large flake-tools and scrapers excavated at Puntutjarpa (1967)

reflect native categories of classification. These typological terms have been assigned for purposes of tabulating percentages by level and square within the site and for specific comparisons with material reported from other excavated sites in Australia.

(a) *Micro-adzes* (fig. 12). This category is composed of two sub-types; *micro-adzes* and *micro-adze slugs*. Each of these sub-types is further distinguishable into two categories; *tula* and *non-tula* (for detailed discussions of tula-type adzes and slugs see Horne and

Plate 8 The backs of houses in the Telefolmin village, Telefolip, showing accumulation of débris on a continually-occupied site

Plate 9 A Ngatjara-speaking woman and child foraging in sandhill country near Pulykara, Western Australia, in April 1970. Their diet consisted of plant staples supplemented by small game (lizards and feral cats)

Plate 10 Trench 2 showing Upper Rockfall layer in section and Lower Rockfall layer on bottom

Plate 11 Nyatunyatjara man using a hafted stone adze to trim a spear

Plate 12 Close up of ethnographic Aborigine stone adze (at an intermediate stage of wear) showing the nature of haft (of spinifex-resin)

Plate 13 Trench 2 and Lower Rockfall layer showing two rock-free areas at rear of cave marking limits of ancient living surfaces

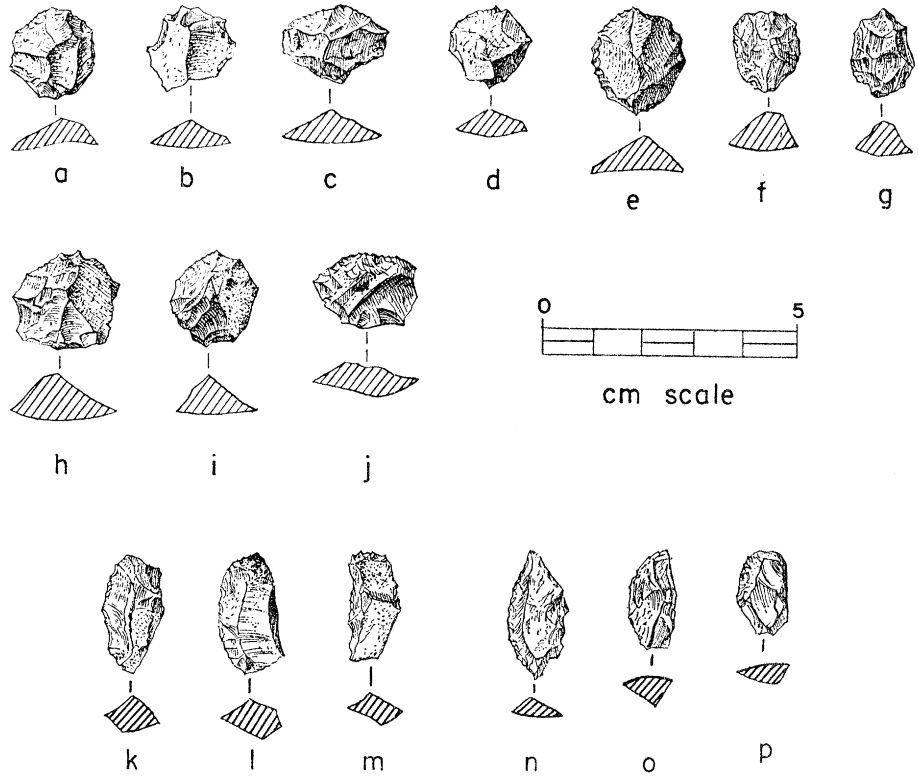


Figure 12 Micro-adzes and slugs excavated at Puntutjarpa (1969–70)
a—j Micro-adzes (unworn or partially-worn)
k—m 'Tula'-type micro-adze slugs
n—p Non-tula micro-adze slugs

Aiston 1924 and Mulvaney 1969: 72–4). As Mulvaney correctly points out (1969: 73–4) tula-type adze slugs can sometimes be rendered unrecognizable by the presence of retouch and/or use-wear covering the striking platform of the original flake. Thus a few slugs classified as non-tula may have been tulas to start with.

Micro-adzes are small discoidal scrapers ranging in thickness from 0·3 cm. to 1·2 cm., in maximum width from 1 cm. to 2·4 cm., and in weight from 0·7 grams to 4·5 grams. Most show signs of extremely regular retouch, and the slugs may weigh as little as 0·5 grams. On tula-type micro-adzes and slugs use-wear and retouch proceeded primarily along the edge of the flake opposite the striking-platform (and, in some cases, on the striking-platform edge itself as well). On non-tula types, use-wear and/or retouch generally proceeded along one or both of the lateral edges of the flake. In general these non-tulas conform to a less regular pattern than tulas, which accounts for the reluctance here to apply the typological term of 'burren' (McCarthy 1967: 27–8) to non-tula forms. The angles of the working edges of micro-adzes and slugs (as measured at the mid-section of each tool) range from 40° to 88°.

(b) *Adzes* (fig. 13). The only difference between micro-adzes (and slugs) and adzes (and slugs) is size. Adzes so far measured range in thickness from 0·7 cm. to 1·6 cm., in

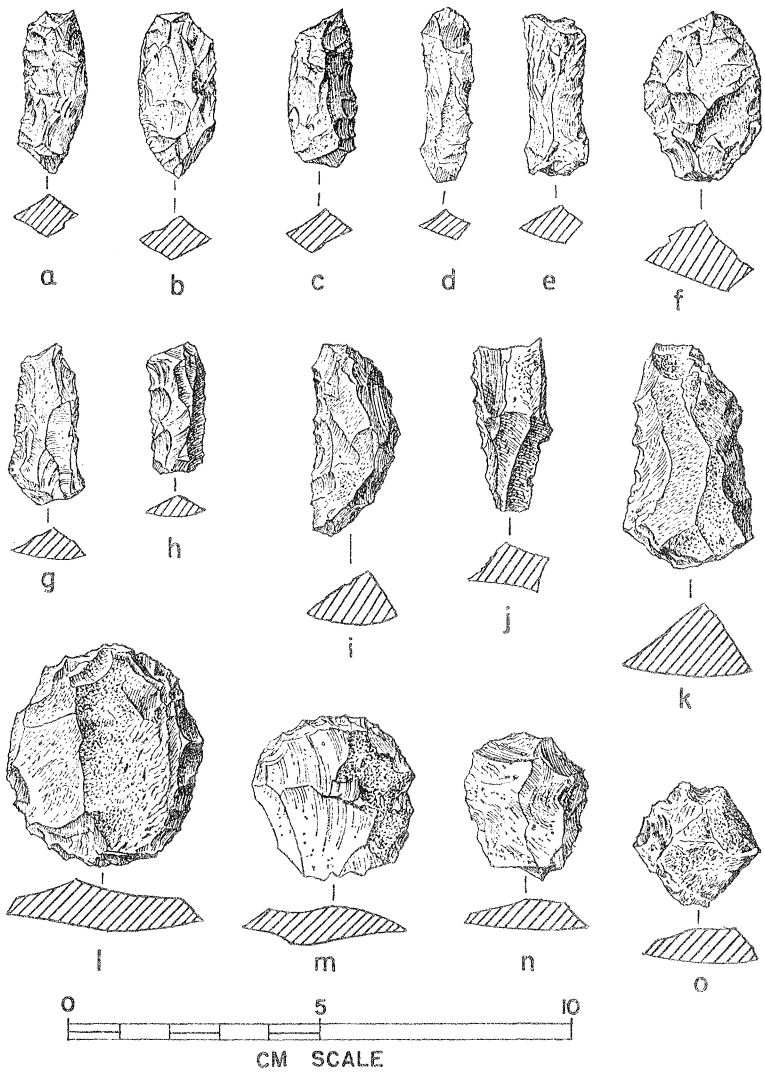


Figure 13 Adzes and adze-slugs excavated at Puntutjarpa (1969–70):
a—f 'Tula' type adze slugs
g—k Non-tula adze-slugs
l—o Adzes (unworn or partially-worn)

maximum width from 2·5 cm. to 4·4 cm., and in weight from 3·4 grams to 25·6 grams. As these measurements indicate, there is a continuous distribution in size and weight between micro-adzes and adzes, with the cut-off point being an arbitrary choice made by the archaeologist. When all of these materials from the site have been identified and measured it will be possible to analyze these measurements statistically against the total number of specimens and determine if they follow a single curve or separate out into a bimodal distribution. Working edge-angle measurements for adzes and slugs range from 39° to 89°. As with the micro-adzes, adzes and adze-slugs can be divided into both tula and non-tula types. Analysis so far indicates that tula and non-tula types for both adzes

and micro-adzes occur in about equal numbers at all occupied levels of the site, but this observation, too, is subject to possible revision once the entire artefact sample has been studied.

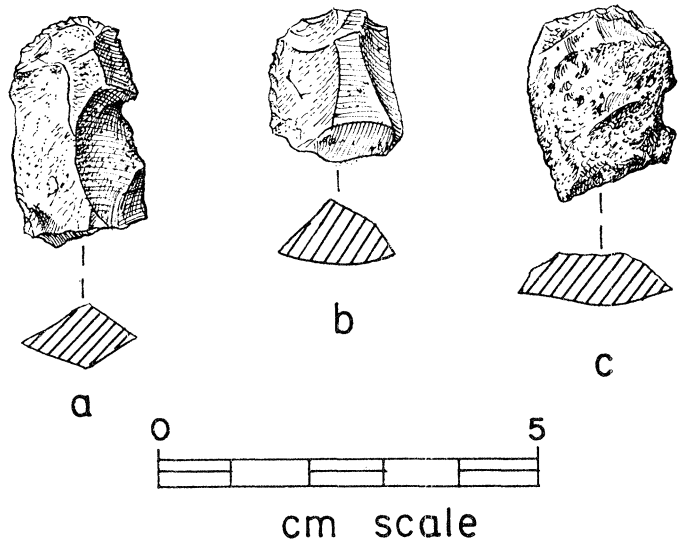


Figure 14 Small endscrapers excavated at Puntutjarpa (1969–70)

(c) *Small endscrapers* (fig. 14). So far only six examples of this category have been identified. In terms of overall size and characteristics of the working edge these small tools differ from micro-adzes only in that they are made on flakes which are at least twice as long as they are wide. The working-edge angles of these small endscrapers range from 44° to 81°.

(d) *Backed blades and flakes* (fig. 15). Often termed 'microliths' by Old World archaeologists, these tools fall into three formal categories; 1. symmetrical (i.e. 'lunates'), 2. asymmetrical (i.e. forms comparable to the 'Bondi points' commonly found in the eastern states of Australia), and 3. a residual category of highly variable but generally well-made forms with regular backed retouch. It should also be mentioned that numbers of fragmentary flakes with backed (or 'microlithic') retouch occur in many levels of the site, but these are not included within the class of backed blades and flakes.

(e) *Micro-cores* (fig. 16). These small cores range in weight from 2·5 grams to 17·8 grams and clearly served as the source for many if not all of the tools classified under the 'small-tool tradition'. Many of these cores have only a single striking platform, and some of these show the same kind of undercutting characteristic of the much larger 'horsehoofs'. Many of the micro-cores, however, show two distinct striking platforms.

3 *Stone tools and stratigraphy at Puntutjarpa*

All the major types within the 'core and flake-tool tradition' occurred throughout the stratigraphic sequence, and all of these with the single exception of the horsehoof core,

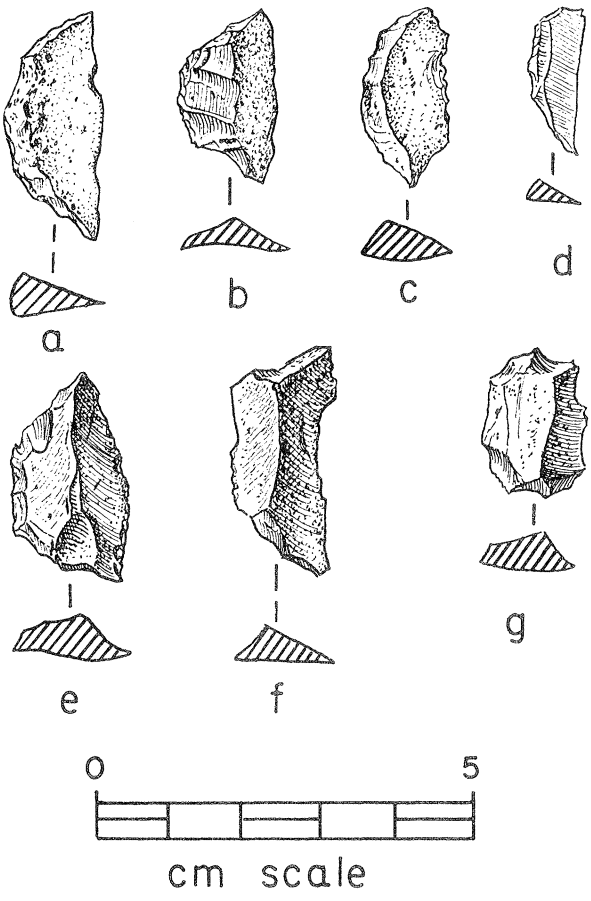


Figure 15 Backed blades and flakes excavated at Puntutjarpa (1969–70)

have been observed in use among living Western Desert Aborigines. Initial observations suggest that there was little if any change in the character or frequencies of these large tools during the entire occupation of Puntutjarpa, but again it must be cautioned that the final results of analysis may reveal patterns which are not readily apparent at this time.

Some important changes are apparent, however, in the case of the 'small-tool tradition'. Micro-adzes and slugs were the first of these types to appear in large numbers. They made their earliest appearance (in both tula and non-tula forms) within the lowest levels of the Feature 4 unit, and they persisted throughout the sequence upward into layers of the Feature 3 unit. Adzes and adze-slugs (of both tula and non-tula type) also appeared for the first time near the very bottom of Feature 4, but they do not become common until the middle layers of Feature 4. From then on they persisted in large numbers throughout the upper layers of Feature 4, through Feature 3, and finally appeared as the most readily identified tool-type found in the surface collections made at Puntutjarpa.

It should be of interest to note that, after backfilling Trench 1 in June 1967, a careful and complete surface collection was taken at the site. In November 1969, upon revisiting

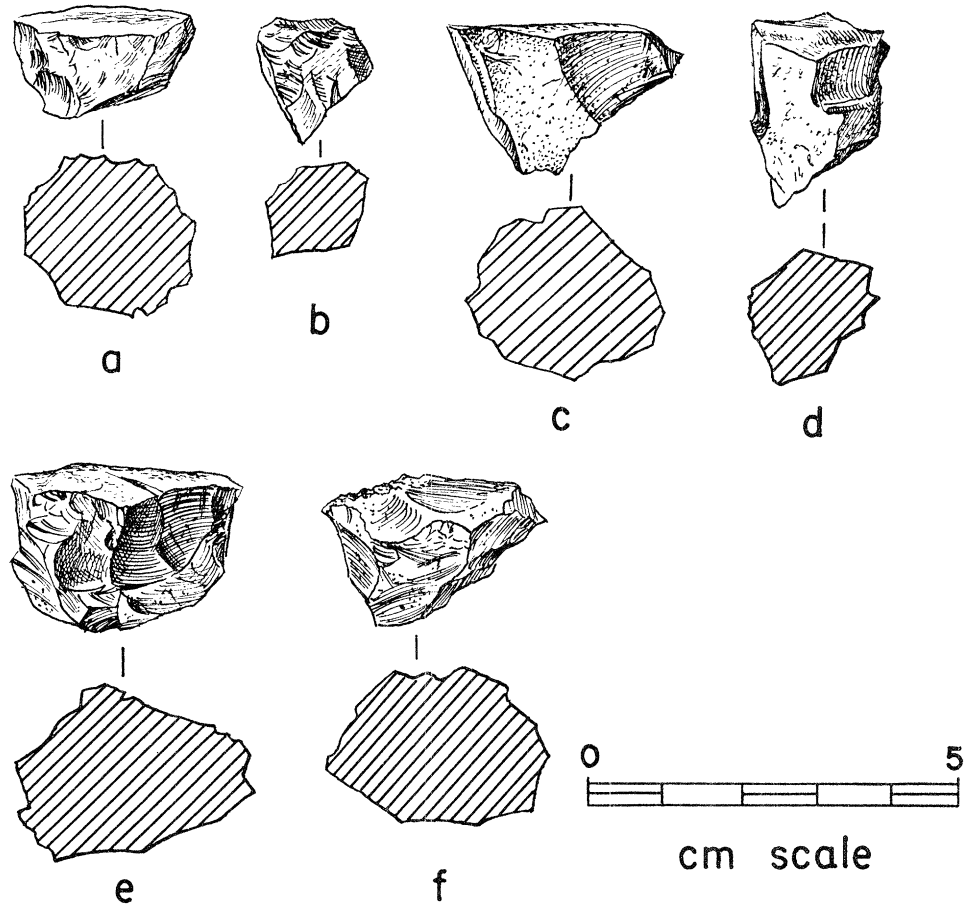


Figure 16 Micro-cores excavated at Puntutjarpa (1969–70)

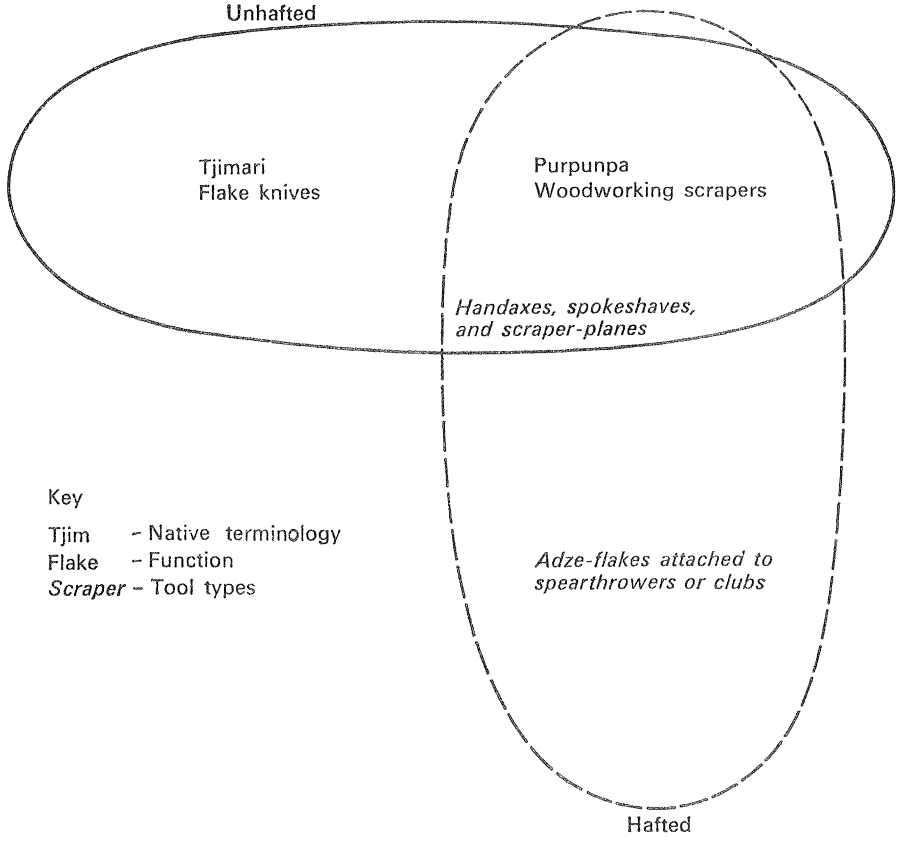
the site for the first time, another surface collection was made and nine stone adze-slugs were found. It is almost certain that these tools and a number of accompanying flakes were left behind by present-day Aborigines who visited the site during the twenty-nine-month interval.

Backed blades and flakes, however, made their earliest appearance at Puntutjarpa much later than the micro-adzes and adzes. A single symmetrical backed blade (lunate) was found at a depth of 32 in., at a level which, on stratigraphic grounds, is estimated to be around 4,000 years old. In slightly higher levels backed blades of all varieties became abundant and persisted into the uppermost levels of the site to within a few hundred years of the present. No modern desert Aborigines have been observed making and using backed blades. Micro-cores were found widely throughout the deposit, first appearing at a depth of 48 in. and persisting into the uppermost levels of the Feature 4 unit. When the analysis of excavated lithic materials from the site is completed, the relative frequencies of these various tool-types will be tabulated by level and systematic comparisons will be attempted with materials from other key excavated sites in Australia, most notably Kenniff Cave in Queensland.

4 *Hafting and functions of stone tools at Puntutjarpa*

Perhaps the most direct application of ethnographic data to archaeological findings at Puntutjarpa occurs in the analysis of stone tools in terms of their possible functions and the likelihood of their having been hafted when in use. Detailed ethnographic evidence on the stone toolkit of the present-day Western Desert Aborigines has been presented in Gould, Koster and Sontz 1971.

TABLE 6
Diagrammed relationship of ethnographic chipped stone tools of the western desert aborigines



The modern desert toolkit of stone implements consists of both hand-held and hafted tools. The Aborigines themselves classify these tools with a simple binary terminology that cross-cuts these functional and typological distinctions (see table 6). Modern flake-knives (*tjimari* – used for cutting skin, meat, sinew etc.) are generally unretouched and are all hand-held in use, although sometimes one of these stone flakes may be given a small handle of spinifex resin. Large woodworking scrapers (*purpunpa*) are hand-held and are used as handaxes or scraper-planes (see also Thomson 1964: 412), while smaller adze-flakes are attached with spinifex-resin to the ends of wooden spear-throwers or clubs (see plates 11 and 12). Small, untrimmed flakes used as tools for engraving wood (called

pitjuru-pitjuru, but classified also as *purpunpa*) are hafted in the same way to the ends of short wooden handles. Angle measurements of the working edges (at mid-section) of ethnographic examples from these two categories show a bimodal distribution which correlates with their observed functions (see table 7).

TABLE 7

Working edge angle frequencies for ethnographic Western Desert stone tools

Degrees	*Purpunpa* (adzes)	*Tjimari* (knives)
19°–29°	0	4
30°–39°	0	9
40°–49°	3	6
50°–59°	7	6
60°–69°	4	0
70°–79°	6	0
80°–89°	6	0
Total samples:	26	25

(Calculated from ungrouped data)

Mean working edge angle for adzes (*Purpunpa*) 67·0°
Mean working edge angle for knives (*Tjimari*) 39·52°
$t = 7{\cdot}5660$
Probability $< 0{\cdot}001$

Microscopic examination of the working edges of the ethnographic woodworking scrapers revealed a distinctive use-wear pattern in the form of tiny terminated flakes extending back from the working edge along the bulbar face of the flake. These were clearly visible under a binocular microscope at a magnitude of 36× and their occurrence was further checked by experiments involving manufacture and use of stone adze-flakes in the laboratory. Macroscopic inspection also revealed woodworking wear in the form of distinctive step-flaking (the result of progressive wear and resharpening of the working edge).

The typological distinction between tula and non-tula type adzes and slugs, although widely accepted by Australian prehistorians, is not recognized by the ethnographic desert Aborigines. Both types occur in the toolkit, but they arise fortuitously as the outcome of a choice by the stoneworker to employ either a distal or lateral edge of the flake as the working edge. Any flake with a suitable working edge may be used in this manner, so the choice by the stoneworker is not based on any previous planning but on the chance recognition of a flake with a usable working edge anywhere along its perimeter.

The continuity between the ethnographic and prehistoric stone toolkits is remarkable, particularly in the case of woodworking tools. Adze-flakes and adze-slugs found in the excavations so far are indistinguishable from the ethnographic sample in terms of overall shape and size, working edge-angle measurements, and use-wear patterns. The same is true (with the single exception of size) of the micro-adzes and micro-adze slugs so far

studied from the site. Many of the large, presumably hand-held, scrapers found in the excavations show working edge-angle and use-wear patterns indicative of woodworking wear in a manner identical to ethnographically studied hand-held scraper-planes, hand-axes and spokeshaves.

These facts lead to the conclusion that the micro-adzes encountered in the lowest levels of Feature 4 were hafted and used in a manner analogous to the ethnographic hafted woodworking adze. As P. White has recently observed on the basis of his ethno-archaeological observations in New Guinea, size alone cannot tell the archaeologist whether or not a stone tool had to be hafted to be used (White, personal communication). But small size combined with evidence for woodworking use-wear in the form of step-flaking and microscopic terminated flakes on the bulbar face lead one to conclude that these particular small tools must have been hafted. No person, however strong, could reasonably be expected to accomplish woodworking tasks of the sort inferred for these tools by holding them without the mechanical support of a handle. An argument along similar lines can be made for the small endscrapers from the site. These show definite woodworking wear and it can safely be assumed that they were hafted. They, like the micro-adzes, first appeared at lowest inhabited levels of the site. However, like micro-adzes and backed blades their use did not survive to the present day among the Western Desert Aborigines. However, it can be noted that endscrapers generally similar in shape though larger in size did survive among the historic Wongkonguru Aborigines near Lake Eyre, South Australia (Horne and Aiston 1924; Gould 1966: 5). The Wongkonguru term for these endscrapers was *kalara*, and it was reported that some were hand held while others were hafted.

These observations are even more significant when considered in light of the radiocarbon date of 10,170 ± 230 B.P. recently obtained for the lowest level of Feature 4 (from a hearth at a depth of 46½–48 in., directly underneath the lower rockfall). Thus micro-adzes are not only the earliest hafted, chipped stone tools to appear stratigraphically at Puntutjarpa, but they are also the earliest by far yet reported anywhere in Australia. They appear to mark the beginning of the 'small tool tradition' in Australia. Recent discussions with W. Solheim II and other specialists in south-east Asian prehistory indicate that micro-adzes and adzes, while they occur widely within Australia, have not yet been reported from Indonesia or New Guinea. Admittedly, negative evidence of this kind is risky, but it does begin to look as if this distinctive tool-type (or types if one keeps the large and small varieties separate) originated independently in Australia, probably in the Western or Central Desert area at least 10,000 years ago, where it has persisted in use (in its large form) continuously to the present day.

In contrast, backed blades appeared later within the small tool tradition. Since backed blades appeared widely in the Old World, including India and south-east Asia, it seems probable that these, unlike adzes and micro-adzes, were introduced directly by trade or transport or indirectly through diffusion of ideas into Australia from outside the continent. This latter observation, of course, is highly speculative and may be changed by new evidence. In contrast to other stone tool-types of both major traditions in Australia, backed blades in the Western Desert enjoyed a relatively brief period of popularity over a few thousand years, falling out of use entirely by historic times. There is no necessary reason to think that these tools were hafted, although Old World parallels

strongly suggest that they were. In any event, ethnographic analogies for their possible function in the Australian Desert are entirely lacking.

When trying to conserve raw material, ethnographic desert Aborigines have been observed to obtain stone flakes from polyhedral cores with multiple striking platforms. Stone cores identical to these occur in significant numbers throughout the entire depth of habitational deposit at Puntutjarpa. No modern desert Aborigines have ever been observed making 'horsehoof'-type cores, but examples found on the surface of sites by Aborigines are readily identified as cores (*wupula*). Considering this fact and their persistence into recent habitational levels at Puntutjarpa, the possibility exists that Aborigines were producing horsehoofs until perhaps as recently as the last thirty years but that these may have been missed by anthropologists due to inadequate ethnographic sampling.

Ethnographic quarrying and lithic materials at Puntutjarpa

Ngatatjara Aborigines currently living in the Warburton Ranges area regularly visit seven localized quarry sites to obtain the raw materials for their stone tools. As summarized in table 8, these sites all lie within a twenty-mile radius of Puntutjarpa Rock-

TABLE 8

Ethnographic quarry sites in area around Puntutjarpa Rockshelter

Location	Approx. direct-line mileage and direction from Puntutjarpa	Lithic material
1 Spring Granite (Kunapurul)	20 miles north-east	white chert
2 3 miles W. of Spring Granite	20 miles north	white chert
3 Warburton Ranges (immediately S. of Mt Talbot)	6 miles north-east	Warburton porphyry
4 The Sisters	10 miles south-east	dark red chert
5 Mulyangiri	14 miles north	white chert
6 1 mile S. of Waṇampi Well	20 miles east	white chert
7 ½ mile N. of Mulyayiti	15 miles south-east	white chert

shelter. In addition to these localized sources, the Aborigines visit several extensive clay flats ranging from about one to five miles south and south-east of the site to collect surface agate. They also obtain pebbles of Warburton porphyry, quartzite and opaline material from the gravels in all the large creek-beds in the Warburton Ranges vicinity. The closest of these to the site is Hughes Creek, about 1,600 ft to the north-east of the site. Finally, and most important, there is a natural abundance of quartz over wide areas on the surface throughout the Warburton Ranges–Brown Range region. All of these raw materials were present in large amounts throughout the excavated fill of the site in the form of stone tools and debitage. The present analysis is distinguishing between

these various kinds of raw material to determine preferences by percentage at different levels of occupation.

Raw materials which occurred at the site but could not be attributed to any of the known local sources have been tentatively classified as exotic. The implication is that these were traded or transported to the site from distant sources. So far, only one of these sources has been pinpointed (a quarry in the Wingelinna Hills, about 180 miles east of Puntutjarpa, produces a distinctive transluscent form of chrysoprase which ranges in color from pale green to white). The lithic analysis at Puntutjarpa is also classifying all stone tools and debitage in terms of local or exotic origin, and these results are being tabulated by level to show when, for example, exotic raw materials were being favored most. By inspection at this time it appears that local materials (especially quartz) dominated the lithic assemblage at Puntutjarpa throughout the sequence there, but that exotic materials achieved their greatest relative popularity during the period when backed blade- and flake-tools were most common. All of these observations will require careful testing when the entire collection has been studied and analyzed statistically.

Ethnographic camp-sites and archaeological living-surfaces

In the Puntutjarpa excavations of 1969–70 a total of three complete and two fragmentary living-surfaces were recognized and mapped. Two of these, Features 32 and 40 appear on the map of Trench 2 as rock-free areas. Evidence gathered so far indicates that these two roughly oval-shaped spaces were cleared of rocks by the inhabitants when they reoccupied the rockshelter after the lower rockfall had covered the cave floor. Each of these rock-free areas contained hearths, stone tools and flakes, butchered bones and other typical camp debris. Moreover, the rocks indicated in black on the Trench 2 (fig. 17) map were found resting on Feature 4 soil from 4 to 8 in. above the lower rockfall. These rocks do not form part of either rockfall layer at the site, and two alternative explanations for their presence are possible; 1. these rocks were a third but smaller rockfall layer that fell during a time intermediate between the others, or 2. these rocks were originally part of the lower rockfall and were thrown out by the cave inhabitants during the clearing of the two camp-sites at the back of the cave. If this latter alternative is correct, it means that a small amount of soil accumulated over the lower rockfall layer out near the rockshelter entrance during the absence of the occupants. It should be noted that these rocks were a convenient 'stone's throw' in distance from the two rock-free areas. The second alternative seems, on present evidence, to be the more economical, since otherwise one is faced with the improbable suggestion that the lower rockfall fell in exactly the manner in which it was found, with no rocks at all falling in the two rock-free areas. Both of the living-surfaces defined by these rock-free areas occurred stratigraphically at depths intermediate between the 10,170±230 B.P. radiocarbon date for the lowest level of Feature 4 (46½–48 in.) and a hearth at 28–30 in. which was radiocarbon dated at 6,740± 120 B.P.

The third living-surface (designated Feature 7) was found at a depth of 17–20 in. below the surface, directly under the uppermost layer of the upper rockfall. That is, this living-surface was occupied during an interval between the falls that formed this upper

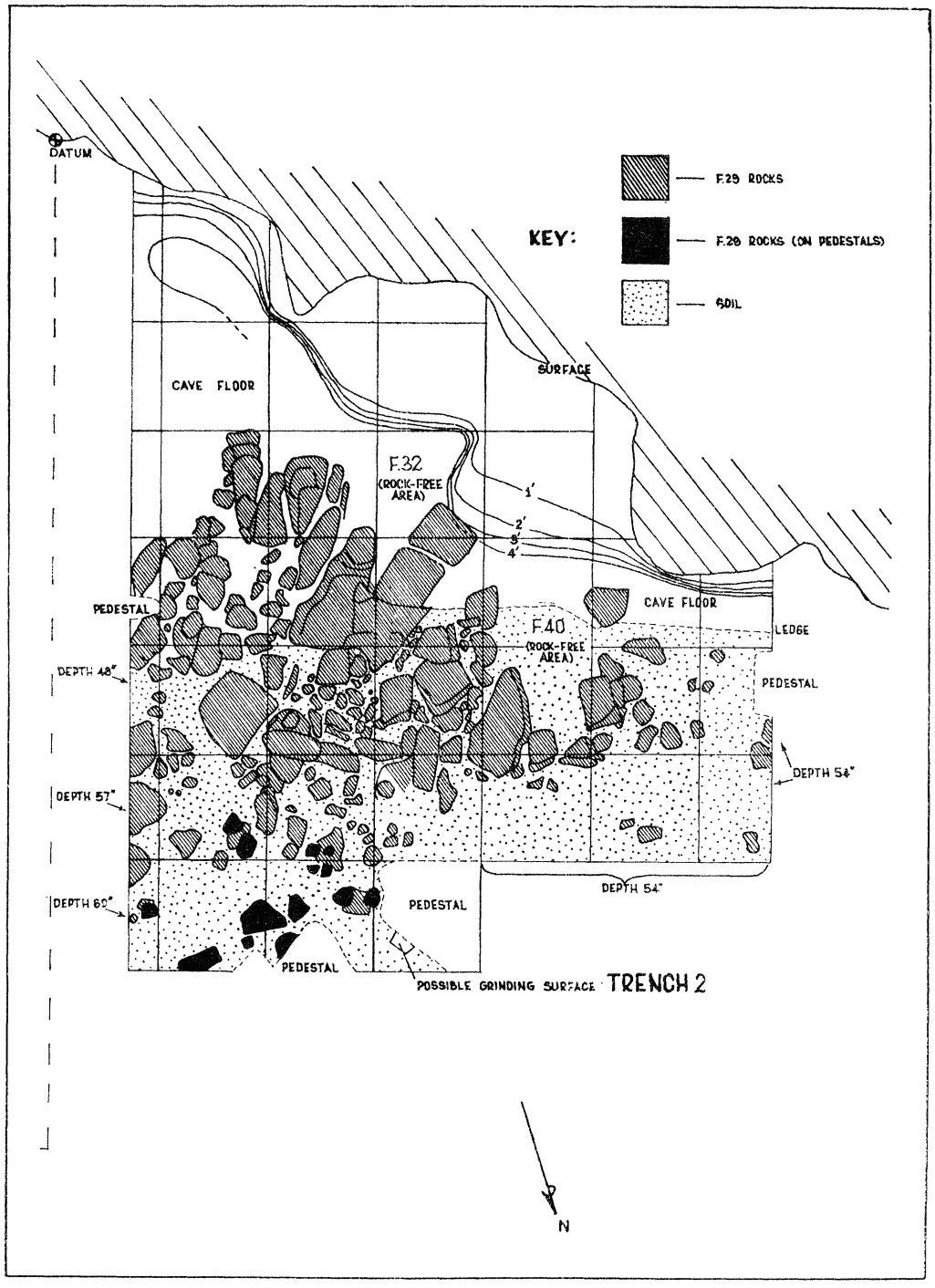


Figure 17 Trench 2 Plan showing Lower Rockfall Layer and two rock-free areas. For a photographic detail of this area, see plate 13

rockfall layer. A map of this living-surface is shown in fig. 18b. It was first recognized as a layer of compact earth underlying a layer of looser soil and rocks. On this surface were found two hearths, two stone grinding-slabs (resting level on this surface), a micro-adze slug, two backed blades (both lunate in form), a horsehoof core, a possible small grinder (for seeds) or hammerstone, and large amounts of debitage and butchered bone fragments. Charcoal samples taken from both hearths and combined gave a date of 435 ± 90 B.P.

In terms of contents and overall shape these excavated living-surfaces bear a close resemblance to the maps and studies made of ethnographic Aborigine camp-sites from 1966 to 1970. Fig. 18a shows one such camp-site, an open-air, cold weather camp in plan. A summer and winter camp are illustrated in plates 14 and 15 respectively. In terms of area, the Feature 7 living-surface measured 38·5 sq. ft, the Feature 32 living-surface measured 38·5 sq. ft, and the Feature 40 living-surface measured 56·7 sq. ft, These figures are somewhat approximate owing to irregularities in shape, and the same is true of the measurements for the ethnographic camps. The areas obtained for the three archaeological living-surfaces fall well within the range presented for forty-one ethnographic camp-sites measured in this study (table 9). This and other lines of evidence

TABLE 9

Measured areas of ethnographic camp-sites (in square feet) at seven localities[1]

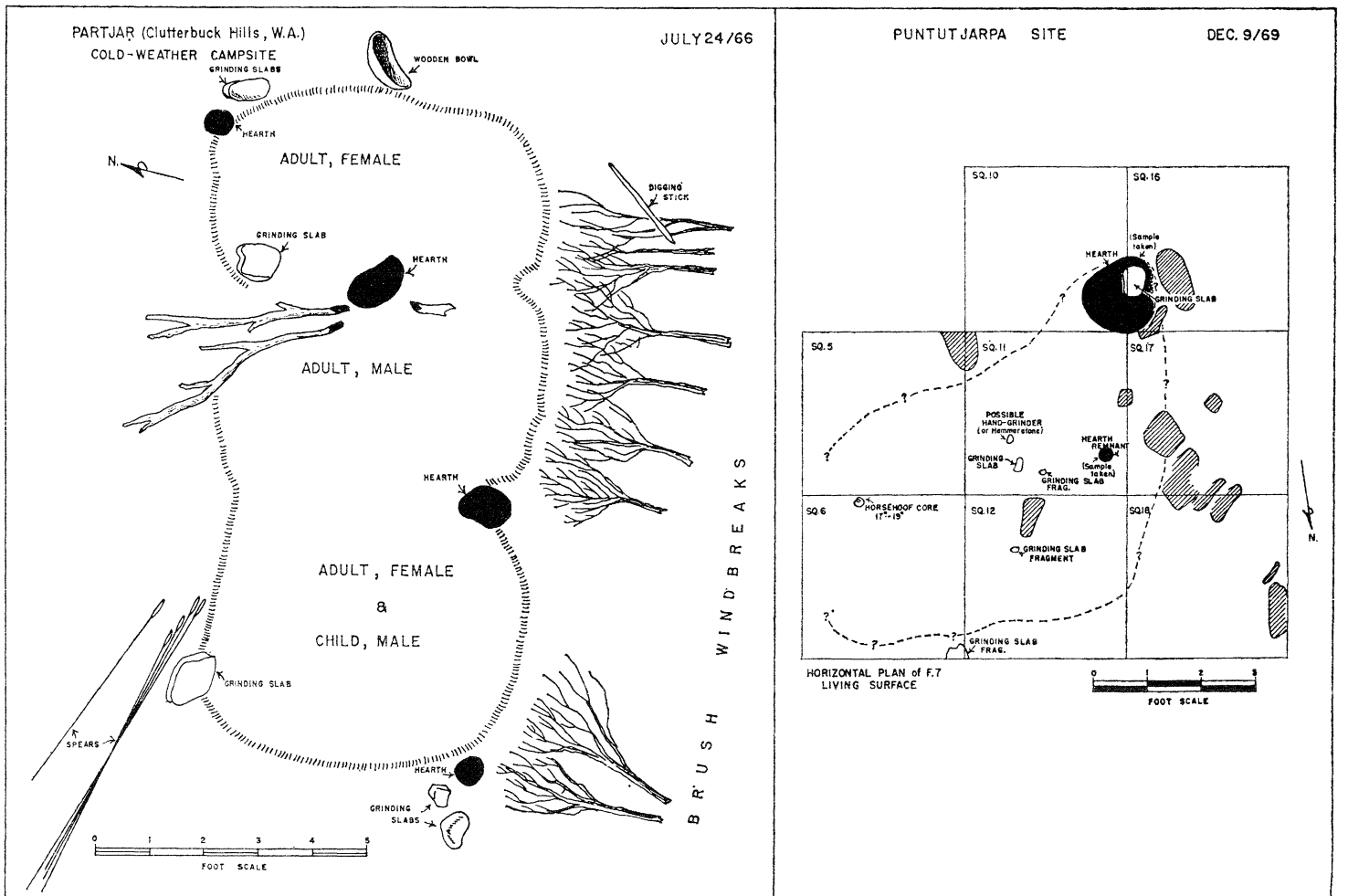
Areas	Winter (cold-weather) camps	Summer (shade-shelter) camps
9–19 sq. ft	0	1
20–29	1	10
30–39	2	12
40–49	2	2
50–59	2	3
60–69	1	1
70–79	2	1
80–89	0	0
90–99	1	0
Total samples	11	30

(Calculated from ungrouped data)

Mean camp-site area for winter camps 53·70 sq. ft
Mean camp-site area for summer camps 36·25 sq. ft
$t = 0{\cdot}249$

indicate that the archaeological living-surfaces defined in the Puntutjarpa excavations are indistinguishable from the camp-sites of the modern Western Desert Aborigines. The evidence is not precise enough, however, to permit recognition of prehistoric summer *vs.* winter camp-sites (note that the value for t in table 9 is only 0·25, indicating that in terms of area the winter and summer camps represent virtually identical population).

[1] These seven localities were Tika-tika (1966), Yaturi (1966), Piriya (1966), Maṭura (1966), Wanampi Well (1966), Partjaṛ (1966–7) and Pulykara (1970).



a *b*

Figure 18 Comparison of Cold Weather Campsite at Partjaṛ (*a*) and Living Surface (Feature 7) at the Puntutjarpa Rockshelter (*b*)

Given the close similarities between ancient and ethnographic camp-sites in the Western Desert, it seems worth while to attempt an estimate of the number of people who occupied each camp-site. This, of course, was done entirely on the basis of ethnographic data and cannot be checked independently. The results summarized in table 10 suggest that an estimate of 3·55 persons per camp would be reasonable. As an aside, it should be noted that an anomaly appears in table 10. The winter camp observed at the Warburton

TABLE 10

Summary of ethnographic camp-data, Western Desert Aborigines, 1966–70

Site	Date of observation	Summer (shade-shelter) camp	Winter (cold-weather) camp	No. of extended families	Total no. of people	No. of shade-shelters	No. of open camps	Average no. of people per camp
Waṇampi Well	12/13/66	x		17	107	21	3	4·46
Mulyangiri	1/15/70	x		7	58	20	1	2·76
Warburton (newly-arrived desert people)	8/10/66		x	6	54	7	5	4·50
Tika-tika	7/18/66		x	2	10		3	3·33
Partjaṛ	7/22/66		x	2	10		3	3·33
Partjaṛ	12/27/66	x		3	14	3	1	3·50
Pulykara	4/22/70		x	2	9		3	3·00

Overall average no. of people per camp 3·55

Ranges Mission on 10 August 1966, had more shade-shelters than is usual in such camps under traditional, nomadic conditions. This was because the Aborigines living in this camp had just acquired some old tarpaulins, blankets and other goods from the Mission and had set about making 'improvements' which resulted eventually in structures (termed 'humpies' by Europeans) which are the year-round type of dwelling used by mission-dwelling Aborigines.

The West Cave pit and Aboriginal 'native wells'

Excavations in the West Cave (Trench 3) at Puntutjarpa presented a stratigraphic picture different from that seen in the main cave fill. Only occasional stone artefacts and very few stone flakes or pieces of butchered bone were found there, and the soil proved to be a light grayish-pink unit of relatively fine textured sand which was almost entirely homogenous

from top to bottom. This unit showed none of the dark colour or concentrated habitational debris of the sort encountered in the Feature 4 unit in the main cave. It continued this way to the rock floor of the West Cave, encountered at a depth of 76 in.

However, one prominent stratigraphic feature did occur within the West Cave. The photograph in plate 16 shows the side wall of Trench 3, and it will be noted, particularly on the left-hand side of the picture, that a sharply dipping line of soil-color change is visible. A similar dipping line appeared on the extreme right, most of it, unfortunately, just outside the edge of the picture. In profiling this feature (called Feature 44) it became apparent that we were dealing with a pit of some kind, either natural or man-made. The internal stratigraphy of the pit was extremely complicated, being composed of numerous inwardly dipping (and frequently overlapping) lenses of soil which were sometimes marked not only by differences in color but by thin dipping lenses of ash or charcoal. Some of these are visible in the plate 16 photograph. The Feature 44 pit was traced to a depth of 66 in.

It should be mentioned at this point that it rained only once at Warburton during the summer of 1969–70, when 43 points of rain (i.e. just under half an inch) fell on 14 December. Excavation of the Feature 44 pit did not begin until a month later, in mid-January, so that it came as something of a surprise when the excavators discovered moist soil within the pit as they dug downward, level by level. Further investigation showed that moisture from this rainfall had collected on the top of the Brown Range escarpment and that later this moisture had percolated downward through fissures in the rock ultimately to emerge from the rear wall of the West Cave. There the moisture had remained despite a month of intense mid-summer heat outside the cave. It was this chance clue which first suggested to the excavators the possibility that the pit may have been part of an ancient water-catchment. Indeed, one of the unresolved questions about the ancient human occupation of Puntutjarpa Rockshelter centered on the apparent lack of dependable water supplies. Hughes Creek, about 1,600 ft from the site, holds water for only a short time in its bed after heavy rains. A couple of small rockholes in the Brown Range about half a mile from the site and some claypans on the far side of Hughes Creek which hold fresh water for a few days after rains appeared to be the only locally-available water sources. A permanent soakage occurs at Milesia Well (the original location for the Warburton Ranges Mission in 1934) near the west end of the Brown Range about one and a half miles away from the site – a little too far for convenient access but accessible nevertheless.

During the course of ethnographic studies it had been noted that desert Aborigines often depended upon so-called 'native wells' for water, and that the interval between their visits to one might be several months or even years. A native well is nothing more than a place where it is known to the Aborigines that a localized sub-surface water table exists. In these places they dig to get water, using wooden digging-bowls and digging-sticks and collecting the water by letting it flow into a large wooden bowl placed at the bottom. Frequently during the intervals between visits large amounts of tumble grass, weeds and thorns accumulate within the pit, and the sides of the pit may also collapse to some extent. Upon revisiting such a place, the first step is generally to set fire to the brush within the pit (by far the easiest way to clear it), and the next step is to dig back down to the water table. The photograph in plate 17 shows the native well at Pulykara, an

Aboriginal camp about 330 miles north-west of Warburton where there were nomadic Aborigines camped in April 1970.

Ethnographic observations at Pulykara and other places like it lead this author to suggest that the easiest way to interpret the complex stratigraphy within the West Cave is to view the Feature 44 pit as an ancient native well similar to those observed ethnographically. Such an interpretation takes into account the persistence of moisture within the West Cave after the December 1969 rain, and relates this in the most economical manner possible to the dipping soil and ash lenses within the pit (these latter were thought to be the traces of past burning and clearing during efforts by Aborigines to obtain water there). It should be noted that a similar situation, of a cave containing a steady trickle of fresh water through fissures at the back and serving as a water-source for desert Aborigines, was observed in 1966 at the site of Wi:ntjara (Glen Cumming) in the Rawlinson Range (Gould 1969c: 148). This interpretation also accounts for the relatively small amounts of cultural debris contained within the pit and the fill surrounding it.

The uppermost foot of fill within the West Cave showed no trace of the pit-outline but contained a large hearth which was found horizontally superimposed above the edge of the pit. Thus, it was reasoned, the hearth must have post-dated the last use of the pit, since any later efforts to clear the pit by digging would have cut through this hearth. A radiocarbon date of 3,840 ± 105 B.P. was obtained from the hearth material, indicating this as the last possible date for the abandonment of the pit as a water-source. No adequate explanation can be offered at this time for the abandonment of the native well inside the West Cave, although geomorphological studies are presently being carried out by Mr Ian Eliot, Dept. of Geography, Australian National University, Canberra, to assist in this interpretation.

Unchanging subsistence patterns at Puntutjarpa

As mentioned earlier, the main cave fill at Puntutjarpa contained large amounts of faunal remains in the form of pieces of butchered and burned bones and teeth. Analysis by R. Tedford of faunal remains from Trench 1 (see Appendix II in Gould 1968c: 184–5) indicated that only modern mammalian species were present throughout the human occupation of the site. Moreover, these were characteristically desert species of the kind noted for the Warburton Ranges area during the early period of European contact there. Much larger collections of faunal remains from the 1969–70 excavations are currently being studied by Mr M. Archer, The Western Australian Museum, Perth, who reported in a recent letter that so far he, too, has identified only modern desert mammalian species from the site fill. This evidence is clearly preliminary in nature, but so far it suggests that little climatic change (with resultant changes in flora and fauna) has occurred in the Warburton Ranges area during the past 10,000 years.

Considering the tremendous quantities of bone and the extent to which these bones were smashed and charred, it was apparent that butchering and consumption of game were a principal activity of the cave's ancient occupants. This is not surprising when one considers that the slightly elevated position of the rockshelter offers an excellent vantage point for observing game movements through the mulga-covered flats to the north and

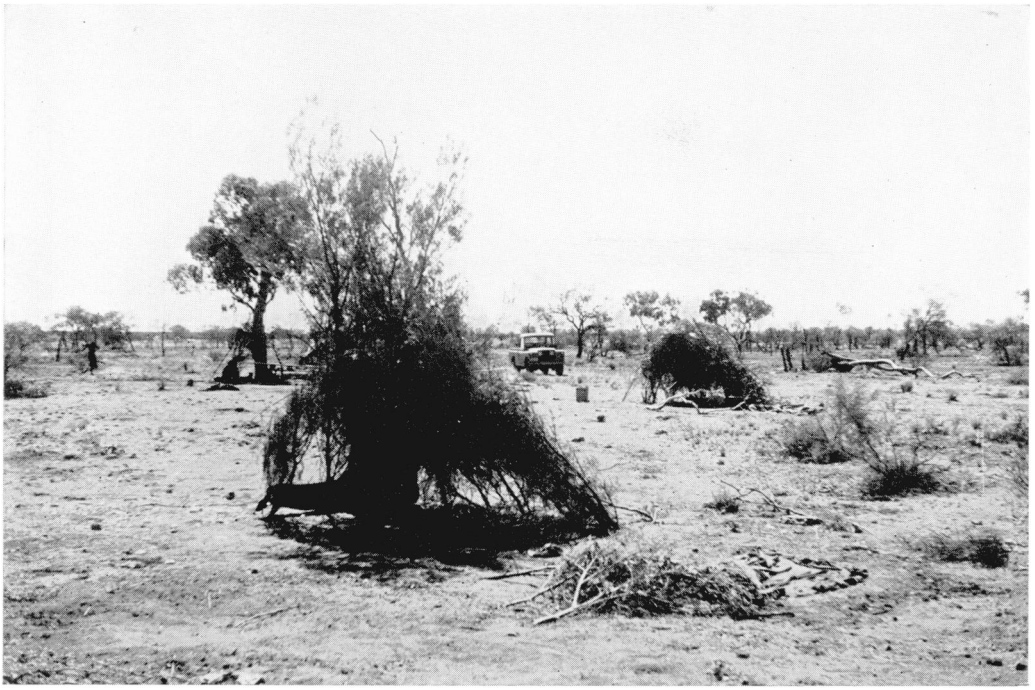


Plate 14 Aboriginal summer camp at Mulyangiri, north of the Warburton Ranges, January 1967

Plate 15 Ngatatjara winter camp near Spring Granite (Kunapurul), the Warburton Ranges, July 1966

Plate 16 Trench 3 (W. Cave) showing profile containing pit outline (Feature 44)

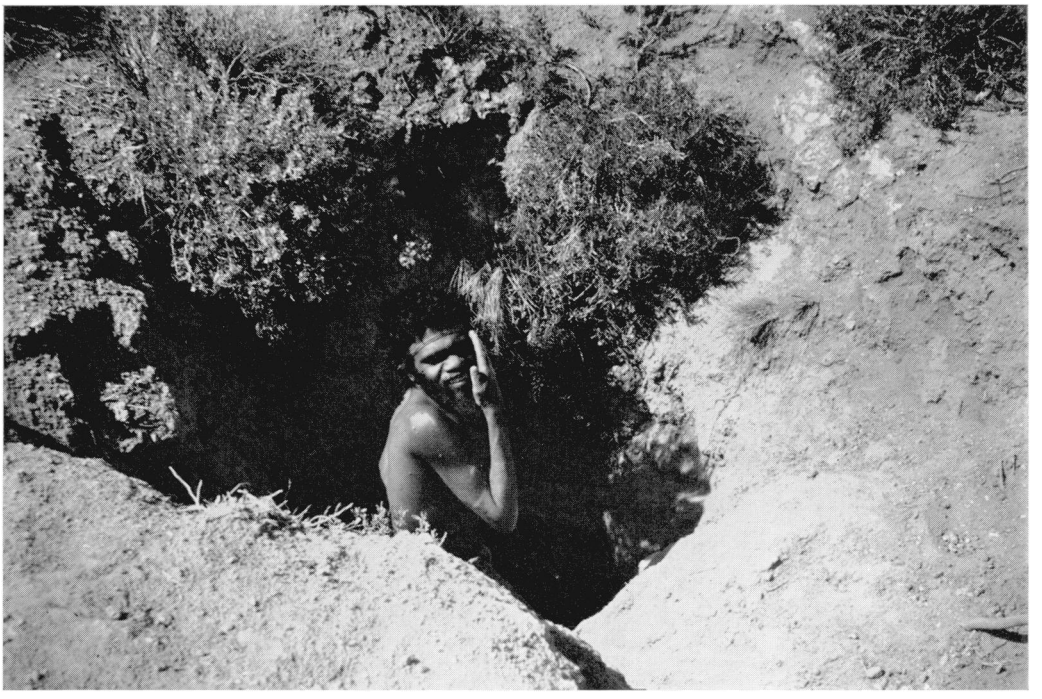


Plate 17 'Native well' at Pulykara, April 1970

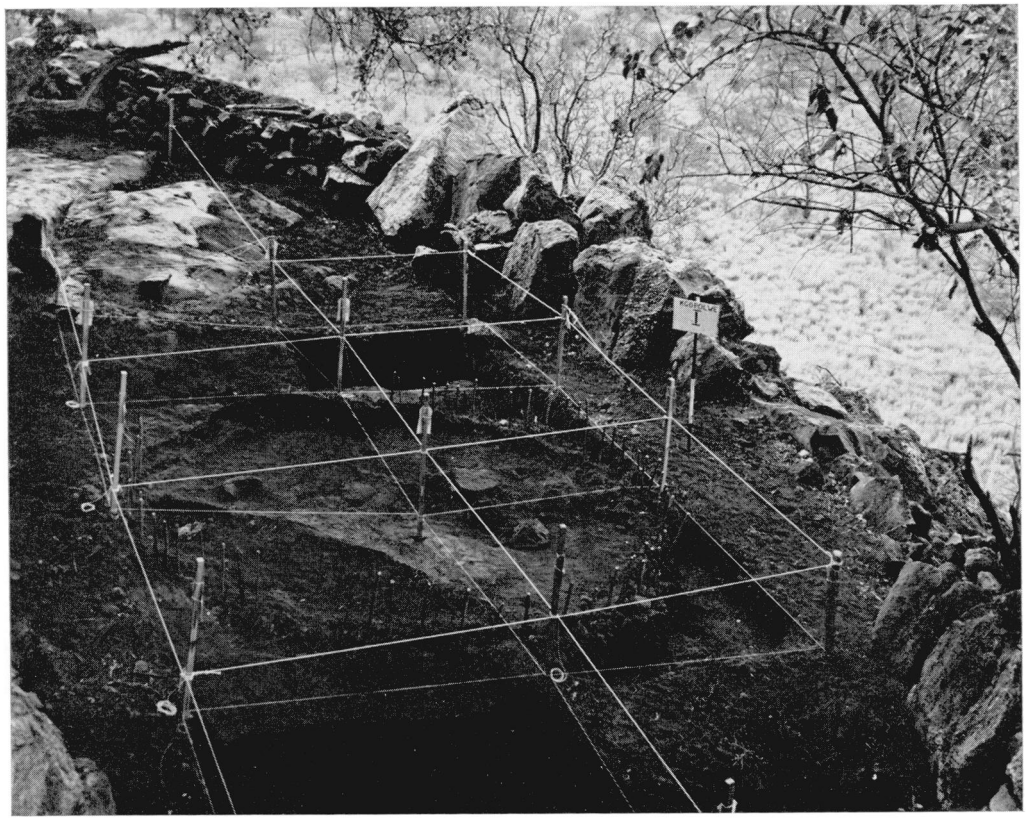


Plate 18 House grid at Kgopolwe I (house outline is marked with small stakes)

Plate 19 **Modern BaPhalaborwa house of traditional style, Makushane reservation**

that, according to accounts by early missionaries, kangaroos and other game were far more abundant there at the time of European contact than is the case today. Indeed, until the late 1930s, when the concentration of Aborigines at Warburton as a result of the Mission's presence became much greater, the mulga (*Acacia aneura*) covered area between the Brown Range and the Warburton Range was a kind of 'oasis' for good hunting in the midst of a vast area of spinifex-covered desert where hunting was and still is extremely poor. As reported in Gould (1969a), hunting among the ethnographic Western Desert Aborigines is considerably less important in the overall subsistence economy than foraging (for plant foods), but the large amounts of butchered bone found at Puntutjarpa suggest that the opposite may have been true at this particular site.

An effort was made to obtain carbonized food-plant remains from the Trench 2 fill by flotation, and the results were successful. Samples of these remains have been packed and labelled and await analysis, but it must be remembered that botanical studies in this region are not well advanced. Thus it may be a while before someone can be found to identify these remains. Until such results are available it will remain hard to assess the relative importance of hunting *vs.* foraging in the total subsistence economy at Puntutjarpa. One indirect line of evidence on this matter exists, however, in the form of hand-held stone seed-grinders (indistinguishable from the ethnographic ones, called *tjungari*) and flat rock grinding-slabs (similar to ethnographic *tjiwa*). Tools of exactly this kind have been observed in use ethnographically to prepare several important plant staples, including *wanguṇu* (*Eragrostis eriopoda* – edible seeds), *kalpaṛi* (*Chenopodium rhadinostachyum* – edible seeds), *kampuṛarpa* (*Solanum sp.* – edible fruit), and *ngaṛu* (*Solanum eremophilum* – edible fruit). A hand-held stone seed-grinder of this kind from a depth of 18–19 in. in Trench 1 is illustrated in fig. 19. Numerous seed-grinders and grinding-slabs occurred in all levels down to the lower rockfall, suggesting that seed-grinding in a manner exactly analagous to that observed ethnographically in the Western Desert has been an important part of subsistence behavior at Puntutjarpa for at least the last 7,000 years and perhaps as much as 10,000 years.

Samples were also taken for fossil pollen analysis, but a preliminary examination of this material by Dr B. Balme, Dept. of Geology, University of Western Australia, gave disappointing results. At this time it appears that little or no fossil pollen material has been preserved in the Puntutjarpa soils.

Continuity *vs.* change at Puntutjarpa: the Australian desert culture

While it would be incorrect to propose that human cultural remains at Puntutjarpa showed no evidence of change for a span of 10,000 years or that they were identical throughout that period to the material and economic aspects of ethnographic Western Desert Aborigines, the fact remains that the Puntutjarpa sequence presents archaeologists and anthropologists with one of the most dramatic and best-documented cases of cultural conservatism in the world. At this stage in the analysis evidence of continuities of culture in the sequence outweighs evidences for change. This was the initial observation proposed in the preliminary report on the 1967 excavations at Puntutjarpa (Gould 1968c:

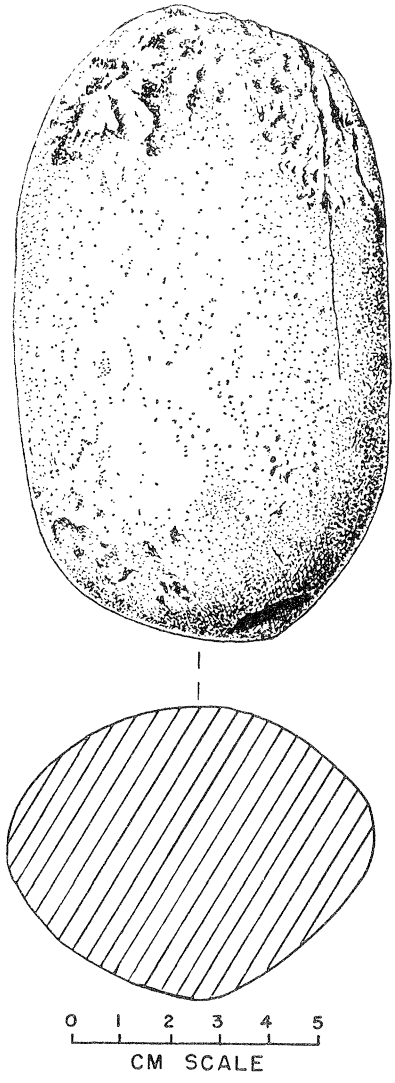


Figure 19 Stone seed-grinder from excavations at Puntutjarpa (1967)

180), and despite modifications of certain other ideas about the site the results of the 1969–70 excavations still point to the same broad conclusion.

There is no question that certain variations in technology, economy, and settlement pattern did occur during the 10,000-year record of human habitation at Puntutjarpa.

1 The introduction and later disappearance of backed blades and flakes, along with the late disappearance of micro-adzes, small end-scrapers, micro-cores, and (probably) 'horsehoof' cores.
2 The abandonment of the rockshelter as a habitation site. Modern Western Desert Aborigines live entirely in open-air camps and generally make only short visits to caves or rockshelters of any kind.

3 On the basis of the faunal evidence there is at least a possibility that for the inhabitants of Puntutjarpa hunting of macropods was of greater importance in the overall subsistence economy than is the case for the present-day Aborigines of the area.
4 It is expected that fluctuations in the amounts of exotic as opposed to local lithic raw materials will be found when the analysis is completed. The presence of exotic stone materials can be regarded as a good indicator of contact with outside areas and other groups, and it will be of interest to see if these fluctuations correlate in any way with the observed changes in technology.

Balanced against this evidence for change, however, there is even more compelling evidence to support the view that Puntutjarpa represents a place which was continuously inhabited or visited by the same culture from at least 10,000 years ago to the present. Each of the changes mentioned above needs to be considered in the light of these continuities:

1 The appearance and/or disappearance of certain stone tool types in the Puntutjarpa sequence (mainly, as it turns out, within the small-tool tradition) can be regarded as minor changes in technology when compared to the long persistence of both hafted and unhafted tool-types such as flake scrapers, horsehoof cores, spokeshaves, microadzes and adzes, and large cores with multiple striking platforms. All of the ethnographic tool types which can be recognized, either by archaeologists or the natives themselves, are historically derived from types which have been present for at least 10,000 years at Puntutjarpa. The ethnographic Western Desert Aborigine toolkit embodies both the core and flake-tool tradition and the small-tool tradition – the latter is traceable continuously back to the earliest occupation of the site while the former shows clear resemblances to the earliest human occupation so far discovered in Australia (around 26,000 years ago).
2 In considering the fact that the inhabitants of Puntutjarpa were cave-dwellers, one must also be aware that there are very few habitable caves in the Australian desert. In terms of the present-day Aborigines' needs for food, water, shade and other advantages like protection from the prevailing winds and a clear view of the surrounding country Puntutjarpa provided an ideal set of conditions not easily matched anywhere in this region. Out of the 122 sites surveyed in the course of this study only three were rockshelters with habitational fill (one of these was Puntutjarpa, while the other two were in the same geological formation further to the east). In the area visited during this study no caves were found where the present-day Aborigines could live, mainly because they lie too far from dependable sources of water. In short, it is easier to regard Puntutjarpa as a place which, owing to the presence of good water and other advantages close at hand, was exceptionally attractive to people whose hunting and foraging way of life was not much different from that of the modern Aborigines. After about 3,800 years ago, with the failure of the native well there, Puntutjarpa was probably visited less regularly and less often (perhaps only when there was water in the creek or claypans nearby) – much in the way it is visited today for occasional foraging, hunting and sacred purposes. The presence of three recognizable living-surfaces within the excavated portions of the cave, all three of which closely resemble modern

Aborigine campsites, further suggests that cave-living in this case does not imply a sharp departure from the settlement patterns generally observed today.

3 The modern Aborigines rate all meat (*kuka*) above vegetable foods and non-fleshy foods (*mirka*) and actively engage in hunting whenever possible. Their predominantly vegetable diet is due to a general shortage of large game in most parts of the desert. The Warburton area, however, was evidently richer in game than the surrounding country and would naturally have attracted settlement whenever possible. The usually large amounts of butchered kangaroo and other macropod bones in the excavations suggest a greater degree of localized success in hunting by people who generally had to depend more on foraging for plant foods in the same manner as the ethnographic Aborigines.

4 Aspects of ethnographic trade and transport of lithic materials by Western Desert Aborigines have been described in Gould 1968a: 107. Long-distance exchange networks also exist throughout the desert for sacred objects. Of special interest is the bifacially-worked Kimberley point reported in use as a circumcision knife at the Warburton Ranges in 1935 (Tindale 1965: 155). This piece must have travelled at least 500 miles from is place of manufacture, and similar items have been reported among the Walbiri, another desert-living group (Meggitt 1955: 400). Thus social mechanisms exist among the modern desert Aborigines to account for the presence of exotic lithic materials, and the occurrence of these materials in the excavated portions of Puntutjarpa suggest the possibility that similar mechanisms may have operated in the past as well.

There are no sharp breaks in the Puntutjarpa sequence. There were no interruptions, and no changes occurred which transformed the culture. Even at this early stage in the analysis of material from the site, it is impressive to note the long-term continuities in culture that have existed there from at least 10,000 years ago to the present day Aborigines. Thus it becomes possible to suggest the hypothesis that during all or most of the post-Pleistocene period in this region there has existed a stable hunting and foraging way of life which can be regarded as the Australian desert culture. The model for this pattern exists in the ethnographic present, among the Western Desert Aborigines (i.e. the Ngatatjara and their neighbors). This hypothesis draws freely on a concept first proposed by J. D. Jennings in North America. Jennings (1957) uncovered a culture-sequence at the site of Danger Cave, Utah. The sequence there extended continuously from about 11,000 years ago to the culture of the historic Gosiute and Paiute Indians. The evidence at Danger Cave led Jennings to propose the concept of the desert culture to emphasize the elements of historical continuity and cultural stability from the ancient to the ethnographic hunter-gatherers of the Great Basin region. Although further archaeological work in the Great Basin has led to some important modifications of this idea, it remains as an important synthesizing concept for the prehistory of a large area of North America.

This concept gains general support, too, from evidence gathered in the surface collection and survey of the Western Desert. Out of the material from all of the sites studied only a tiny handful of unusual stone tools cannot easily be fitted in with the assemblage excavated at Puntutjarpa. Thus the Australian desert culture not only appears to show great time-depth, but it covers a large part of the interior of Australia and may extend beyond the limits of this survey. If further stratigraphic excavations in areas like

the central and Simpson Deserts on the one hand and the Great Sandy and Victoria Deserts on the other reveal culture sequences similar to Puntutjarpa it may be possible to propose that the entire arid interior of Australia was a single diffusion-sphere (to borrow an expression by Caldwell 1958: 71) within which a broadly uniform and distinctive foraging way of life developed and then remained as an adaptation to the onset and persistence of the rigorous environmental conditions of the last 10,000 years. Present evidence suggests that in terms of both stability through time and uniformity in space this Australian case even surpasses the original example proposed by Jennings in the Great Basin of North America.

Conclusions

The case of the Western Desert Aborigines and the Puntutjarpa Rockshelter demonstrates that ethnographic knowledge can be brought to bear on at least three levels of archaeological research. First, there is the *practical level*, where, for example, Aborigines were able to direct the archaeologist to useful sites and to describe current or recent uses and background mythology relating to these sites. Assistance of this kind can increase the efficiency and scope of archaeological survey. Second, there is the level of *specific interpretation*. Examples of this are seen in the functional interpretation of excavated micro-adzes and adzes, the examination of the living-surfaces at the site, and the stratigraphic analysis of the pit discovered in the West Cave at Puntutjarpa. In each case the interpretation was directed toward solving a specific archaeological problem within the context of the individual site. Finally, there is the level of *general interpretation*, where broad interpretations of culture history are attempted. These appear as hypotheses of varying completeness and detail, such as the idea here of an Australian desert culture. Like any hypothesis this one can and should be tested and refined by further work. Its main value is in the guidance it affords in planning a strategy for further archaeological research. This final level of interpretation carries the archaeologist as ethnographer beyond the individual site to wider generalizations, but always, it will be noted, by starting with the individual site and extending outward.

This case study demonstrates that ethnography works best for the archaeologist when it is site-oriented. The most reliable interpretations are those in which a direct historical connection can be drawn archaeologically between the particular ethnographic and prehistoric cultures concerned. In sequences where the direct historical connection is broken or interrupted, however, site-oriented ethnographic data can be useful in furnishing alternative possibilities for the interpretation of excavated features and artefacts. By combining archaeology and ethnology into a single holistic site-oriented approach one can avoid the temptation to draw improbable analogies or make premature assumptions about prehistoric human behavior. In this way ethnographic knowledge may serve as a guide to the archaeologist instead of a trap.

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Abstract

Gould, R. A.

The archaeologist as ethnographer: a case from the Western Desert of Australia

Recent excavations at Puntutjarpa Rockshelter, in the Western Desert of Australia, reveal a continuous human occupation of this site from 10,000 years ago to the present. Preliminary analysis has stressed systematic comparisons of modern desert Aborigine stone tools, camp-sites, 'native wells', etc., with specific archaeological features and lithic materials discovered in the excavations. Changes, mainly in the stone toolkit, are evident. These, however, are outweighed by evidence for cultural continuities pointing to a relatively stable adaptation to rigorous post-Pleistocene conditions in the Western Desert which has continued to the present-day (the Ngatatjara Aborigines and their desert-living kin). This long-term hunting and foraging pattern is referred to here as 'the Australian desert culture'. The formulation of this hypothesis points to specific ways the ethno-archaeologist, as a site-oriented ethnographer, can achieve useful interpretations of prehistoric human behavior.