THE PREHISTORY OF ABORIGINAL LANDUSE ON THE UPPER FLINDERS RIVER, NORTH QUEENSLAND HIGHLANDS

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INTRODUCTION

A general theme in Australian prehistory is the development of the distinctive social, economic and technological systems observed in recent Aboriginal societies. Research has demonstrated significant change in the Australian archaeological sequence and general trends of such are shared by numerous regions. Most that have been investigated indicate low density occupation during the Pleistocene and early Holocene with significant increases in site numbers, increased artefact discard rates and dissemination of new technologies and artefact types in mid-to-late Holocene times (e.g. Lourandos 1985). On the other hand, each region has a unique prehistory, range of material evidence and research potential. Our knowledge of Holocene developments in Aboriginal subsistence systems, for instance, is largely based upon the history of cycad exploitation in the Central Queensland Highlands (Beaton 1982), the appearance of seed grindstones in arid and semi-arid zones (Smith 1986) and evidence for increased emphasis on small-bodied animals in N.E. New South Wales and S.E. Queensland (McBryde 1977:233; Morwood 1987:347).

The North Queensland Highlands have their own unique contribution to make concerning of Aboriginal Holocene adaptation. Partly this derives from location; the region is a largely unknown, lying in an intermediate position between S.E. Cape York Peninsula (Rosenfeld et al 1981), the Central Queensland Highlands (Morwood 1981, 1984a), the Gulf country of N.W. Queensland (Hiscock 1984) and the Townsville area (e.g. Brayshaw 1977; Campbell 1982). The region also constitutes the headwaters of rivers draining into the Gulf of Carpentaria and inland south-west to Lake Eyre. Since a possible route for Aboriginal colonisation of the interior of the continent was to follow the Gulf rivers to their source, cross the watershed, then proceed down the inland river system, the highlands potentially hold evidence for early occupation of Australia.

This paper begins with a brief description of the region and its ethnohistory, then presents the results of excavations and surveys on the upper Flinders River. Mid-way through the project, it became clear that the terrain unit mapping and resource assessment carried out in association with the archaeological work provided a crucial structural component for the interpretation of the cultural sequence. At this point, the focus of the research changed from the investigation of site-specific sequences to a more direct concern with Aboriginal use of areas, how patterns of resource use may have changed over time, and the strategies required to collect evidence for answering these questions. It is in this context, that the geographical and chronological distribution of seed grindstones was found to provide evidence for developments in local Aboriginal landuse and economic intensity. On a more general note, the paper concludes that some of the theoretical issues current in Australian archaeology cannot be resolved without different approaches to data aquisition.

THE STUDY AREA

The North Queensland Highlands area, which extends from Hughenden to Laura in S.E. Cape York Peninsula (Figure 1), is a major watershed with rivers radiating eastward to the coast (the Burdekin), south to the Cooper Creek system (the Thomson) and north-west into the Gulf of Carpentaria (e.g. the Flinders, Norman, and Gilbert rivers). The area is drier, more elevated and more lightly timbered than Cape York Peninsula immediately to the north. It is bounded by tropical rainforests to the east, the Mitchell Grass Downs to the west, and the brigalow belt and Desert Uplands to the south (Stanton and Morgan 1977).

The research described here focussed on the upper Flinders River which is located 350km west of Townsville and immediately north of Hughenden. The basal geology of the upper Flinders area comprises an uplifted block of Mesozoic sandstones which has subsequently been heavily dissected then capped in some areas with Tertiary basalt flows (Coventry et al 1985; Vine and Paine 1974:29).

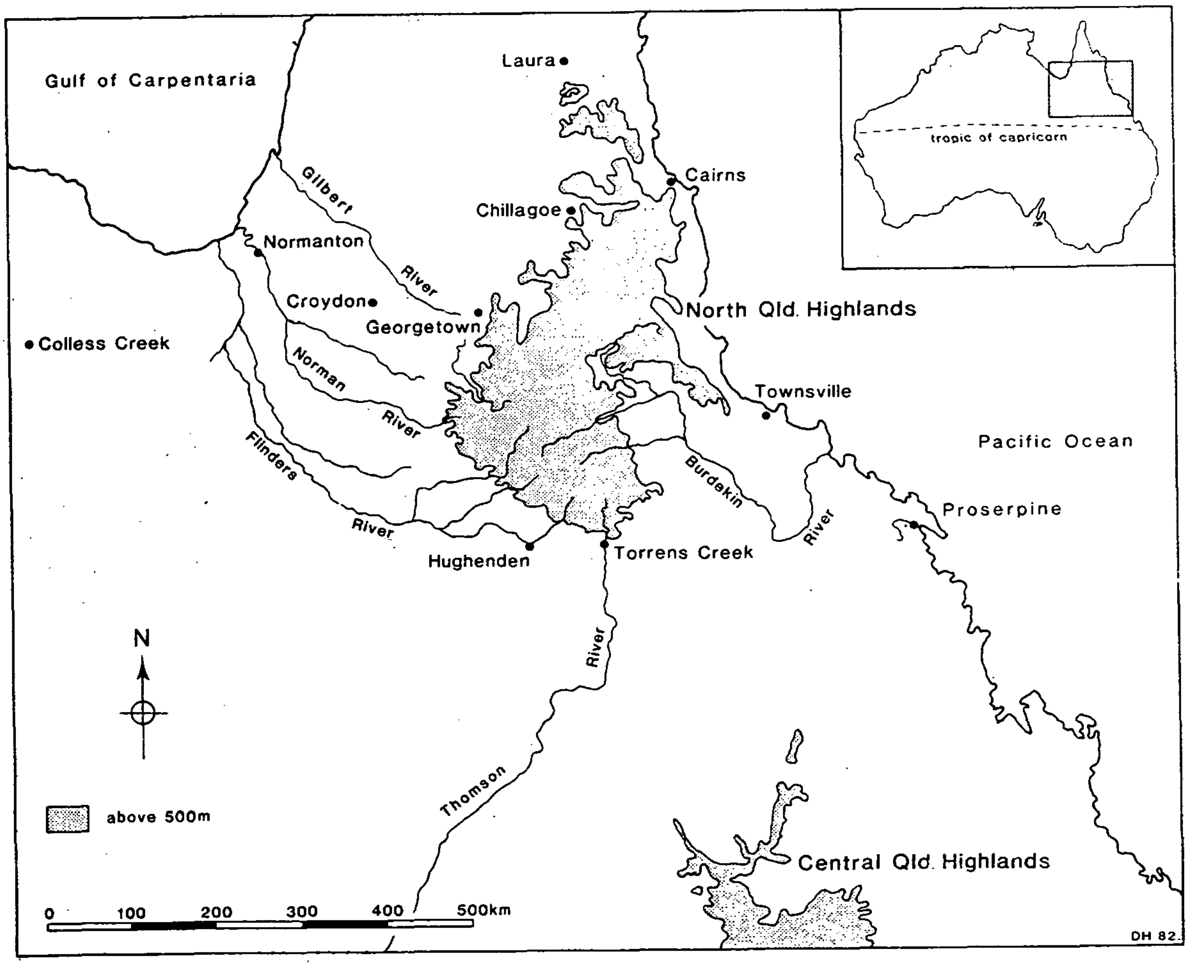

Figure 1. General Location Map of North Queensland Highlands.

ETHNOHISTORICAL BACKGROUND

Although there is ethnographic information available on the distribution of Aboriginal groups, their social organisation and material culture, much of it is too general to be of use in formulating specific archaeological questions. On the evidence of Palmer (1884: 277), Tindale (1974) ascribes the upper Flinders and Thomson Rivers to the Jirandali tribe (or Yerrunthully). However, Bennett (1927:401) states that the Dalleburra occupied the Towerhill Creek area of the upper Thompson, while the Quippenburra occupied the upper Flinders River. Since the Towerhill and upper Flinders languages were said to much resemble each other (Curr 1886:460), these latter names probably refer to local groups of the Jirandali, a linguistically defined "tribe". This interpretation is supported by a map drawn by Christison included in a letter to A.W. Howitt showing the location of a number of "tribes" in the upper Thomson-Flinders region.

The lack of detailed ethnographic information reflects the nature and timing of the European contact period, which began with the expeditions of Frederick Walker in 1861 and William Landsborough in 1862 (Favenec 1967). Both parties passed rapidly through the area but were closely followed by pastoralists. Extensive tracts were first occupied by Europeans with the taking up of huge pastoral leases such as Hughenden and Lammermoor Stations from 1863 (Gray 1913; L. Gray 1965). In most cases local Aboriginal groups were "kept out" of these runs and were only allowed to "come in" after a lengthy time period.

In 1868 the first of a number of goldrushes occurred on the Gilbert River (Wegner 1978:153). This led to a further influx of Europeans and increased pressure on local Aborigines. Violence ensued and Gray (1913: 78) estimated that 10 to 15 per cent of the European population were killed by Aborigines during the '60s. Lonely "bush" graves provide material evidence for this violent period, while there is still local knowledge concerning sites where Aborigines were massacred. In 1870, as a result of petitioning by local land-holders, a detachment of Queensland Native Police arrived in the upper Flinders area and set up headquarters at Hughenden. They were employed to "disperse" troublesome Aborigines (e.g. Gray 1913:198).

Of particular note is an incident related by Bob Pearce, an elderly Hughenden resident, who was told the details by actual participants when he was younger. In response to the killing of a mailman on the present-day Hann Highway, and the spearing of horses from Mt. Emu Station on "the Island" between Porcupine and Prairie Gorges, the Queensland Native Police and local settlers surprised and trapped an Aboriginal group on a spur overlooking the precipitous east side of Prairie Gorge. The Aborigines had the choice of jumping to their deaths or being shot. All were shot. This event is reported to have involved Sub-Inspector Coward, who led the Hughenden detachment of the Native Police between late October 1873 and April 1874 (Gray 1913:198). Another incident involved the Native Police rounding up Aborigines in the Lolworth area on the Flinders-Burdekin watershed and shooting all males over the age of 16 years (Bob Pearce: pers. comm.). These events took place at a particularly violent time in the region, between 1869 and 1874, when many instances were reported of stock-spearing by local Aborigines followed by Native Police "dispersals" (Walsh 1985:67-72). By 1874, traditional life in the area appears to have collapsed and local Aborigines began to occupy fringe-camps around stations (Gray 1913:196).

Displacement, violence, introduced diseases, opium and alcohol, all led to a rapid decline in Aboriginal population culminating in the forcible removal of survivors to reserves, such as Woorabinda (Koepping 1976:34-35), under the Aborigines Protection and Restriction of the Sale of Opium Act of 1897.

In these circumstances, the bulk of good ethnographic information for this part of Queensland has come from one or two exceptional individuals such as Christison of Lammermoor Station who had an unusually humane attitude towards local Aborigines for his time (Bennett 1927, 1928). Other snippets of information are available in the journals of settlers (e.g. Gray 1913; L. Gray 1965), the accounts of travellers (eg. Baden-Powell 1892:115-8), and salvage ethnographies, such as those by Howitt (1904), Palmer (1887) and Curr (1886).

PREVIOUS ARCHAEOLOGICAL WORK

The prehistory of the North Queensland Highlands is little known. The work of Brayshaw (1977), Campbell (1982) and Mardaga-Campbell and Campbell (1985) in granite rockshelters west of Townsville provides the closest comparable data on regional prehistory, while excavations by Campbell (1982), Mardaga-Campbell (1986) and David (1990) in the Chillagoe limestones have established the minimum time-depth of Aboriginal occupation of the general region - 19,000 b.p. for Walkunder Arch and 29,000 years b.p. at Fern Cave. Such work has also shown that the Townsville and Chillagoe regions have distinctive rock art traditions (Brayshaw 1977; David and David 1988) which quite unlike the stencil art predominant at rock art sites on the upper Flinders, Thomson, Gilbert and Norman Rivers, which is more akin to the Central Queensland Highlands art (Morwood 1984a).

Reports by Chisholm (1901, 1903, 1907, 1910, 1912), Gray (1913:114), Wilkins (1928), and Davidson (1936) on Aboriginal rock art sites on the upper Flinders and Thomson Rivers, have long indicated that the region had a high density of archaeological sites. However, no systematic work had previously been undertaken in the extensive, basalt-capped sandstones which form the southern section of the Highlands.

The present project was the first to carry out archaeological survey and excavation on the upper Flinders River (see Morwood and Godwin 1982), although such work has more recently been undertaken as part of environmental impact assessement for developments and Government Departments (e.g. Morwood 1984b; Walsh 1988). The project began in 1980 with a wide-ranging reconnaissance and recording project between Torrens Creek and Richmond in the south, and Georgetown and Croydon in the north. Later work focussed on two areas on the upper Flinders River where sites with good excavation prospects associated with a range of other evidence were identified. These areas comprised Mickey Springs and the Prairie-Porcupine Creek system.

MICKEY SPRINGS

Mickey Springs is about 400m downstream from the head of Mickey Gorge, itself a tributary to the main Flinders River channel 67km northeast of Hughenden (Figure 1). The gorge is shallowly incised at the northern end where sandstone scarps of variable height are fronted by talus slopes down to the creek bed. Basalts do not cap the plateau in the immediate vicinity of Mickey Gorge which is of lateritic sandstone with thin sandy soils. Most of the sandstones in the area are coarse-grained and friable, although scarps of fine-grained sandstone occur below the springs on the eastern side. Vegetation comprises a scrub in which ironbark and acacias predominate, although stands of Melaleuca occur at the springs and 300m north of the gorge in Mickey Swamp. The local sandstones contain conglomerate layers from which quartz pebbles are readily available for stone artefact manufacture.

The springs represent the only permanent water for a considerable distance, although a rock hole at the head of the gorge as well as Mickey and Carbine Swamps contain water on a seasonal basis. The survey of the gorge yielded 14 rockshelters in the sandstone scarps with evidence of Aboriginal use, an axe grinding site in the creek bed and a basalt grindstone stored on a sandstone ledge. Burials are also reported to have been once present in the area, but all surface evidence for such has been removed. Rockshelters in the immediate vicinity of the springs contain rock art assemblages of abraded engravings, pecked engravings and stencils. Most also contain occupational evidence comprising flaked stone artefacts, grindstones and charcoal rich deposits. Significantly, all of the recorded archaeological sites are within 400m of the springs. Although numerous rockshelters occur further down the gorge, no evidence for Aboriginal use was found, suggesting that Aboriginal sites in the gorge are effectively tethered to the permanent water source.

The excavation programme at Mickey Springs concentrated on Site 34 which contained a large and varied rock art assemblage, cached material, and occupation deposits which appeared to be both rich and deep. Since some of the trends identified in the depositional, technological and artistic sequences at Site 34 could have been site-specific, confirmation was also sought from small soundings undertaken at Sites 31, 33 and 38. Results from these excavations are summarised below.

Mickey Springs 34

This site is a rockshelter, 12m deep, 8.5m wide and 3.7m high, which is located on the western side of Mickey Gorge, 250m north of the springs (Figures 2 & 3). The site has an extensive rock art assemblage dominated by a series of vertical abraded lines. In some sections these disappear beneath the present floor level. Other motifs include abraded bird and macropod tracks, and pits. Pecked engravings of tracks, arcs, circles and line series occur only on case-hardened sections of the shelter wall and appear to be the oldest surviving rock art at the site.

Twelve hand stencils (including those of a young child) were also recorded, although the faintness of some examples suggests that this is a minimum count. The surface deposits are rich in charcoal and flaked stone artefacts, while two sandstone mullers had been placed against the wall, presumably for later re-use. During the excavation, a cache was found hidden in a crevice towards the rear of the shelter. It yielded a small boomerang, two quartz pebbles, a little red flying fox phalange (Pteropus scapulatus), a possum mandible (Trichosurus vulpecula), and fragments of macropod longbone, rib and vertebrae.

The Excavation

All excavations undertaken as part of this project followed procedures outlined by Johnson (1979:148-52). At Mickey Springs 34 the excavation area was divided into 50cm x 50cm squares labelled a, b, c, or d, moving anti-clockwise from the S.E. corner of designated 1m x 1m squares. Deposits from each were removed in 3-5cm (average) excavation units (spits) with five spot levels being taken at the start and end of each. Depth measurements (z) were taken in relation to an elevation datum using water levels. Most spits were arbitrarily defined, but stratigraphic interfaces were also taken into account. The S.E. corner of each square served as the 0.0 reference point for horizontal (x and y) co-ordinates of recovered artefacts. After being weighed, all excavated deposits were dry-sieved outside the site through 3mm, 5mm and 7mm nested sieves. The different sieve fractions were then weighed separately and bagged for wet-sieving in the field or later in the laboratory. Bulk samples of deposits were taken from the baulks at the end of the excavation.

In September 1980 a 50cm x 100cm sounding was made in the rear section (Square G9) to a depth of 75cm (Figure 2). Charcoal from the lowermost deposits yielded an early Holocene date and it was anticipated that deeper deposits would contain occupation of late Pleistocene age. In July 1984 further excavations were undertaken in two areas near the front of the shelter. These were positioned to sample different activity areas, to investigate deeper sections of the deposits, and to obtain minimum ages for some of the rock engravings which appeared to continue below ground level.

The major excavation comprising two square metres (C11a-d, D11a-d) was located against the shelter wall on the south side where deposits reached a maximum depth of 160 cm. Another 100cm x 50cm sounding was located in the mid-section of the entrance (G11b, G11c) where deposits reached a depth of 143cm, and the original sounding at the rear of the shelter was continued to bedrock at a maximum depth of 120cm. The stratigraphy in the three excavated areas was as follows:

<u>Front Excavation Squares C/D11 and G11 (Figure 4)</u>

Layer 1 - loose, disturbed sand containing much recent vegetable matter and animal dung. Colour 10YR 4/3.

Layer 2 - coarse-grained, more compact sand. High in charcoal content and of lumpy appearance. Colour 7.5YR 7/4. pH = 5.

Layer 3 - distinguished by a very high organic/charcoal content. Colour 7.5YR 4/2. pH = 4.5.

Layer 3a - comprises a lense of yellowish sediment which is high in ash content. Colour 10YR 5/3.

Layer 4 - A fine-grained sediment. Colour 7.5YR 5/2.

Layer 5 - Compact and more granular in texture than overlying material. Contains a high proportion of rockfall and a low artefact density. Colour 7.5YR 6/4. pH = 4.5.

Layer 6 - A very granular deposit. Colour changes with depth from light brown at the top to pinkish grey at bottom. Colour 7.5YR 7/4.

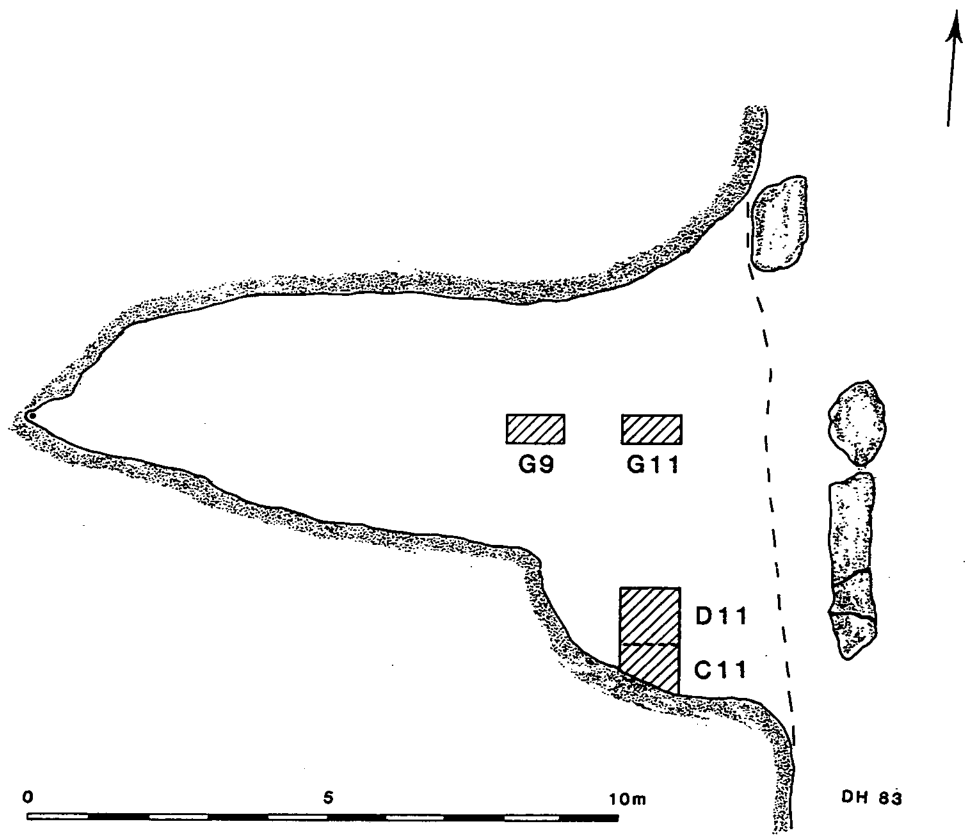

Figure 2. Plan of Mickey Springs 34 showing excavation areas.

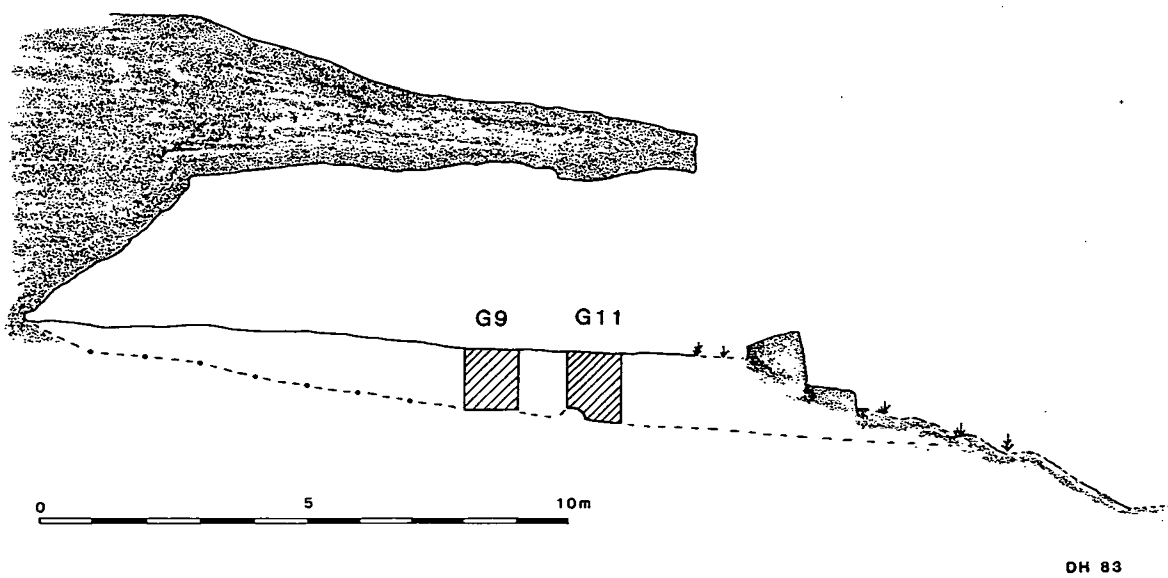

Figure 3. Cross-section of Mickey Springs 34.

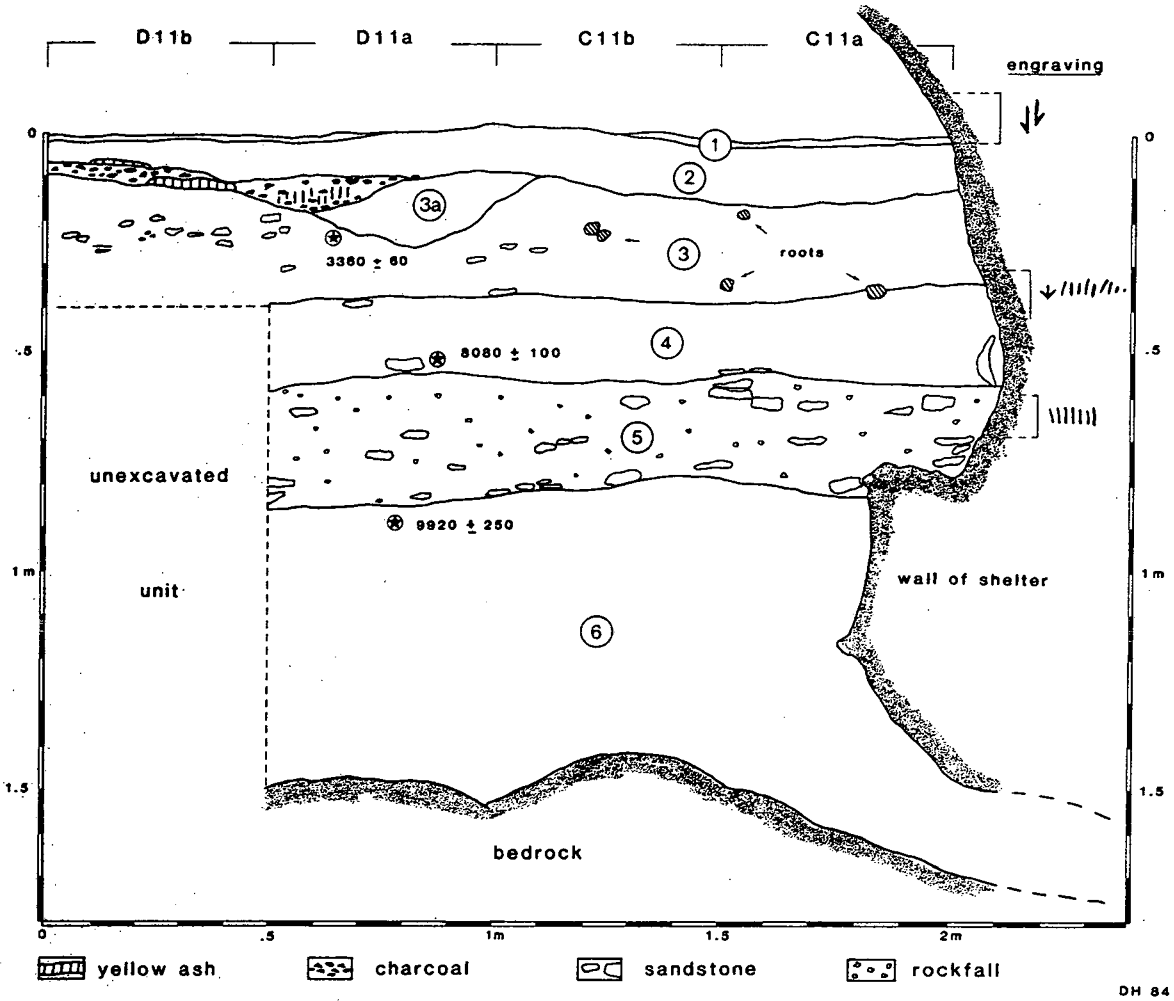

Figure 4. Mickey Springs 34: Stratigraphic cross-section of Excavation Area C/D11, east side. Note position of pecked engravings.

Rear Excavation Squares G9 (Figure 5).

Layer 1 - loose, disturbed sand.

Layer 2 - Powdery, sand rich in charcoal including definite lenses. Colour 10YR 4/2. pH = 7.

Layer 3 - a complex series of hearths, rake-outs and ash lenses. Colour variable. pH = 7.5.

Layer 4 - coarse, brown sand with large lumps of charcoal giving a lumpy appearance. pH = 7.

Layer 5 - coarse to fine pink/orange sand. Charcoal and stone artefacts only occur in the uppermost 15 cm of this layer. The remainder is culturally sterile and merges into sand derived from weathered bedrock. Colour ranges from 10YR 6/3 at the top to 10YR 7/4 at the bottom. pH = 7.

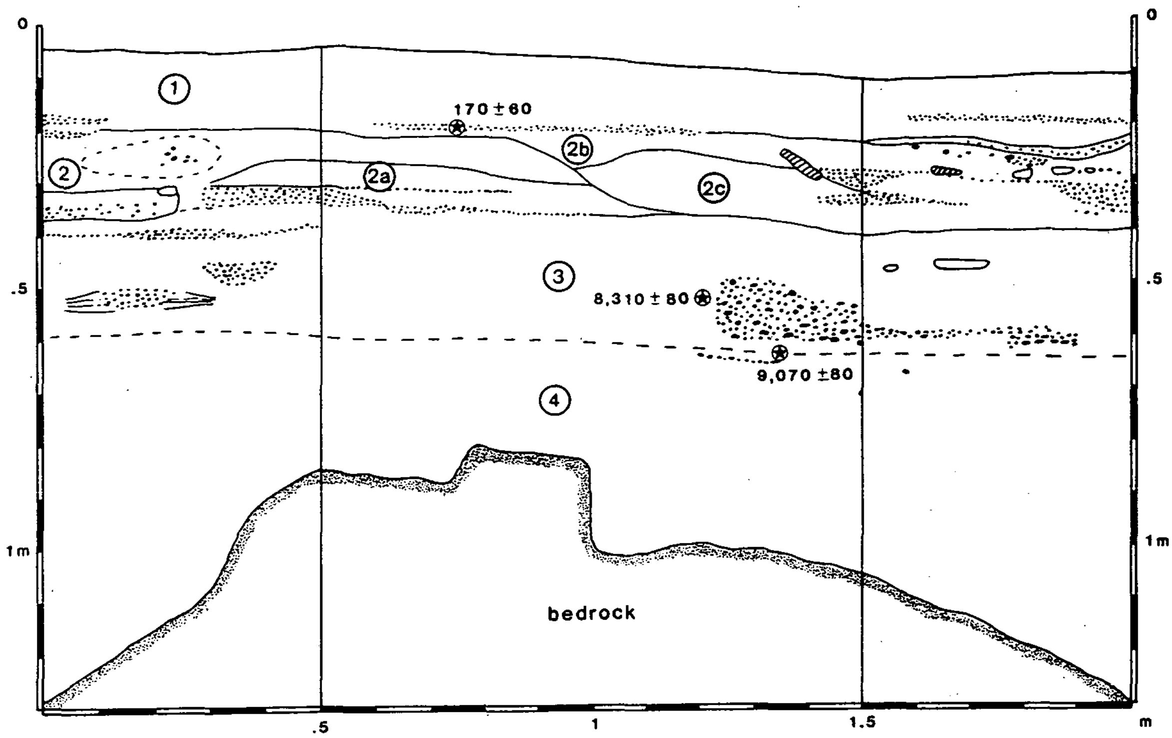

Figure 5. Mickey Springs 34: Stratigraphic cross-section of Excavation Area G9.

Stratigraphic divisions corresponded to major differences in charcoal, bone and artefact densities which reflect both cultural and taphonomic processes (Figure 6). For instance, the nature and distribution of hearths changes markedly throughout the sequence and correlates with stratigraphic change. Below 30-35cm, all hearths were isolated charcoal lenses averaging 20cm to 30cm in diameter, while above this a significant increase in the number, range and complexity of hearth structures is one of the distinguishing features of Layer 2. The change is most clearly seen in in the stratigraphic cross-section for Square G9, where well-preserved hearths were found throughout the sequence (Figure 5).

Dating

Six charcoal samples from Mickey Springs 34 were submitted for C14 dates. The results are:

170∓60 b.p. (Beta 7454) from a hearth in Layer 1 (Spit 5, G9c). This sample was submitted to assess the likely date for the most recent traditional occupation of the site. Depth = 10.5-14.5cm.

3,360∓60 b.p. (Beta 11734) for Layer 3 (Spit 6, D11a). This dates the appearance of backed blades and adze slugs in the sequence. Depth = 23-25cm.

8,080∓100 b.p. (SUA 2252) from the top of Layer 4 (Spit 15 D11d). Depth = 48-52cm.

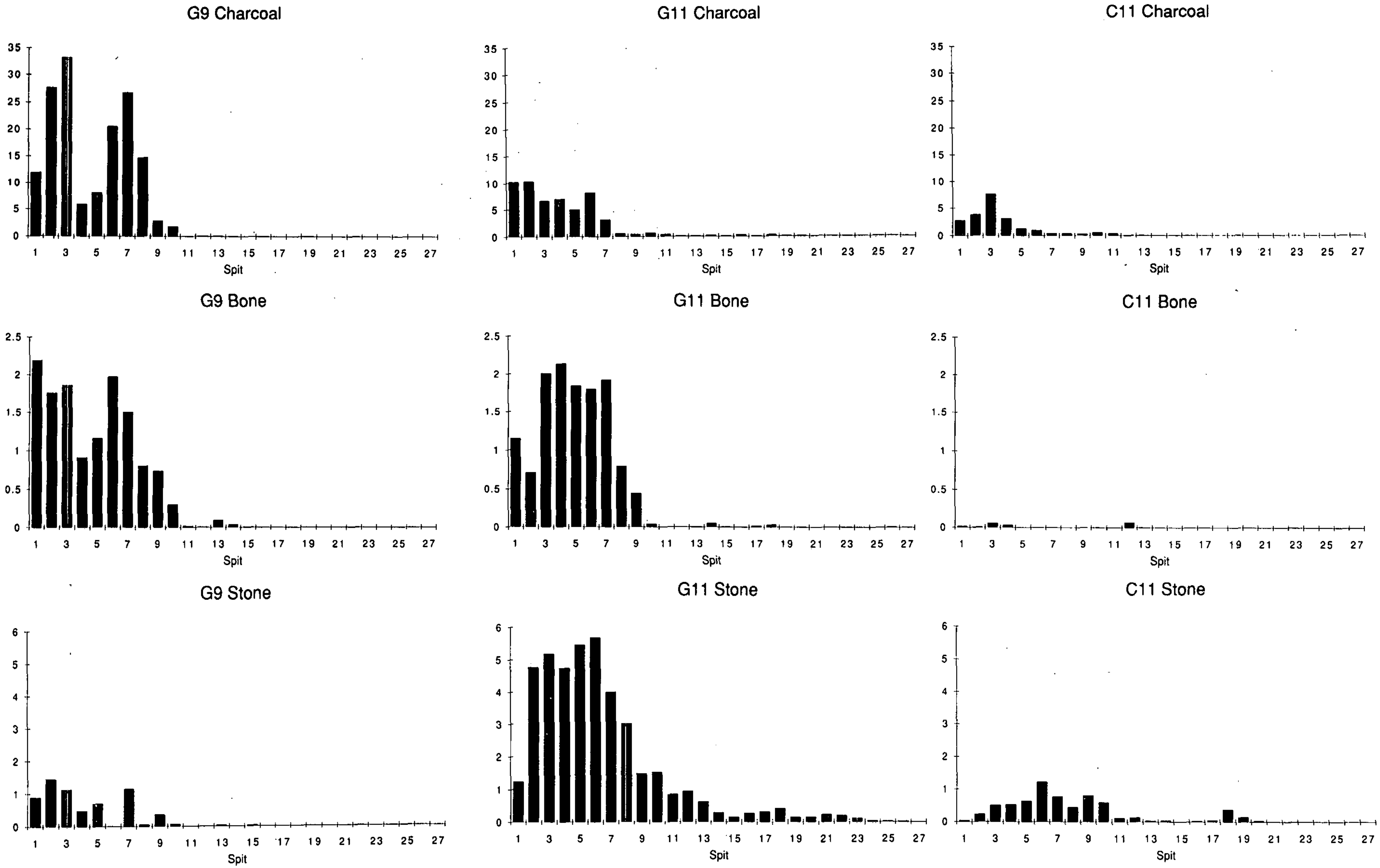

Figure 6. Mickey Springs 34: Histograms summarising vertical distribution of charcoal, bone and stone artefact densities in C11, G11 and G9. (Charcoal and bone in g/kg deposit; artefacts in number/kg of deposit.

8,310∓80 b.p. (Beta 4225) from the base of Layer 3 (Spit 7, G9b). This was from the bottom of the 1980 sounding. Depth = 40-50cm.

9,070∓80 b.p. (Beta 7453) from Layer 4a (Spit 9, G9b). This dates the lowermost cultural material in the rear section of the site. Depth = 55-58cm.

9,920∓250 b.p. (SUA 2248) for a small hearth in Layer 6, (Sample 10, Spit 24, D11d). This appears to be the earliest evidence for occupation of the site, as beneath this level the deposits were culturally sterile. The hearth lies immediately beneath Layer 5 which has a high rock fall component, appears to have accumulated rapidly, and seals in the lower-most engravings found on the exposed wall. Depth = 84-92cm.

There is a close fit between the stratigraphies revealed in the front two excavation areas, G11 and C/D11, and a general similarity between these and the sequence in Area G9. In addition, the two radio-carbon dates from the rear excavation are compatible with the age-depth trend evident in C/D11, while chronological markers in the cultural sequence in all three excavated areas occur at similar depths. For these reasons, the general age-graph curve seems applicable to all areas of the site (Figure 7). Extrapolation of this graph suggests that the deepest evidence for occupation (at 120cm) in both C/D11 and G11 may date to ca. 10,700 b.p.

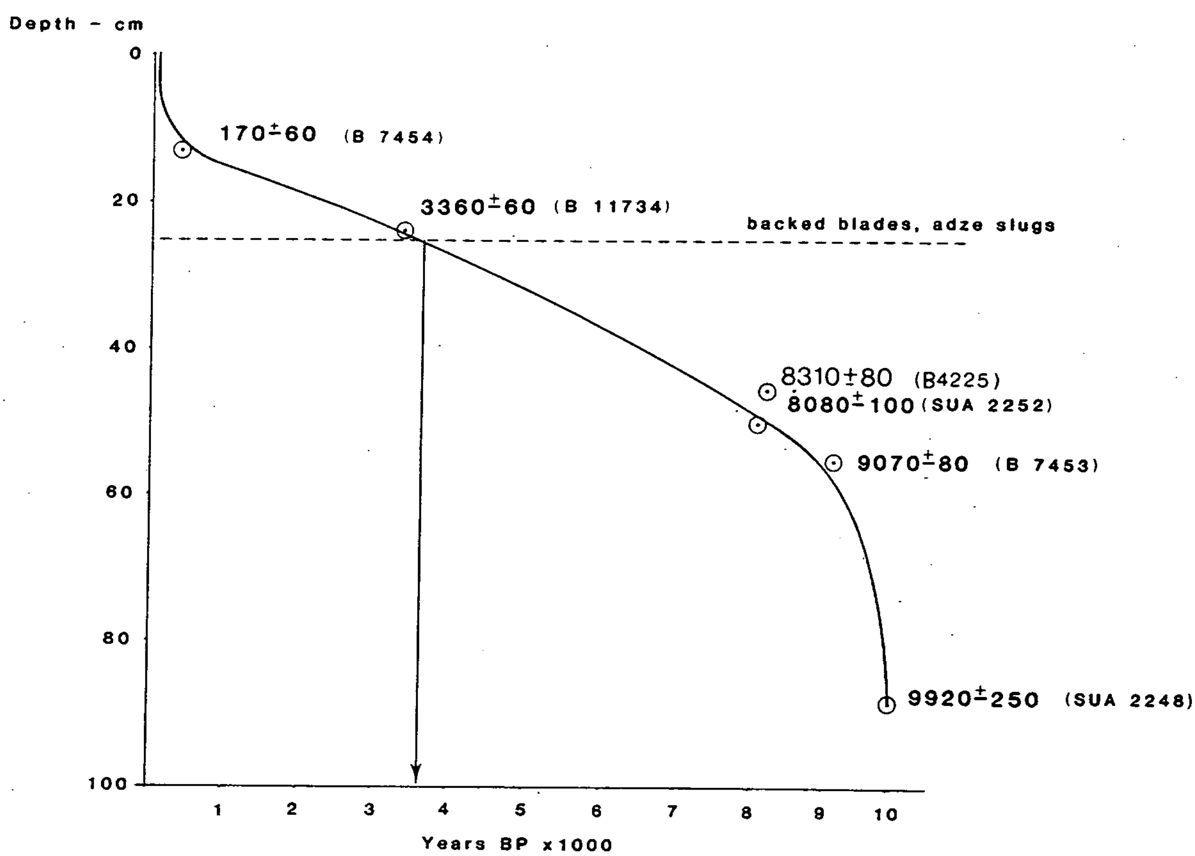

Figure 7. The Age-depth Curve based on six radiocarbon dates from Mickey Springs 34.

The calculated stone artefact discard rate differs between excavated areas of the site. Partly, this relates to intra-site differences in the accumulation of deposits. For instance, in Area C/D11, Layer 5 corresponds to an occupational hiatus, but this rockfall layer only just intrudes into a section of Area G11 in the middle of the site (G11). Differences in artefact discard rate between areas, especially in the uppermost deposits, may also reflect the establishment of more formalised patterns of site use and cleaning behaviour as occupation became more systematic and intensive. Even so, all artefact discard rates have features in common, most notably in the low density and sporadic occupation evident up until ca. 8000 b.p., after which artefactual deposition became more consistent. In contrast, the rate of sediment accumulation associated with the earlier, low density occupation, was rapid. This was an unexpected result given the positive relationship between occupational intensity and sediment build-up in many other rock shelters (c.f. Hughes and Lampert 1982:16).

Art Evidence

Fragments of ochre with ground areas, suggesting their use for pigment manufacture, were found throughout the occupational sequence. Painting has been a feature of Aboriginal site use since the site was first occupied, although not necessarily rock painting. In addition, an assemblage of pecked engravings was exposed on the shelter wall during excavation of Squares C11a and C11b. The lowermost engravings, comprising a series of seven vertical lines, were located 15cm above sediments dated at 9920 b.p. and below those dated 8080 b.p. These were sealed in by a rockfall layer and are likely to be associated with initial occupation of the site. The buried engravings also included another vertical line series and a bird track. Similar deeply-weathered pecked engravings occur on the case-hardened wall at floor level and these include paired macropod tracks, bird tracks, pits and circles (Figure 8).

Faunal Remains

Deposits near the front of the cave against the walls are acidic and are exposed to periodic wetting. As a result very little bone was recovered from excavation areas C/D11 and what was recovered tended to be very weathered and largely unidentifiable. In contrast, deposits in Squares G9 and G11 are relatively protected and well-preserved bone occurred throughout most of the sequence.

Animal representation in area G9 is summarised in Table 1. Large and medium sized macropods appear to have been the economic staple, although small-bodied species were also taken (Isoodon macrourus, Trichosurus vulpecula). Some of the faunal material (especially rodents) is likely to have been naturally deposited on site, however the presence of cut-marks and extensive charring of macropod bones suggests that these were predominant components in the Aboriginal diet. Macropus rufus would not normally be found in Mickey Gorge and its presence in the site is further evidence for the human emphasis on macropods. In the deposits predating occupation (i.e. below 55 cm in G9), the range of species represented decreases abruptly (most notable is the absence of aboreal animals). The fact that the remains of rodents and other small animals occur in the lowermost deposit indicates that this change is not just a reflection of decay processes.

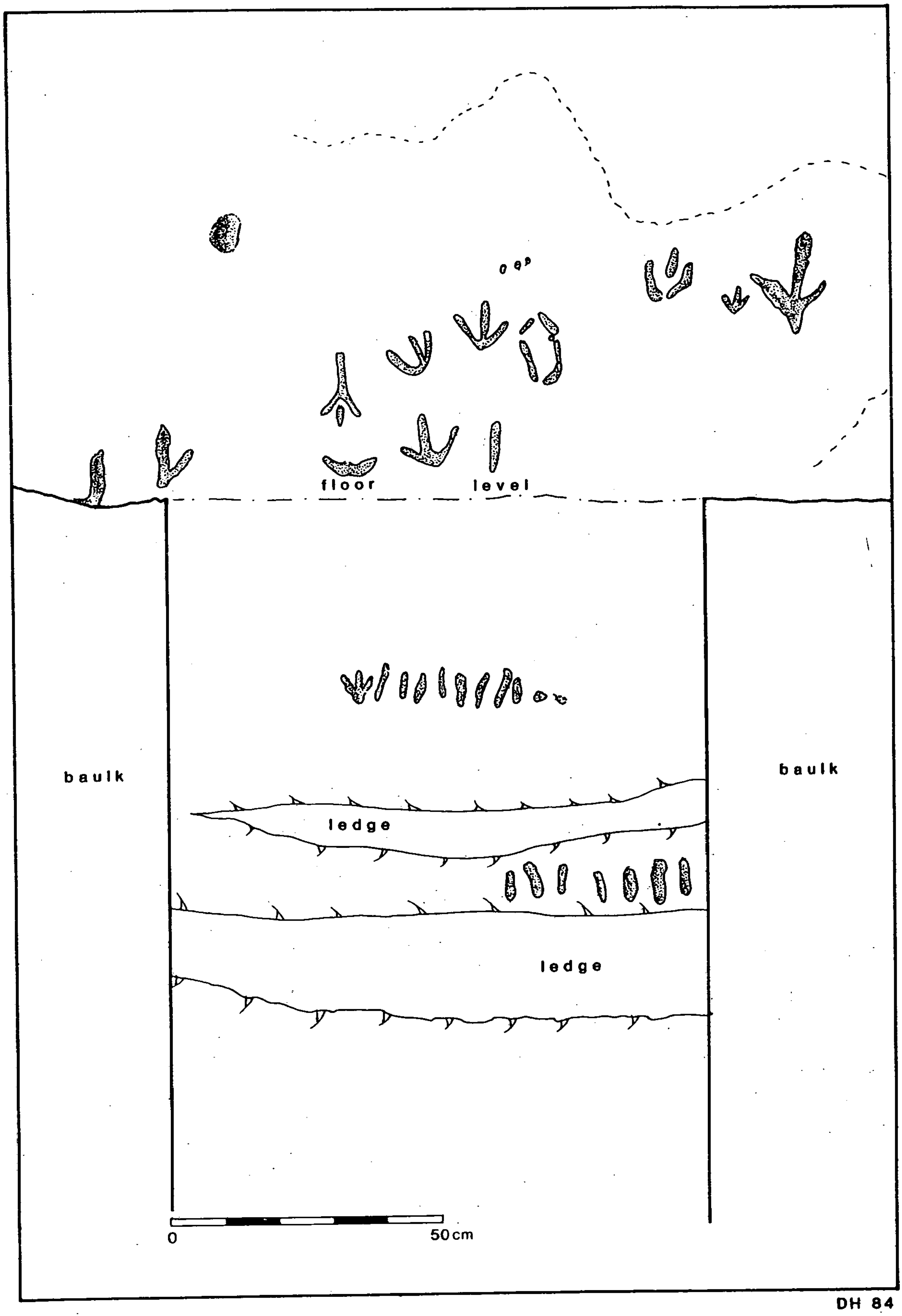

Figure 8. The panel of pecked engravings revealed during excavations at Mickey Springs 34.

Table 1. MNI estimates for faunal remains excavated from Area G9, Mickey Springs 34.

	Depth (cm)															
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Macropus giganteus	1					1										
M. robustus	1	1		1	1			1	1							
Petrogale sp.	1	1			1	1	1	1		1						
Macropus sp.		m	s,l	s	s,m						s	s,l	s			
Isoodon auratus			1	1	1	1	1		1							
Petauroides c.f. volans		1		1			1									
Trichosurus vulpecula	1	1		1	1				1	1						
Pseudocheirus peregrinus	1		1													
Dasyurus sp.		1					1									
Rattus sp.						1		2	1		2	1				
Zyzomys sp.					1	1	2	1			1		1	1		
Pseudomys sp.					1	1	1		1							
Rodent	1	1	1	1						4		1	3		1	
Snake			1													
Lizard						1	1	1								
Bird								1		1	1					
Land snail	+	+	+		+	+	+	+			+					

Bone Artefacts

Four ground bone artefacts came from G9 and another was collected from the surface of G8. They comprise four uni-points and a small spatula, all made from sections of macropod fibula (Figure 9). Bennett (1927:409) states that fishing spears had prongs of bone fastened to the shaft below the point; these examples may have served a similar purpose.

Stone Artefacts

A total of 3468 stone artefacts was recovered. In summary, their horizontal distribution was as follows: C11a (119), C11b (175), C11c (129), C11d (33), D11a (322), D11b (286), D11c (284), D11d (228), G11b (839), G11c (652), G9b (204), G9c (196). These figures indicate that the central front section of the cave was the main discard zone.

The vertical distribution of stone artefact types and materials in Squares C/D11 (summarised in Tables 2 & 3) show that a range of new implement types, including backed blades and adzes, appeared in the sequence at about 3360 b.p. Although the sample size is small, the disposition of ground stone implements in the deposits suggests a similar late appearance for grindstones and edge-ground axes. For instance, a grindstone fragment came from Spit 4, D11a (15-20cm) while two complete mullers were left against the shelter wall as site appliances. The presence of edge-ground axes in the uppermost industry is attested to by two fragments at 10cm and 25cm depth in Square G11b.

The bipolar or block-fracturing of quartz pebbles is the most frequent stone-working activity, and there appears to be no significant variation in size of discarded quartz cores over time. However, there is a substantial change in raw material use evident in the sequence, with an abrupt increase in the range of materials used in the uppermost 50cm (ca. 8000 b.p.). For instance, with the exception of a single, tiny retouch flake, chert is unrepresented in deposits below this depth in the main C/D11 excavation area but constitutes between 8% and 25% of the artefacts in higher levels (Table 3).

Table 2. Stone artefacts recovered from Area C/D11, Mickey Springs 34.

Depth cm	Amorph	Single core	Multi core	Bipolar core	Blade core	Blade	Backed point	Geom micro	Bondi point	Adze	Tula adze	Burren adze	Grinds. frag.	TOT
5	17			1										18
10	39										1			40
15	65					4	1	1		1		1		73
20	157		1	1		5			1		1		1	167
25	257		1	1	1	10		2	1					273
30	316		2	5	1	8								332
35	147					4								151
40	135	3	2	4		1								145
45	158					4								162
50	75					2								77
55	23													23
60	22													22
65	13			1										14
70	4			1										5
75	7													7
80	9													9
85	13	2				1								16
90	29			2										31
95	7													7
100	2													2
105	2													2
TOT	1497	5	6	16	2	39	1	3	2	1	2	1	1	1576

Table 3. Stone artefact materials from Area C/D11, Mickey Springs 34.

Depth cm	Basalt B	Chert C	Q/zite Q	Duri D	F.silc F	C.silc S	P/wood P	Porph Y	Volc. V	Quartz Z	Other O	TOT
5		3	1		5					8	1	18
10		10	3		2				3	22		40
15	6	13	3	1	10	4		1		35		73
20	1	30	12		24	2		1	3	94		167
25		34	21	3	27	8	1		3	176		273
30	1	26	23	1	25	2		1	3	249	1	332
35	1	24	21		20	4		1		80		151
40	3	21	22	1	22	2				74		145
45	1	13	22		9			2	1	114		162
50	1	3	13		6				1	53		77
55			2		2	1				18		23
60			8		2				1	11		22
65	1		1							12		14
70			1							4		5
75			1					1		5		7
80			2							7		9
85	1		8		1					6		16
90			8		1			1	1	20		31
95		1	2		1					3		7
100			1							1		2
105						1				1		2
TOT	16	178	175	6	157	24	1	8	16	993	2	1576

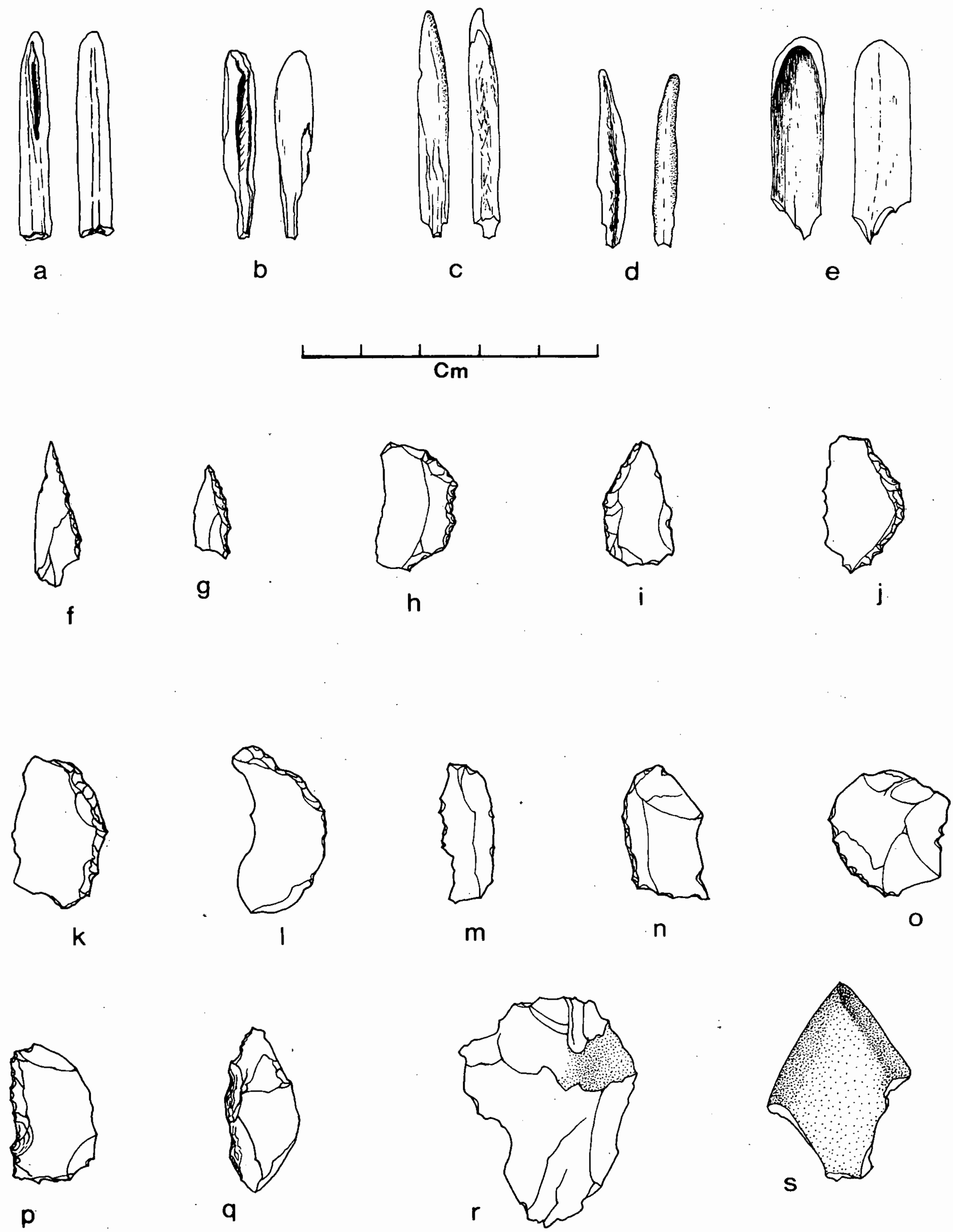

Figure 9. A range of stone and bone artefacts from Mickey Springs 34. a-e) Ground bone points and spatula, f-h) Backed blades, i-l)Backed microliths, m-n) Blades with usewear, o) Thumb-nail scraper, p) Burren adze slug, q) Tula adze slug, r) Axe fragment, s) Piece of ground ochre.

In general, there is an increase in the flaking quality of stone artefact materials during the last 8000 years of occupation, as well as in the ratio of flakes to flaked pieces and platform preparation, but these are trends rather than threshhold changes. For instance, a blade with a focalised platform, overhang removal, and made of high-quality silcrete is one of the lowermost artefacts in Square D11d. It was found in direct association with with the largest artefact recovered from the site, a unifacial chopper made from basalt (Figure 10).

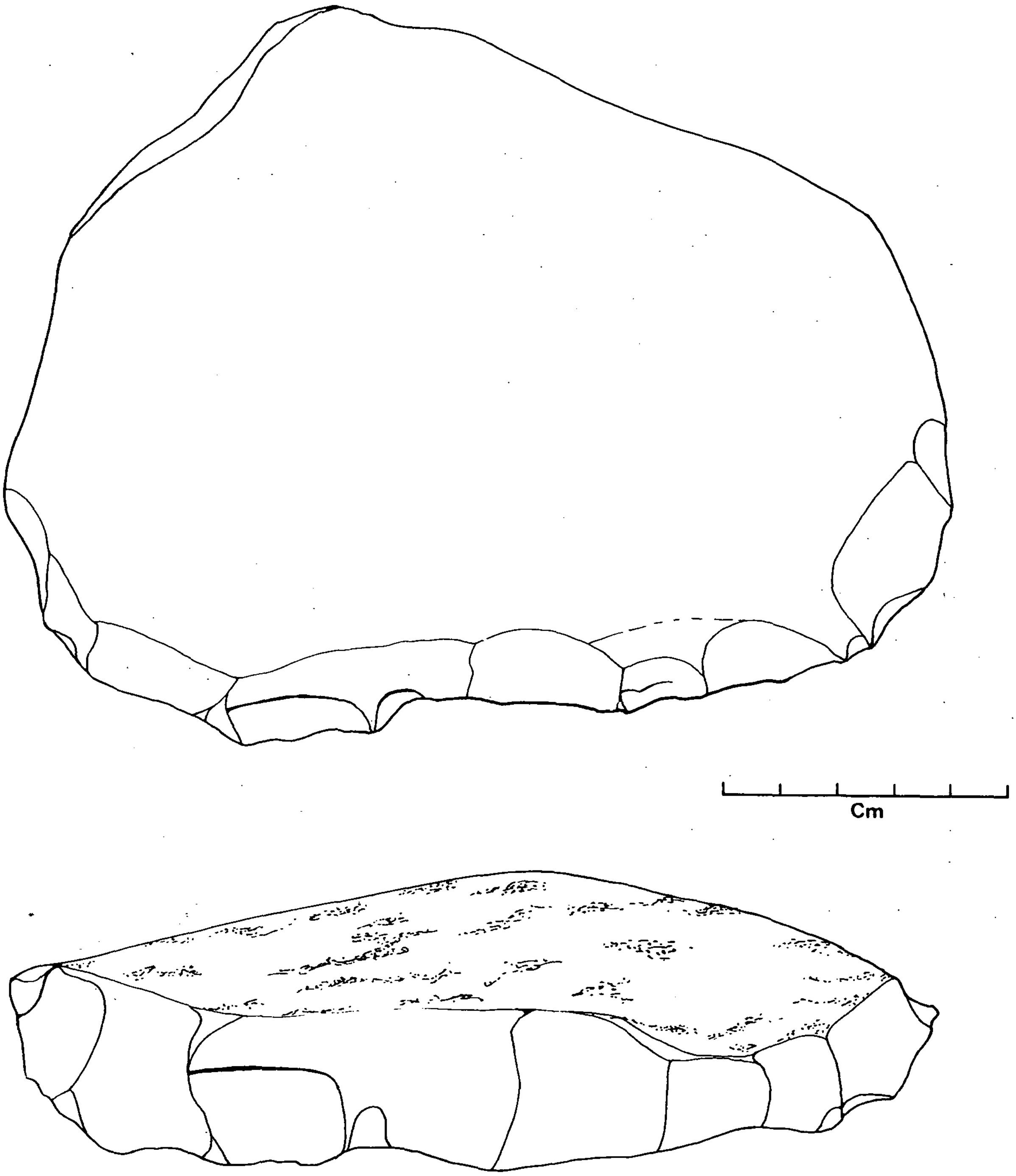

Figure 10. A large basalt chopper from the basal occupation at Mickey Springs 34.

Summary of the Mickey Springs Evidence

Shelters around Mickey Springs appear to have been first occupied in the terminal Pleistocene with near-basal dates of 9,920∓250 b.p. (SUA 2248) and 7,530∓160 b.p. (Beta 23751) being obtained from Mickey Springs 34 and 33 respectively. The 5100∓70 b.p. date (Beta 29290) from Mickey Springs 31 has similar implications. It was from a depth of 30∓ 2cm in cultural deposits with a (max.) depth of 59cm, suggesting initial occupation during the early Holocene or terminal Pleistocene. In the case of Mickey Springs 34, the earliest evidence for occupation was underlain by sterile deposits; this does appear to represent initial use of the site rather than a change in depositional regime. Given the close spatial association between occupied rockshelters and the springs, it seems likely that first systematic use of the area was a result of activation of the springs by changes in the local hydrological regime.

The first occupants of the area undertook a range of artisitic activities. At Mickey Springs 34, the initial occupation in a section of the site was overlain by a sterile layer of rockfall which accumulated rapidly. This rockfall sealed-in deeply-pecked engravings which must be of terminal Pleistocene/early Holocene age. Deeply-pecked and weathered engravings of an arc and line-track maze at Mickey Springs 31 are likely of similar age. There, sections of the rock art surface had exfoliated and it was clear that excavation had the potential to recover fragments of engraved parietal art. Subsequently, three 50cm x 50 cm squares were excavated against the rear wall of the shelter where a pecked arc motif was partially covered by the deposits. At its lowest point the pecked arc motif was found to be 6cm below the present floor level, while three pieces of sandstone bearing peckings were recovered from depths of 28-32cm, 46.5-48.5cm and 50.5-53 cm. The uppermost engraved fragment was associated with the C14 date of 5100 b.p., suggesting that the lowermost is almost certainly early Holocene or terminal Pleistocene in age. Although the engraved fragments were too small for the original motifs to be recognisable, the nature of the peckings and matrix indicate that all are probably derived from a deeply-pecked and weathered panel on the wall immediately above the excavation (Figure 11). The position of these fragments in the deposits indicates that parietal engraving was undertaken throughout the duration of site use.

With an emphasis on track and geometric motifs, the early Holocene pecked engravings at Mickey Springs 31 and 34, as well as the undated pecked engravings in other shelters, appear to be regional variants on the widespread and relatively homogeneous Panaramitee rock engraving tradition (see Maynard 1979). Fragments of red ochre with grinding striations also occur throughout the history of occupation at all the excavated Mickey Springs shelters, indicating that painting was part of the artistic repertoire during the early Holocene.

A range of evidence indicates that the early Holocene use of the Mickey Springs sites was by transient small groups. For instance, the rate of stone artefact discard was generally low and episodic. In addition, the only hearths at this time were small, typically 20-30cm in diameter. Other evidence is also suggestive; a high proportion of the early faunal evidence is of rodent, lizard, and small bird remains reflecting use of the shelter by natural predators. Human subsistence refuse is sparse but shows an emphasis upon the hunting of large and medium-sized macropods (e.g. M. robustus, Petrogale sp), although some small-bodied species (e.g. Isoodon macrourus) were also taken.

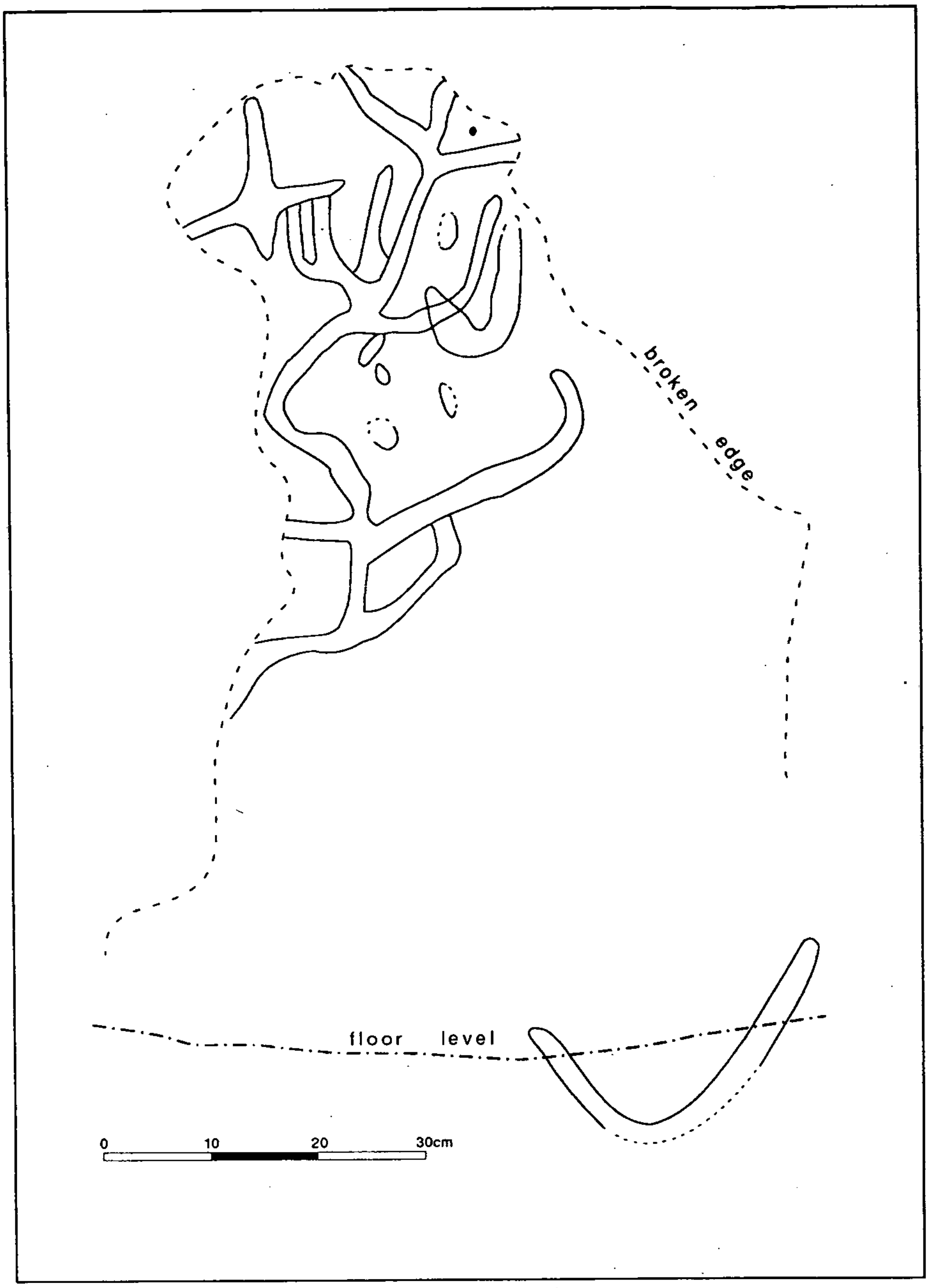

Figure 11. The panel of pecked engravings adjacent to the sounding at Mickey Springs 34.

The pattern of site use began to change at about 8000 b.p. with increases in the rate of stone artefact discard and hearth construction, as well as a greater emphais upon use of higher quality flaking material. All are possible indications of heavier site use. However, on the basis of Mickey Springs 34 evidence, significant technological, economic and artistic change did not occur until 3360 b.p. The range of new artefact types and technologies included backed blades, and adzes of both burren and tula type, edge-ground axes, and (probably) grindstones. From this time there were further increases in stone artefact and ochre discard rates, use of conservation strategies in knapping high-quality stone and rate of hearth manufacture. The evidence from Mickey Springs 31 shows that the nature and timing of this change is not site-specific. Here, 934 stone artefacts were recovered including three burren adze slugs, two tula adze slugs and two fragments of edge-ground axe, all of which came from post-5100 b.p. deposits.

At both Mickey Springs 34 and 38, the bases of the oldest abraded engravings are covered by the uppermost cultural deposits of the late industrial phase. But, the relationship between the location of the lowermost abraded panels and dated occupation levels, together with the increase in excavated evidence for artistic activities, suggests that the extensive panels of abraded engravings which dominate the rock art assemblages in the shelters, post-date the change in site-use that occurred ca. 3400 b.p. Ethnographic evidence collected during the 1920s on the Mickey Springs engravings shows that these continued to be of cultural significance until the European contact period (Bob Pearce: pers. comm.). The range of domestic activities present in the uppermost deposits and the presence of hand stencils of very young children at Mickey Springs 34, suggest that the most recent rock art was public and that occupation involved family groups. In addition, a human molar fragment from the uppermost spit of Mickey Springs 38 provides support for claims by local informants that some of the shelters once contained burials. Overall, the evidence suggests use of the shelters by larger groups, for longer periods of time and for a wider range of activities over the past 3400 years.

PRAIRIE CREEK

Excavations at Mickey Springs indicate that significant changes in site use, technology, economy and art occurred in this area during the past 11,000 years. The implications of this sequence for changes in the pattern of landuse were investigated along the Prairie-Porcupine Creek system located 15km to the west. The reasons for selecting this area included the fact that it was known to have a wide range of site types, such as the Tattoo Hole art sites which appear to span a considerable time period, as well as Quippenburra Cave which has datable deposits associated with evidence for large ceremonial gatherings. In addition, the area has a number of distinct landforms: plateau, scarps and gorge; sandstone and basalt country; narrow, deeply incised gorge sections and other sections with more subdued relief. Finally, traditional Aboriginal life seems to have come to an abrupt end in the early European contact period with the massacre of a local Aboriginal group by Native Police and settlers on the eastern side of Prairie Gorge in late 1873 or early 1874. Since then, many of the sites have not been greatly interfered with and they exhibit a wide range of artefactual material.

The approach used was to examine the relationship between the distribution of sites, terrain units and resources, then to use dating evidence to monitor changes in the pattern of landuse. Fieldwork involved the following steps: mapping of terrain units, assessment of floral and faunal resources in each terrain unit, a systematic survey of archaeological sites and excavation of selected sites.

The study area comprises the gorges, scarps and adjacent plateaux from Tattoo Hole, on Porcupine Creek, north to the Porcupine-Prairie Creek junction and up Prairie Gorge, a total distance of 21km. On the plateau the margins were systematically examined, for this is the area where ephemeral water sources occur in the form of rock holes. Traverses were also made up to 5km from the gorge country to sample the full range of plateau resource zones.

The method employed in the terrain unit analysis is outlined in Appendix 1. A total of 12 land units was distinguished, comprising the main plateau; black soil plains, breakaways and scree slopes on basalt country; upper slopes, lateritic edges, and footslopes on the Cretaceous sandstones; and upper scarps, talus, lower scarps and creek bed on the Jurassic sandstones (Figures A1, A2 and Tables A1, A2 in Appendix 1). Floral and faunal surveys (Table A3 in Appendix 2) were then made with reference to this terrain unit structure, as was the archaeological survey .

The survey results show significant patterns in site distribution (Figure 12). Large sections of the plateau, plateau margins and sandstone scarps have either no sites or very low numbers of sites (even where ground visibility is excellent). The majority of sites are clustered in the shallowly incised areas of Porcupine Creek in the general Tattoo Hole area. Here, open engraving sites, rockshelters with stencils and abraded engravings, caches, marker sticks in sandstone pipes, and open artefact scatters are all located near permanent water-holes. Differential weathering of the engravings, the oldest of which are similar in technique and motif range to the deeply pecked engravings dated at Mickey Springs 34, indicates that the Tattoo Hole area has probably been a focus for local Aboriginal groups from a time pre-dating the late Holocene appearance of new technologies and intensive economic strategies. More recent, lightly-pecked and unpatinated engravings at Tattoo Hole are similar to those found at the Yahoo engraving site in the White Mountains, which include depictions of hafted axes (Walsh 1985, 1988) and therefore post-date 3400 b.p. on the basis of the Mickey Springs excavations. Open sites in the Tattoo Hole vicinity are mainly characterised by flaked stone assemblages, with grindstones only being found on a site adjacent to a small, swampy, black soil area on the basalts to the west. Aboriginal occupation of the area around this section of the Prairie-Porcupine Creek system did not depend upon seed processing.

The distribution of sites along the margins of deeply incised gorge country to the north along Prairie Creek is in marked contrast to the pattern found around Tattoo Hole. With the exception of widely spaced, small surface scatters of flaked stone (or findsites of individual artefacts), all contain grindstones and occur in areas with ready access to water and two specific plant resources - stands of <u>Panicum decompositum</u> (Native millet) on areas of black soil alluvium, and groves of <u>Brachychiton australis</u> (Kurrajong) on the basalt scarps. The correlation is apparent in the distribution of small, open sites with two or three grindstones which probably served mundane domestic requirements for small family groups. All of these sites are located adjacent to groves of <u>Brachychiton australis</u>, or on red soil flats (good campsites) immediately adjacent to black soil plains where large stands of Panicum decompositum occur. However, where these plant resources occur in the absence of water sources, sites are also absent.

The resource context of Quippenburra Cave, which has evidence for large gatherings of people, shows that the same determinants were operating for aggregation sites along Prairie Creek. The cave has a large number of basalt grindstones and is next to a large, permanent rockhole and extensive black soil plains. Seed processing at this site seems to have underwritten ceremonial activities at a nearby stone arrangement, and the only seeds in the area available in sufficient density to be considered a staple are those of <u>Panicum decompositum</u>.

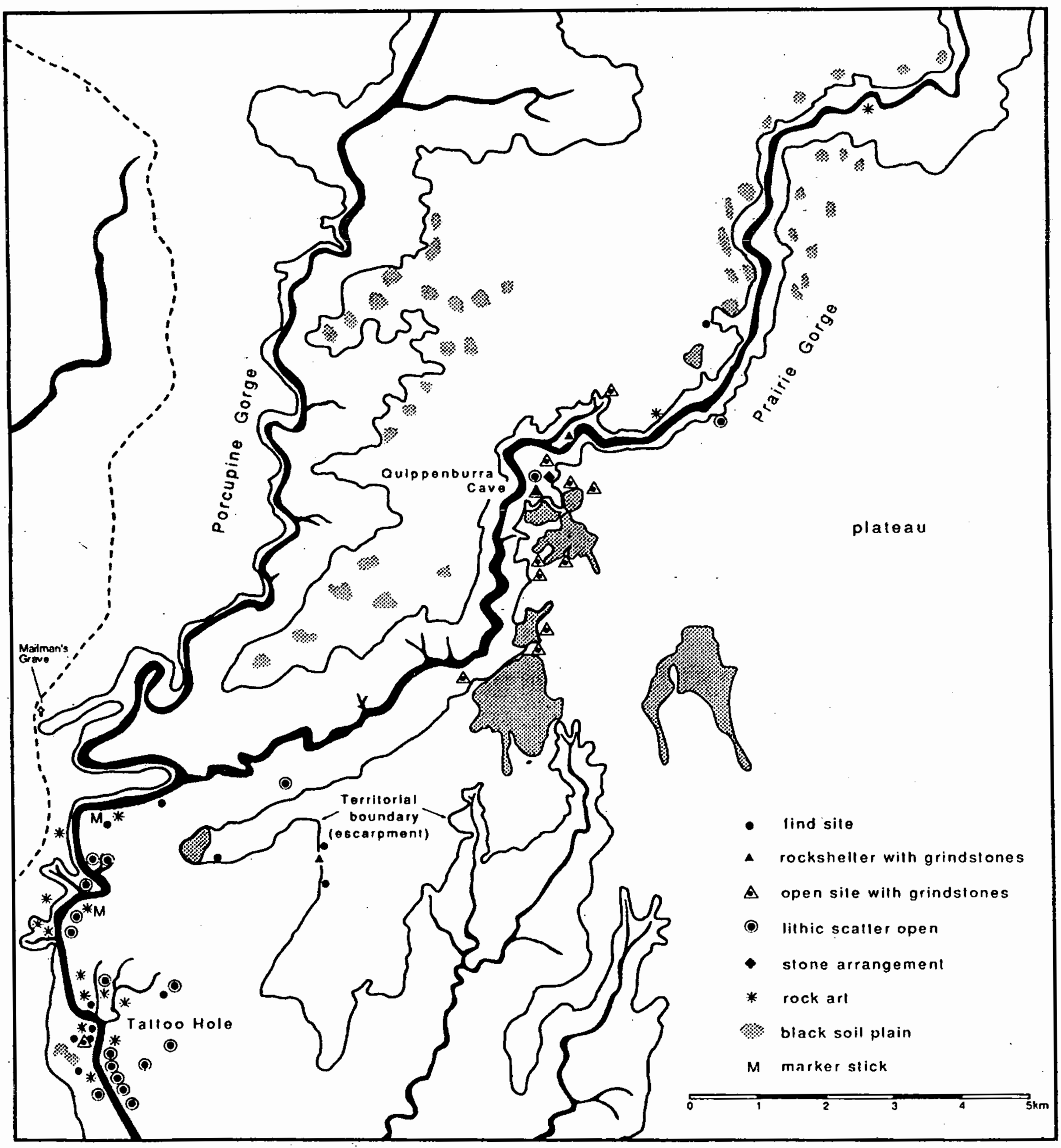

Figure 12. The distribution of archaeological sites along the Prairie-Porcupine Creek system, upper Flinders River.

The distribution and content of both domestic and large-scale ceremonial sites along the margins of the deeply-incised gorge and basalt plateau reflect a dependence on seed grinding, and, on the basis of work at Mickey Springs, this pattern of landuse/site distribution is less than 3,400 years old. This was confirmed by the results of excavations at Quippenburra Cave.

Quippenburra Cave

This site is located on the east side of Prairie Gorge within the lateritic ledge of the Cretaceous sandstone series which is about 100m wide along this section. Apart from spinifex where sandy soil has accumulated and western bloodwood scrub along the outer edge, the ledge is mainly flat bare rock. Behind it there is a steep scarp of deeply-weathered, coarse sandstone partially obscured by a scree slope of basalt boulders derived from the margins of the basalt plateau some 60m above.

The lateritic ledge near the cave is crossed by a creekline which exits from a small gorge incised into the overlying sandstones and basalts at right angles to Prairie Creek. Although normally dry, the creek bed contains a large rockhole just before it drops into the main gorge. If properly maintained this would be a permanent water-source in an area where all other sources along the margins of the gorge would be ephemeral. This is reflected in the number of Aboriginal sites in close proximity to the rockhole: a stone arrangement constructed from basalt boulders occurs on the sandstone platforms flanking the eastern side of the creekline (Figure 13), while scatters of grindstones and flaking debris occur on the western side, as does Quippenburra Cave .

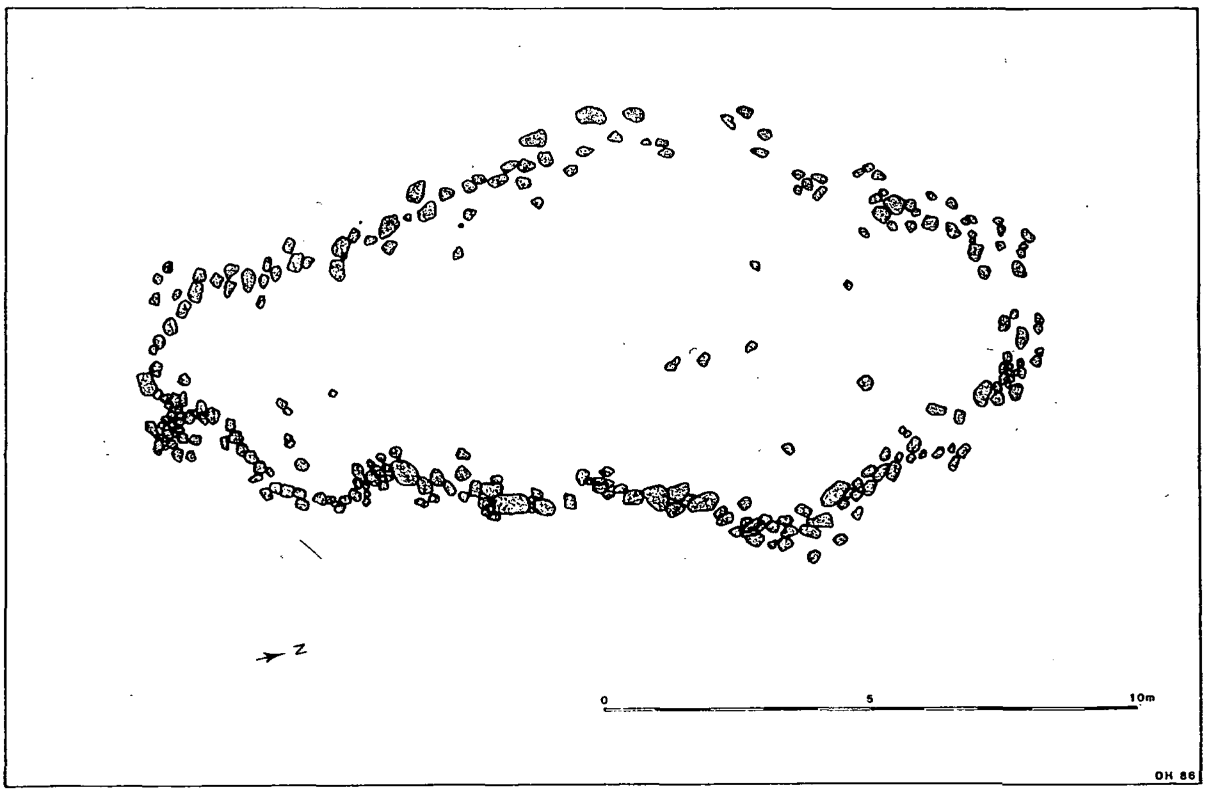

Figure 13. Plan of Stone Arrangement made from basalt boulders and located 100m north of Quippenburra Cave.

Quippenburra Cave has formed by weathering of the softer, lower parts of the lateritic strata. The roof is formed of ironstone lattice, but the cave matrix is predominantly of a white sandstone containing patches of orange and red ironstone staining. The site measures 40m by 30m with a maximum roof height of 5m (Figures 14 & 15). The southern end of the cave has collapsed to form a crater-like opening with a scrub-covered, scree slope, which provides the back entrance. Two other entrances are found to the north and north-west. These are fronted by a sandstone shelf, then a precipitous drop into the main gorge. A small watercourse begins at the back entrance of the cave and exits at the northern entrance. The channel of this is of bedrock and rubble, including many grindstone fragments. On each side of the watercourse are areas of dry deposit rich in organic material and artefacts.

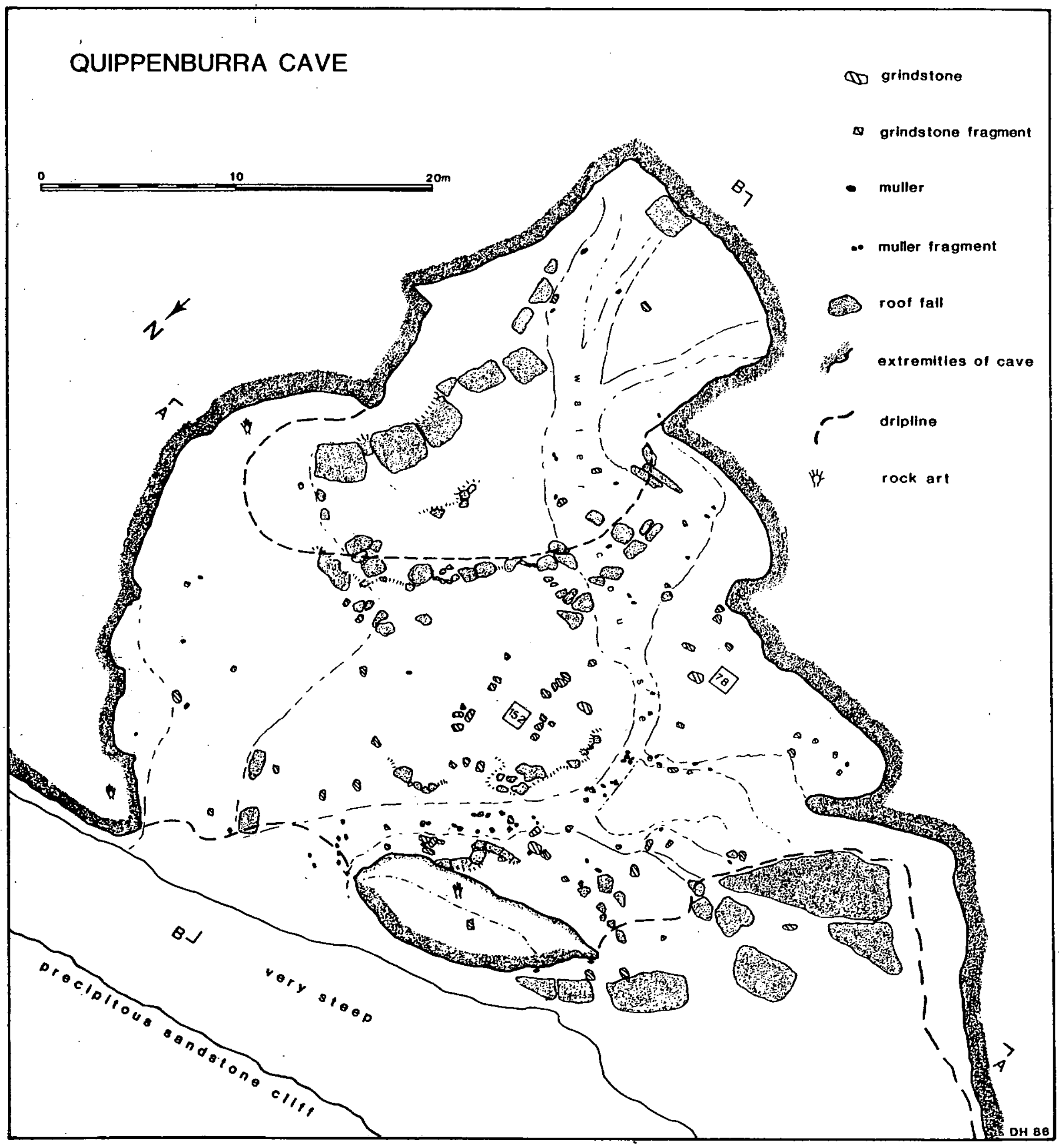

Figure 14. Plan of Quippenburra cave showing position of surface grindstones and the two excavation areas.

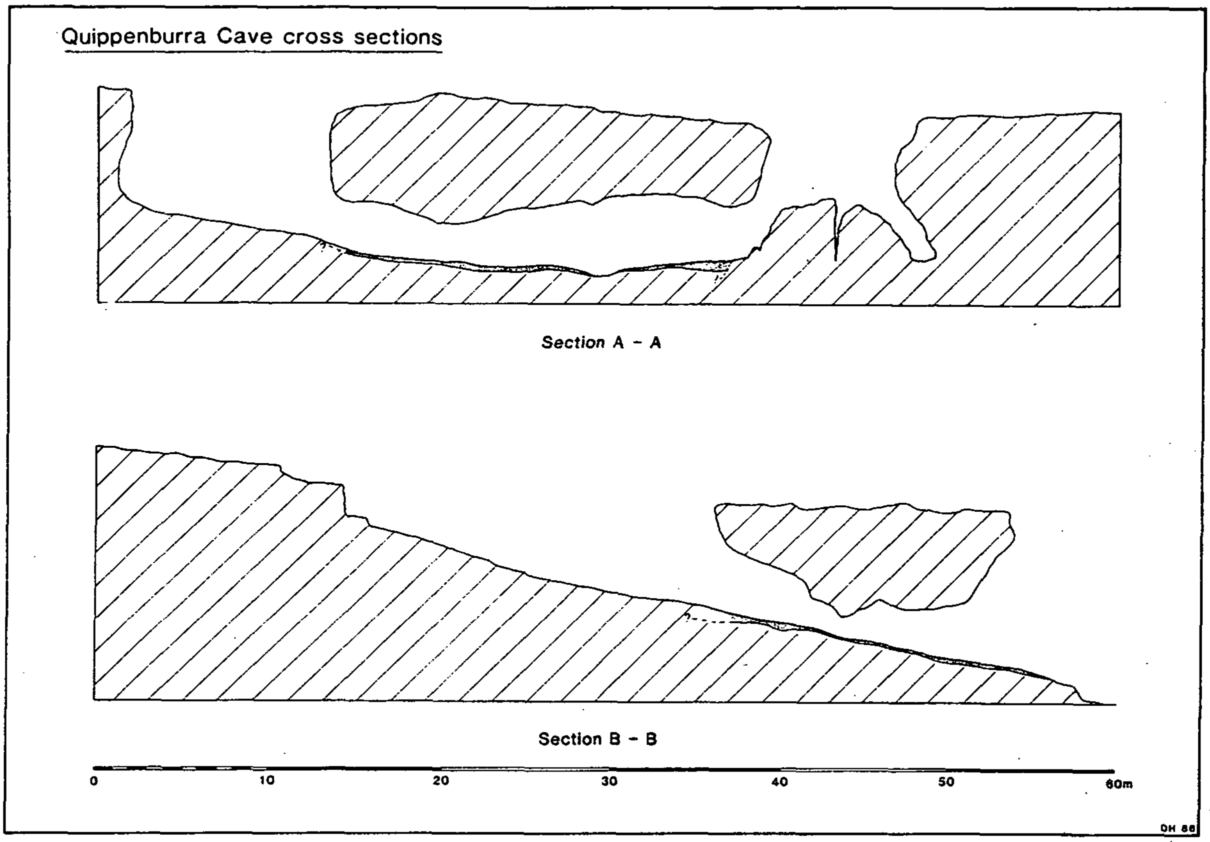

Figure 15. Two cross-sections of Quippenburra Cave.

The cave contains rock art including stencils of 202 hands (including 10 child), one hand-plus-forearm, one foot, two axes, three boomerangs and four unidentified objects. The majority are red, but yellow (2), brown (1), purple (13) and black (3) also occur. The only European vandalism evident is two scratched names dated to 1924. A range of materials for art is available in the cave. The sandstone matrix contains patches of ironstone suitable for red pigment manufacture, while an abraded area on the western wall documents removal of the white matrix which is also suitable for use as pigment.

The most obvious evidence of Aboriginal use of the cave is the large number of grindstones left on the surface as site appliances. These total 89 complete or fragmented lower grindstones and 52 mullers, many of which are grouped (e.g. a line of eight, a parallel line of seven, a pile of four). Outside around the crater entrance a further 31 slab and 31 muller grindstones occur together with scattered flaking debris. With the exception of four specimens of sandstone and one of granite, all grindstones are of local basalt, obtainable from the plateau scarps 100m to the south. The cave also contains evidence for quarrying; a chert outcrop near the northern entrance has been flaked and battered and is surrounded by flaking waste and large hammerstones.

Other surface artefactual material includes an edge-ground axe head, a riding spur and a harmonica reed-frame (Figure 16 a,b,c). The latter are common on post-contact Aboriginal sites in western Queensland (Grahame Walsh:pers. comm.) and, given the very small number of previous European visitors, the Quippenburra Cave reed-frame is likely to belong to the last phase of Aboriginal occupation. The spur is also of some interest as it is a "hunting spur" of a type quite common in the latter half of last century (Brian Rough: pers. comm) and bears a "broad arrow" stamp indicating British Government military issue. Information received from elderly informants about the early contact history of the area, the location of Quippenburra Cave, and the range of material evidence recovered, all suggest that the reported massacre by the Native Mounted Police occurred in the immediate vicinity of the site.

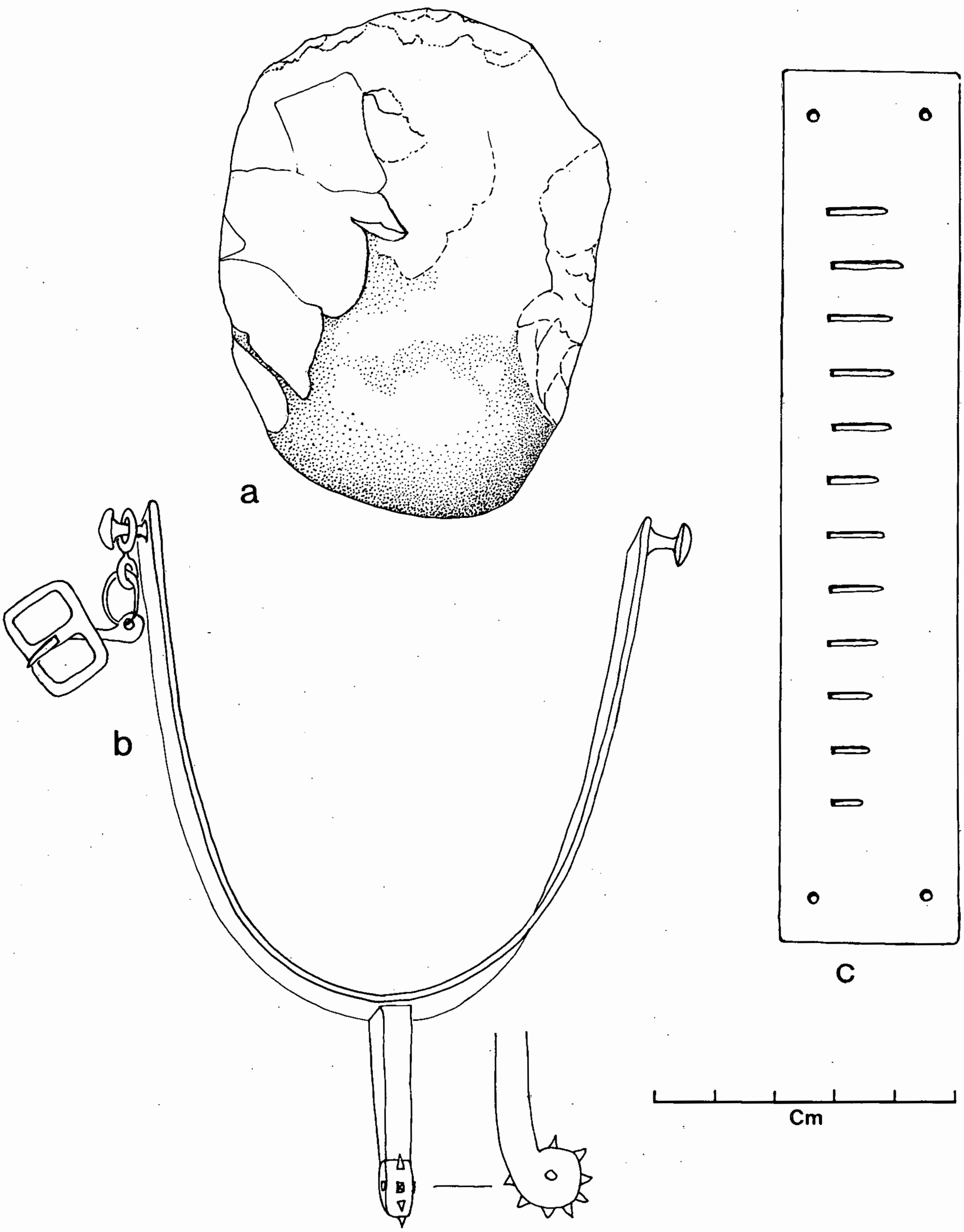

Figure 16. Surface artefacts from Quippenburra Cave: a) Edge-ground Axe, b) Riding Spur, c) Harmonica Reed-frame.

The excavation

I first learned of Quippenburra Cave when discussing Aboriginal sites of the Hughenden region with George Pearce, who had driven a Model-T Ford there with a group in 1924. Although he could not remember whether or not the cave had rock art or other evidence of Aboriginal use, his photographs of the site looked tantalising. As a result, during the excavations at Mickey Springs 34 in 1984, I drove to the general area of Prairie Gorge indicated by Mr Pearce, and relocated the site. Its research potential was clear.

In June 1986, two 1m x 1m squares were excavated. These were positioned in dry areas of high grindstone density where probing indicated the deepest deposits. The squares were designated 8-7 and 15-2 on the basis of their distance along and from a surveyed baseline across the cave (Figure 14). Each square was subdivided into 50cm x 50cm squares designated a, b, c or d moving anti-clockwise from the N.E. corner. These were the basic excavation units. The N.E. corner also served as the 0.0 reference point for horizontal (x and y) co-ordinates for artefacts recovered from each 50cm square.

Beneath a loose surface layer, deposits in Square 8-7 were found to be extremely hard, requiring use of a pick in xcavation. Due to this problem, the low density of artefactual material and the absence of faunal remains in the hard deposits, the exavation area was reduced to 100cm x 50cm after the top 4-10cm of loose material had been removed. Bedrock was reached at a maximum depth of 30cm.

Deposits in Square 15-2 reached a maximum depth of 63cm in two main units (Figure 17). The upper unit (Layers 1 to 3) comprised a compact sand with lenses of charcoal and ash and was rich in charcoal, bone, plant materials and stone artefacts. It also contained a large number of well-defined hearths, and the layer divisions largely correspond to ash rake-outs. The pH was variable.

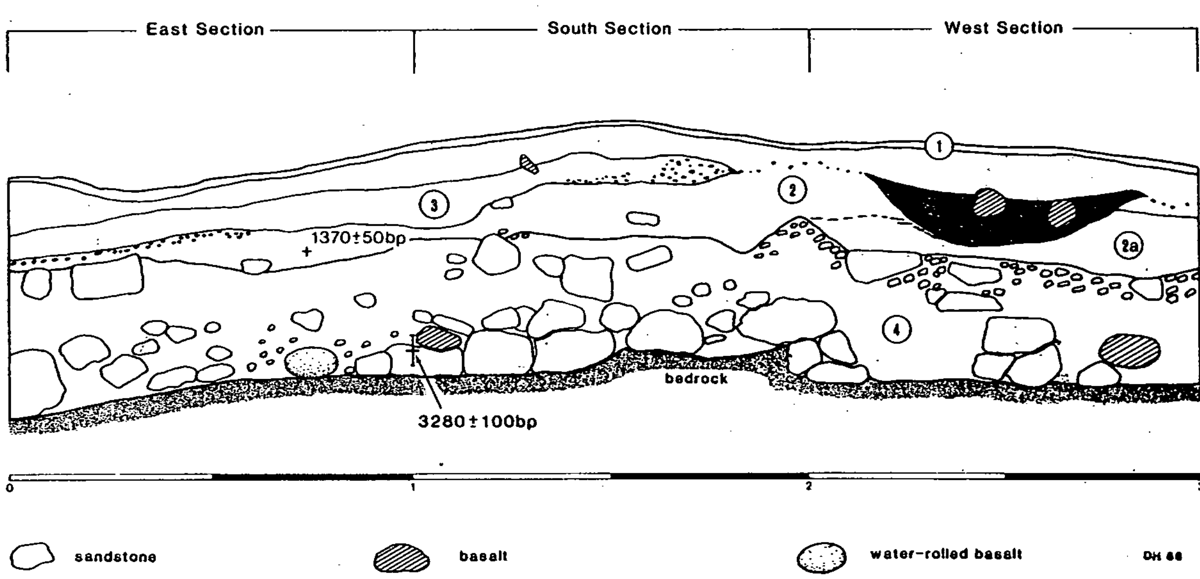

Figure 17. Stratigraphic cross-section for Square 15-2, Quippenburra Cave.

In contrast, the lower unit (Layer 4), a coarse-grained sand between sandstone talus and the occasional water-rolled basalt pebble, was similar in composition to the talus/scree slope in the "crater". Much of this material appears to have been water-deposited and although the stone artefact density was similar to that found in the upper unit, there was minimal charcoal, bone or other organic material. The basal units of both excavation areas may document a period when the cave deposits were periodically much wetter prior to the formation of a well-defined drainage channel through the site. Stratigraphic details are as follows:

Layer 1 - Loose, grey sand, rich in charcoal, dung and plant matter. Colour 10YR 5/3. pH=8.5.

Layer 2 - Compact, fine grey sand with lenses of charcoal. Colour 10YR 5/2. Ph=8.5. Layer 2a is similar but slightly redder probably due to the proximity of a hearth. Colour 10YR 6/6. pH=5.5.

Layer 3 - A fine, yellow sand/ash with lenses of charcoal. Colour 10YR 6/4. pH=7.5.

Layer 4 - A compact, coarse-grained sand between sandstone rubble. Colour 10YR 6/2. pH=5.5.

The two main stratigraphic units are also reflected in the distributions of charcoal, bone and stone artefacts (Figure 18), all of which indicate a major change in the depositional regime.

Dating

Two charcoal samples were submitted for radiocarbon dating and the results are as follows:

1370∓50 b.p. (Beta 23752) for Spit 6 of Square 15-2d. This sample was from Feature 2, a discrete hearth containing bone at the base of Layer 2. It dates the change in sedimentary regime which resulted in good preservation of organic materials in the uppermost levels. Depth 21∓3cm.

3280∓100 b.p. (Beta 17848) for Spit 14 in Square 15-2d. This was from Layer 5 immediately above bedrock. Depth 54∓7cm. A fragment of muller with traces of red ochre was obtained at the same depth in the adjacent Square 15-2c.

The dates suggest that the rate of sediment accumulation at the site has been relatively constant.

Floral remains

A range of plant material was recovered from the uppermost 10cm of the deposits. Species identified by the Queensland Herbarium include *Pleiogynium timorense*, the Burdekin plum, and *Terminalia* sp., the Green plum. Both species occur on the lower scarp areas, suggesting that the bottom of adjacent Prairie Gorge was being exploited by the site's occupants. The large number of grindstones in the cave is suggests a reliance on plant resources. Both starch grains and green plant matter were identified on grindstone specimens (Richard Fullager: pers. comm.), while the distribution of sites with grindstones along this section of the gorge indicates that the seeds of <u>Panicum</u> <u>decompositum</u> and <u>Brachychiton</u> <u>australis</u> were staples. The evidence shows that Aboriginal plant exploitation from Quippenburra Cave included the entire span of Prairie Creek relief zones, from the lower scarp areas of the gorge, to the basalt scree slopes, the breakaways, and the black soil plains on the plateau (Table A1). Exploitation of these plant resources probably occurred in February-April following good summer rains.

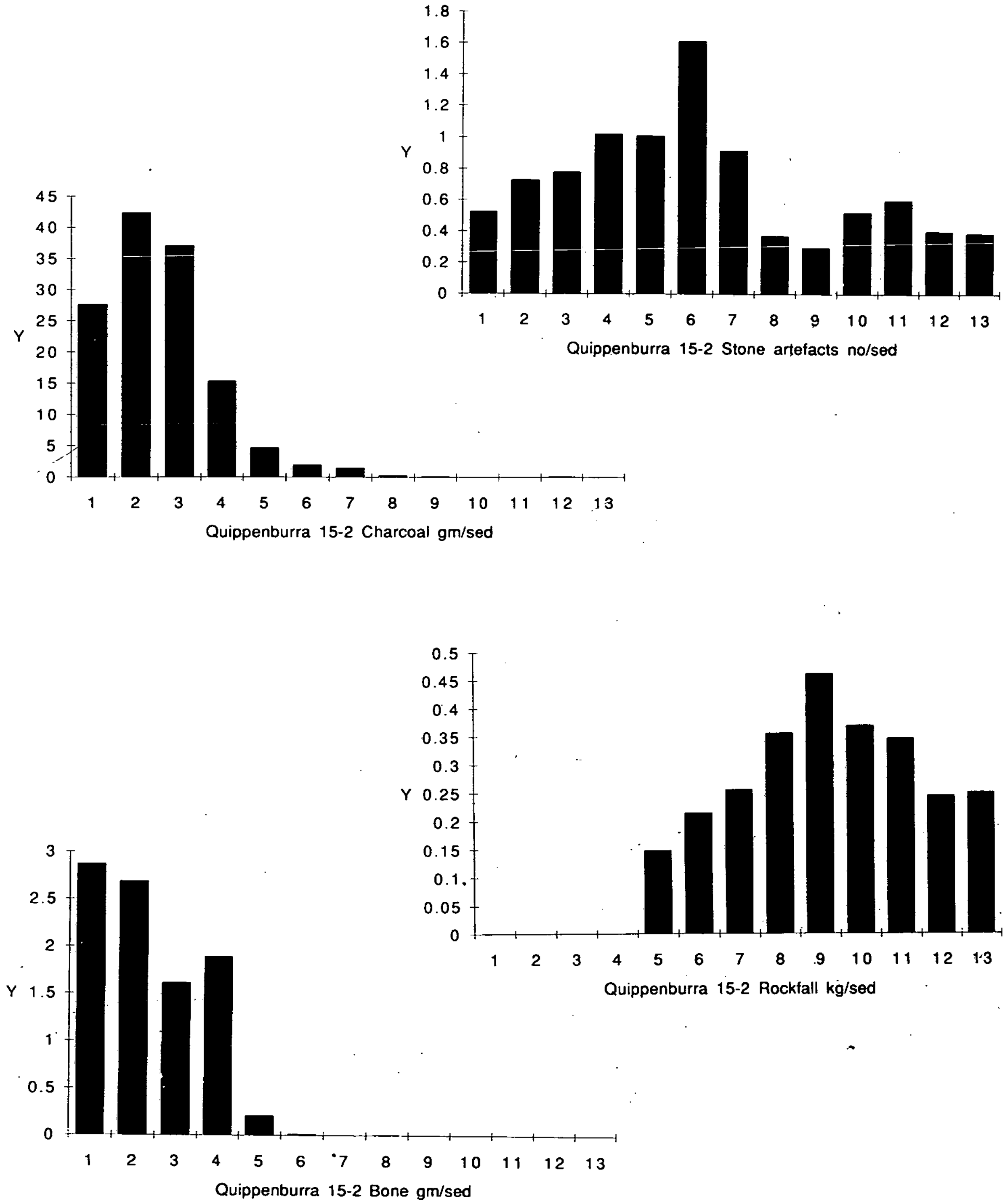

Figure 18. Histograms summarising the distribution of charcoal, bone and stone artefacts in Square, 15-2, Quippenburra Cave. (Charcoal and bone in gm/kg of deposit; artefacts in number/kg of deposit).

Faunal Remains

A total of 586g of bone was recovered in Square 15-2, predominantly from the uppermost 20cm (Layers 1-4). The negative correlation between the vertical distribution of bone and rockfall shows that this is a reflection of site taphonomic processes, not necessarily changes in site use. Bone preservation in the uppermost levels of the deposits was excellent throughout. The range of fauna represented is diverse, although the number of individuals per species is small, making economic reconstruction difficult (Table 4). As with the plant evidence, faunal remains come from the full range of habitats present in the general vicinity of the site. They include the red-earth woodlands of the main plateau (*Macropus rufus*), the escarpments (*M. robustus*, *Petrogale inornata*), and the gorge (freshwater mussel, *Isoodon macrourus*, *Hydromys chrysogaster*).

The presence of recent *M. robustus* and *Petrogale inornata* "drop-deads" on site, as well as gastric etching or canine puncture marks on seven small macropod bone fragments, indicate that some of the excavated material was almost certainly deposited by natural agencies. However, the occurrence of these same species within excavated hearth structures also shows a cultural component to the assemblage. A finding of particular interest was *Isoodon macrourus* which is well outside its historically-documented distribution. The faunal resource survey indicates that this species is still extant in the area.

Table 4. Fuanal MNI estimates from Square 15-2, Quippenburra cave.

					L4	L4	
Depth (cm)	0-5 cm	5-10 cm	10-15 cm	15-20 cm	25-30 cm	35-40 cm	TOTAL
Macropus rufus			1				1
Macropus robustus	2	1	2	2			7
Petrogale inornata	2	2	2	1			7
Lagorchestes sp.		1		1			2
Aepyprymnus sp.		1					1
Bettongia sp.	1						1
Small macropod	1		1				2
Trichosurus vulpecula	2	2		1			5
Pseudocheirus sp.		2	1				3
Petauroides volanes		1					1
Petaurus breviceps		1					1
Isoodon macrourus	1	1	1	1			4
Dasyurus hallucatus	1	1					2
Rattus sp.	4	3	4	3			14
Pseudomys delicatus	3	2	1	1			7
Leggadina sp.	1	2					3
Hydromys sp.	1						1
Zyzomys sp.	1	1					2
Rodent						1	1
Bat		1					1
Large bird		1					1
Medium bird	1	1					2
Small bird	1	1		1	1		4
Egg shell	+	+	+				
Varanus sp.	1						1
Lizard (Agamidae)	1	2					3
Medium lizard		2					2
Small lizard	1		1	1			3
Scincidae	1						1
Snake	1		1				2
Python				1			1
Freshwater mussel	+	+	+				
Land snail	+	+					

Artefacts

A total of 557 stone artefacts was recovered from both excavation areas, with 488 coming from Square 15-2. Vertical differences in stone artefact density are evident (Tables 5 & 6). The majority of the assemblage comprised the waste products of bipolar working of quartz pebbles from nearby conglomerates, but chert, petrified wood, silcrete and basalt also occurred. Only 72 stone tools were identified on the basis of use-wear, retouch or grinding (60 from Square 15-2).

Table 5. Stone artefacts from Square 15-2, Quippenburra Cave.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	15-2 STONE ALL													
2		Amorph	Single	Multi-	Bipolar	Barb	Blade	Backed	Bondi	Tula	Burren	'Adze'	Grind.	Tot
3	Depth		core	core	core			point	point	slug	slug	slug	frag.	
4	5	33 (3)		2					1					36
5	10	5 (16)		1				1		1		2		56
6	15	39 (2)							2					41
7	20	40 (2)		2		1							1	44
8	25	34 (4)	1			5					1			41
9	30	78 (3)	1											79
10	35	38 (2)		2	3	1	1							45
11	40	19 (2)			1									20
12	45	17 (3)		2										19
13	50	29 (8)		1		1								31
14	55	28 (2)		1									2	31
15	60	23 (0)	1	1						1			1	27
16	65	17 (2)		1										18
17														
18	Tot	446 (39)	3	13	4	8	1	1	3	2	1	2	4	488

Table 6. Stone artefact materials from Square 15-2, Quippenburra Cave.

	A	B	C	D	E	F	G	H	I	J
1	QU 15-2 MATERIALS									
2		Basalt	Chert	P/wood	Quartz	Quartzite	Silcrete	Volcanic	Other	TOT
3	DEPTH									
4	5	1	8		25		2			36
5	10		17		33		5		2	57
6	15		6		33		1		1	41
7	20	1	7		35		1		1	45
8	25		6		33		1		1	41
9	30		8		69		2			79
10	35		2		41		1	1		45
11	40		1		19					20
12	45		1		16		1		1	19
13	50	1	4	1	20	4	1		1	32
14	55	4	6		22		1			33
15	60		2		21		3		2	28
16	65		2		13	1	2			18
17										
18	TOT	4	70	1	380	5	21	1	6	488

Formal artefact types included four grindstone fragments comprising two undiagnostic specimens, the edge of a muller with adhering red ochre, and a large fragment of faceted muller (Mike Smith: pers. comm.). The occurrence of specialised seed grindstones in the basal deposits as well as on the cave floor, shows that seed processing has been an economic activity at the site since it was first occupied 3,300 years ago. Other stone tools recovered include a backed point, three Bondi points, two chert tula adze slugs, and a chert burren slug (Figure 19). With the exception of a tula adze slug, these "formal" tools occur in the uppermost sedimentary unit. Their vertical spread in the deposits indicates that backed blades and tula adzes were in use up to the time of European contact.

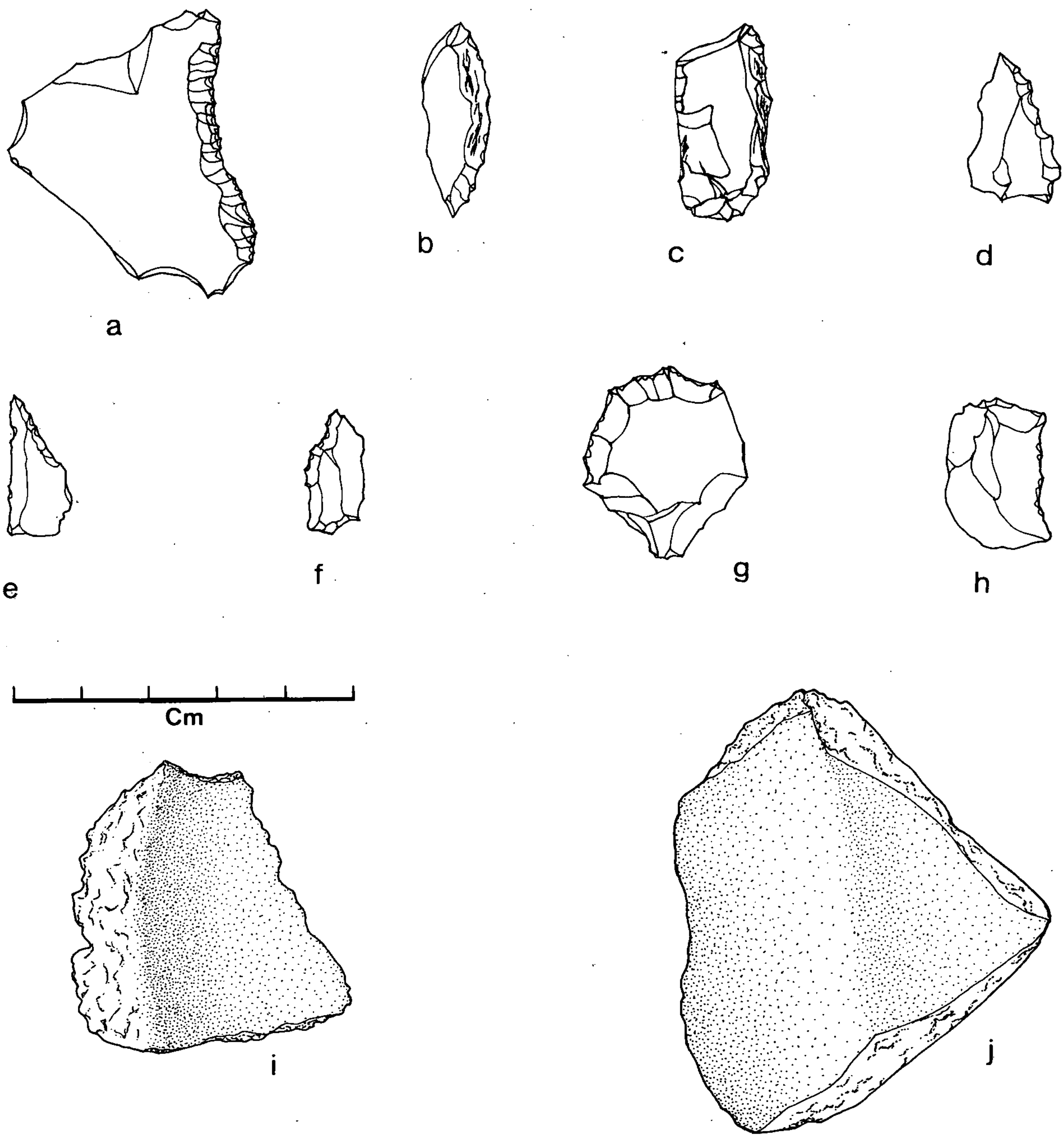

Figure 19. Selected artefacts from Quippenburra Cave: a) Heavily retouched flake, b)Tula Adze slug, c) Burren Adze slug, d-f) Backed Blades, g) Thumbnail Scraper, h) Flake with usewear, j) Grindstone fragment, k) Faceted Muller fragment

In addition to the riding spur and harmonica reed-frame found on the cave floor, post-contact material was excavated from Square 8-7. Here two flattened lead bullets from a .32/20 calibre weapon (probably a Winchester Model 1892) were found in the uppermost levels. This rifle calibre was not present in Australia in great numbers until after World War I. Also recovered were 14 cartridge primers and a piece of lead foil. The primers are of the two-footed anvil type and are most probably a Remington-Peters design of small rifle primers not in existence until the 1920s (Stan Robinson: pers. comm.). The material probably relates to a person reloading cartridges during the 1924 visit by George Pearce and his companions.

DISCUSSION

The distribution and content of both domestic and ceremonial sites in the deeply-incised country along Prairie Creek reflects a committment to seed grinding and, on the basis of work at Mickey Springs, this pattern of landuse/site distribution is probably less than 3400 years old, an interpretation strongly supported by the results of excavations at Quippenburra Cave. While Aboriginal occupation of the North Queensland Highlands generally goes back at least 29,000 years, most of this span is unrepresented at Mickey Springs and the deeply incised gorge country of Prairie Creek. When occupation does appear in these two areas at ~11,000 and 3300 b.p respectively, the timing coincides with broad-scale environmental and cultural changes which have consequences for local resource use.

In summary, a range of evidence indicates that the distribution of archaeological sites in the region is highly correlated with resource distribution, and that resource levels and structure have effectively changed at least twice over the past 11,000 years. A proposed scenario is as follows:

1) Environmental changes at the end of the Pleistocene probably activated Mickey Springs and allowed an expansion of occupation into the area.

2) The development of a late Holocene committment to seed processing to meet both domestic and social demands upon the production system allowed occupation of previously marginal country along Prairie Creek.

In both phases of expansion, the archaeological evidence indicates that human exploitation of resources in specific areas increased from zero to greater-than-zero. Since economic intensification is defined as an increase in productivity or production per given area (e.g. Bender 1978:205; Lourandos 1983:81), these are tautological examples of the process and lack the ambiguity which arises when "intensification" is inferred from changes within a sequence, such as those at the Mickey Springs about 3400 b.p.

Given the circumstantial nature of archaeological evidence, increases in population and/or productivity in a regional sequence are difficult to prove on the basis of individual or even collective site sequences (e.g. Beaton 1983, 1985 c.f. Lourandos 1985; Boserup 1965 c.f. Blaike and Brookfield 1986; Ross 1985). However, in the case of Mickey Springs and the Prairie Gorge area, increases in local population and productivity , at 11,000 b.p. and 3,300 b.p. respectively, can be tested. Furthermore, initial use of the Prairie Gorge area is associated with the use of seed grinding to meet both domestic and social demands upon the production system, suggesting that local subsistence systems were under periodic stress (Hayden 1981). Such population movement into a previously marginal habitat, in conjunction with the appearance of a labour-intensive economic strategy, can not be explained as a simple redistribution of a stable population and production system within the wider region. Instead, the evidence indicates an overall increase in population and production. A more general implication is that the recognition of population increase and/or economic growth in the archaeological record is not an end in itself. Social, demographic and economic variables are consequences as well as determinates in the evolution of cultural systems, and the real challenge in the writing of prehistory is to understand these functional relationships.

Clearly, data on the organisational relationships between sites and resource structure is essential for the modelling of past cultural systems and the interpretation of change (see Binford 1982), yet little research has been undertaken in Australia with this in mind. Translating this need into a methodology of approach, the upper Flinders region of the North Queensland Highlands has unique research potential, especially in the associative patterning between specific resources (e.g. stands of Panicum grass) and a class of artefacts directly involved in subsistence activities (i.e grindstones). However, much of the information potential of the sites, their distribution and chronology only became evident when the focus of the research moved from emphasis on site-specific sequences, as at Mickey Springs, to a wider concern with changes in Aboriginal landuse. In turn this necessitated, in fact developed from, the mapping of local resource structures by specialists from other disciplines as a basis for interpreting site distribution and contents. Many of the issues now current in Australian prehistory are implicitly concerned with changes in Aboriginal landuse and will only be resolved when appropriate data collection strategies are utilised.

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The terrain unit mapping and botanical collections were undertaken by Gethin Morgan and Jenny Terrey. The faunal survey was conducted by Malcolm Abel, who along with Steve van Dyke and Greg Gordon, also identified excavated bone. Mike Smith and Richard Fullager examined excavated grindstones. Brian Rough and Stan Robinson advised on historical artefacts.

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APPENDIX 1 - LANDS OF THE PRAIRIE/PORCUPINE GORGE SYSTEM, UPPER FLINDERS RIVER, NORTH QUEENSLAND HIGHLANDS.

GETHIN MORGAN AND JENNY TERREY

Landwater Management
Townsville

INTRODUCTION

The Gorge systems of Porcupine and Prairie Creek, are upper tributaries of the Flinders River, 45km NNE of Hughenden. The associated landscape is dominated by basalt capped tablelands of the southern part of the Einasleigh Uplands (Stanton and Morgan 1977) and deep gorges of tributaries that have cut into the underlying sandstones. The strongly monsoonal climate has led to the development of relatively open vegetation, with ironbark woodlands dominating the basalt areas, and bloodwood woodlands the sandstone gorges.

Due to its remote location the area has not been studied in detail. The most comprehensive work available is the Leichardt-Gilbert regional survey published by CSIRO (Perry, et al. 1964). The area has a long history of grazing, but there has been no land improvement and no non-native plant species were found during the course of field work.

Field work was undertaken during June, 1986. Mapping units were delineated on air photos of approximately 1:84,000, and representative sites within each were described during field traverses along Prairie Creek. Of the area mapped only the eastern plateau and the gorge of Prairie Creek were readily accessible for field work, and plant collection was limited to those areas. Aboriginal plant use, associated with the sites, was also likely to be largely centred on these areas.

CLIMATE

Lying on the western fall of the Great Dividing Range, the area is a rainshadow to easterly influences, receiving most rainfall from the north-west. This falls largely during the period between November and April, with up to 80% of the annual rainfall of 500mm falling between December and March. Annual variability is high, with a mean deviation of up to 35% of the mean annual rainfall. Average temperatures are relatively high throughout the year, reaching a maximum during November and December before the onset of cloudier skies associated with the wet season. Maximum temperature may exceed 38^{o} C in December while the average annual minimum of approxi-mately 8^{o} C occurs during July. Frost occurs occasionally in some areas.

GEOLOGY

The basement sandstones of the study area were deposited during the early Cretaceous and late Jurassic periods as part of the north-eastern margin of the Great Artesian Basin (GSQ 1975). These outcrop in the middle reaches of Prairie Creek gorge as massive medium and coarse grained sandstones, interbedded in places with fine sandstones. They are predominantly white, with pink and light yellow iron staining in the upper strata, and have a total outcrop depth of approximately 70 metres.

The basement sandstones are overlain by Cretaceous (Vine and Paine 1974). The basal stratum is composed of interbedded layers of fine sandstones and claystones and is overlain by a coarse but poorly consolidated sandstone that has been kaolinized in its lower parts. Its upper parts are characterized by a well developed lattice of ironstone that forms the roofs rockshelters.

Two other major strata overlie the ironstone lattice; both are predominantly coarse sandstones that are poorly consolidated and deeply weathered. The lower stratum becomes coarser at depth, and its upper parts are heavily ironstained, with orange and pinkish red on a white matrix. The topmost strata of the Cretaceous deposits is a coarse sand with quartz gravel prominent. Its upper parts are laterized but the ironstone formed is soft.

The Mesozoic sediments are overlain by a series of Tertiary or early Pleistocene basalt flows (Coventry et al. 1985) each approximately four metres thick. These flows belong to the Sturgeon Volcanic Province (Twidale 1956). Three can be readily identified. The lowest basalt flow is deeply weathered and is fine-grained. This is overlain by a vesicular basalt, which is in turn overlain by an olivine basalt. Near Prairie Creek, the separate flows form a stepped landscape of ledges and "breakaways".

Early Pleistocene terrestrial deposits overlie the basalts, being residual and flood-out deposits derived from the higher eastern margins of the Great Artesian Basin. They are discontinuous within the study area but are better developed in the east, on the central parts of the plateau. They are predominantly medium to coarse-grained sands and loams.

Micro-relief on the plateau surface has channelled the fine fraction of weathered basalt on to lower basalt ledges in the west, adjacent to the plateau fringe. These areas have distinctive black soils. Colluvial deposits occur adjacent to scarps, and coarse sand deposits form discontinuous banks along Prairie Creek.

LAND UNITS

Land units are small areas of land that are relatively homogeneous and have a characteristic combination of landform, soil and vegetation. They provide a basis for describing and predicting the distribution of plant and animal species. Land units can be primarily delineated on the broad geologies, each major geology having a distinctive suite of plant species. Individual units within each geology are separated according to finer geological differences and the resulting differences in landform, soils and vegetation. The vegetation of each unit is described only by its dominant and characteristic species.

Additional species are shown in Table A1. As fieldwork was undertaken during the dry season, and was preceded by three years of drought, this species list is incomplete. The vertical and horizontal arrangements of land units are shown in Figures A1 and A2 respectively.

Basalt

The area is dominated by an extensive basalt plateau, bisected along the creeks, by a deep gorge incised into shales and sandstones. The basalt is largely overlain by shallow, terrestrial deposits of sands and loams, with bedrock outcrop scattered throughout. Nearer the gorges, basalt is dominant. These areas can be described by four units:

1. **Main Plateau** - The plateau surfaces are characterised by an undulating plain with red earth soils, and a woodland, about 14m tall, dominated by ironbark (Eucalyptus sp. aff. E. crebra) and ghost gum (E. papuana). The soils are relatively shallow and basalt outcrops in some areas, especially towards the western fringes of the land unit. Western bloodwood (E. terminalis) is present as a low tree to about 8m. There is a sparse shrub cover and the dense, mid-height grass layer is dominated by spear grass (Heteropogon contortus) and wire grass (Aristida latifolia and A. leptopoda). Occasional depressions within this unit have a woodland of Brown's box (E. brownii), which reaches around 15m, on greyish-brown clays and reddish-brown loams. The greyer soils have an understorey similar to Land Unit 2. Rocky areas are dominated by ironbark and spinifex (Triodia pungens).

2. **Black Soil Plains** - On some parts of the plateau surface, particularly to the south and east of Quippenburra Cave, there are extensive areas of black soil plain. These largely occur on the vesicular basalt of the middle flow, but are predominantly alluvial in origin, receiving overland flow of fine basaltic material and organic matter during periods of heavy rainfall. Rounded floaters of basalt are common in most areas, occupying between 50% and 80% of the soil surface. The unit is characterized by cracking, self-mulching, black clay soils.

The vegetation is a tussock grassland with a well-developed herbaceous component. Prominent species include wiregrass (A. latifolia), spear-grasses (H. triticeus and H. contortus), native millet (Panicum decompositum), nut grass (Cyperus victoriensis), Wedelia asperrima and Boerhavia sp. Acacia farnesiana occurs as a shrub on higher areas, and sandlewood (Santalum lanceolatum) and whitewood (Atalaya hemiglauca) occur as isolated, low trees or in small clumps on rocky outcrops, particularly towards the fringes of the unit. Smaller areas of black soil occur within Unit 3 where alluvial areas cross that unit.

3. **Breakaways** - The margins of the basalt plateau areas are characterised by increasing rock outcrop bordering a steep, rocky breakaway into Prairie Creek gorge. The euchrozem soils of this unit carry a vegetation characterised by a well developed ground-cover of spinifex and a prominent lower tree story of Terminalia aridicola. The tree story is a woodland or open woodland up to 7m tall, dominated by ironbark and western bloodwood, with sparse ghost gum also usually present. Where deeper, darker soils occur, kangaroo grass (Themeda australis) and black speargrass (Heteropogon contortus) dominate the ground cover. Small areas of black soil occur in some areas. Basaltic colluvium from this unit extends on to the underlying Cretaceous sediments.

4. __Scree__ - In a few areas, Land Unit 3 is obscured by a scree of large basalt boulders, individual rocks reaching 2m in diameter. These sites have an open, softwood scrub in which kurrajong (Brachychiton australis) is the most prominent tree species. Other species include propeller tree (Gyrocarpus americanus), Alectryon connatus, Homalium brachybotrys and native grape (Cissus repens).

Cretaceous sediments

These sediments are obscured to varying degrees in their upper parts by basaltic colluvials, while their lower boundary is sharply defined by a vertical scarp of coarse, Jurassic-Cretaceous sandstones. Units dominated by Cretaceous sediments (5, 6, 7) are mapped as Unit A in Figure A2.

Three distinct land units are present: steep upper slopes on deeply weathered sandstones, a ledge and minor scarp on laterized sandstone (within which the rockshelter occurs), and a lower slope dominated by finely bedded sandstones and shales. The units form an intermediate, sometimes broadly ledged area, between the basalt plateau and the precipitous massive sandstones of the gorge proper.

5. __Upper Slopes__ - These steep, upper slopes are formed on two major strata of deep-weathered, coarse sandstone. They have coarse lithosols with outcrop and basalt boulders common. The vegetation is similar to that if Unit 3, being an open woodland of western bloodwood, with occasional ironbark and ghost gum, and a ground story dominated by spinifex. Terminalia aridicola forms an open, lower tree story. Larger creeklines in this unit, which on their lower reaches may be cut into the underlying lateritic ledge, have well developed fringing vegetation which includes Melaleuca bracteata, Drypetes australasica, Diospyros ferrea var. humilis, and Geijera salicifolia var. latifolia.

6. __Lateritic Ledge__ - This unit is characteristically a gently sloping ledge, in places reaching a 100m wide, in others no more than a few metres. The ledge surface is usually bare, with spinifex or kangaroo grass growing in any soil present. Normanton box (E. normantonensis) and western bloodwood occur on broken areas associated with the outer parts of the ledge. There is usually a scarp formed by the hardened upper parts being undercut by weathering of the softer lower parts of the strata. The shelter was formed by this process.

7. __Footslopes__ - The finely-bedded sandstones and siltstones of this unit typically form a gentle rocky slope, although in places it narrows to a few metres and becomes steep. The soils are fine, rocky lithosols. The vegetation is a woodland or mallee thicket to 10m-tall of Normanton Box with a prominent shrub layer of Acacia sp. (c. 4m tall). Western bloodwood is generally present, particularly adjacent to the underlying sandstones where Hovea lanceolata is a common shrub. Grasses are sparse.

Late Jurassic Sandstone

These late Jurassic and early Cretaceous sediments are dominated by coarse, massive sandstones, which have been undercut to form a narrow gorge. Three main strata occur: an upper unit of massive sandstone that forms a sheer scarp, a middle unit of bedded, finer sandstones, and a basal unit of coarse, massive sandstones. These three strata and the bed of Prairie Creek and its associated alluvials form four distinctive land units (8, 9, 10, 11, 12) which are mapped as Unit B in Figure A2.

8. **Upper Scarp** - This sheer face of sandstone carries little vegetation, having occasional western bloodwoods on the more exposed aspects, and Drypetes australasica, Homalium brachybotrys and kurrajong on creeklines and the more sheltered aspects.

9. **Bedded Sandstones** - These sandstones form a steep to very steep, slightly stepped unit with skeletal soils. Due to its sheltered position within the gorge proper, and more porous parent material, it has a well developed vegetation cover. Western bloodwood and ghost gum are prominent on rockier areas, with an understorey of D. australasica and H. brachybotrys, while Canthium attenuatum, Dodonea viscosa subsp. mucronata, Hovea lanceolata and Acacia sp. and a sparse but diverse grass cover occur where soil has accumulated.

10. **Talus** - In some areas, particularly on meanders where the basalt flows of the tableland come close to the gorge edge, an open softwood scrub occurs on basalt-enriched talus, overlying the bedded sandstones of Unit 9. These are dominated by kurrajong, which may reach 7m and have a diverse and prominent tall shrub and low tree layer. Other species present include Grewia scabrella, Lysiphyllum hookeri, Croton phebalioides and C. arhemicus. The lower part of the talus is cemented, possibly as a result of laterization.

11. **Lower Scarp** - The massive sandstones of the lower scarp, due to their sheltered position and favourable moisture balance, are relatively well vegetated. Species growing in cracks and bedding planes include ghost gum, western bloodwood, L. Lookeri, H. brachybotrys, Burdekin plum (Pleiogynum timorense), Denhamia oleaster, kurrajong, Ficus virens var. sublanceolata, F. obliqua var. petiolaris and E. gilbertensis.

12. **Prairie Creek** - The creek bed is incised deeply into coarse sandstone, and is characterised by boulder and gravel beds, sand banks and deep holes. Creek flow is seasonal, although the deeper holes in shaded areas would hold water all year. The most common tree species present is river red gum (E. camaldulensis), with occasional river oak (Casuarina cunninghamiana), sand-paper fig (F. opposita) and sand fig, F. superba var. henneana, Anisomeles malabarica is a low pea that occurs on sand deposits, while Cyperus javanicus lines some waterholes.

DISCUSSION

In addition to describing the presence and distribution of plants likely to have been used, land units also provide a basis for determining the distribution of fauna within the environs of sites and for assessing any contamination of rockshelter deposits. Contamination by organic matter from plant species growing below roof openings would have occurred. These species are marked by an asterisk on Table A1. In addition, surface wash from Units 3, 5 and 6, above shelters, may also have contaminated the deposits, although this is likely to be minor.

The list of useful plants collected (Table A2) should be viewed in light of the prevailing drought, incomplete information on Aboriginal uses, and the indirect effects of European land use on the natural plant communities. In particular, the altered fire regime, the selective grazing of cattle, the effects of trampling on soil and plants, and the opportunistic collection of plant species, such as sandalwood, by early settlers, are likely to have had a profound influence on the distribution and abundance of some species.

As would be expected, the land units with the most fertile soils (principally those of the basalts), or the most favourable moisture regime (the most sheltered sandstone stratum, fed by groundwater and adjacent to the creeks), have the highest number of food plants. In the gorge bottom, plant foods are dominantly fruit, such as figs and the Burdekin plum, while on the basalts, seeds and roots are the main types of plant food available.

The large number of grinding stones present at both rockshelters and open sites along Prairie Creek indicate that seeds were an important source of food. Of the seed plants available, native millet is the only species currently present in sufficient density to be considered a staple. This species is widely reported in the literature as providing an important and nourishing food, the seed heads being stacked in piles for drying, and the seeds falling to the ground. Unit 2 is the only unit in which native millet occurs, and a number of grinding stones found in the open occurred in association with these black soils.

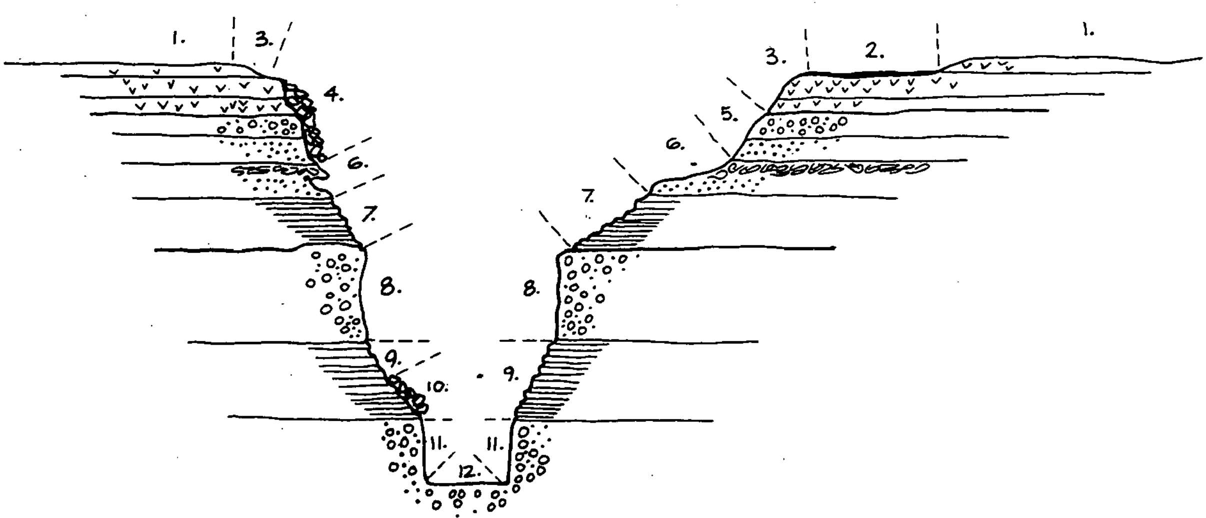

Figure A1. Cross-section for Prairie Creek showing the vertical arrangements of terrain units.

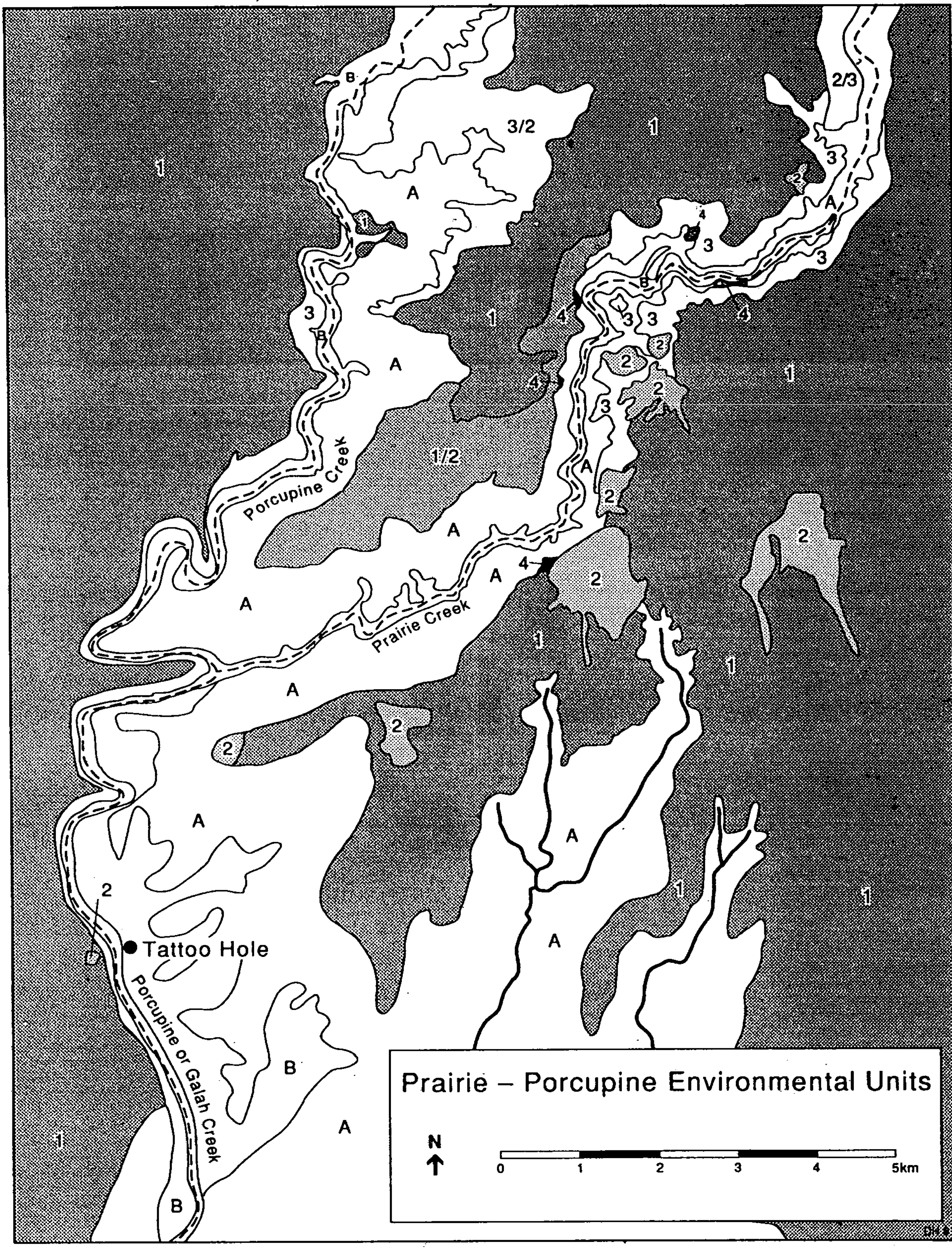

Figure A2. Distribution of terrain units along Prairie and Porcupine Creeks, upper Flinders River.

Table A1. Plants species collected in the Prairie-Porcupine Creek area.

NAME	LAND UNIT 1	2	3	4	5	6	7	8	9	10	11	12
AMARANTHACEAE												
Ptilotus corymbosus		3										
ANACADACEAE												
Pleiogynum timorense											2	
APOCYNACEAE												
Carissa lanceolata	3		3			2*						
Parsonsia lanceolata				3								
ASCLEPIADACEAE												
Marsdenia leptophylla	3											
Sarcostemma australe				3								
ASTERACEAE												
Olearia xerophila									3			
Pterocaulon serrulatum	3											
Wedelia asperrima	2	1										
BORAGINACEAE												
Trichodesma zeylanica	3											
CAESALPINACEAE												
Cassia concinna	3											
Lysiphyllum hookeri			3						2	2	2	
CAPPARACEAE												
Capparis canescens			3									
CASUARINACEAE												
Casuarina cunninghamiana												3
CELASTRACEAE												
Denhamia oleaster											2	
Maytenus cunninghamii	3		3									
COMBRETACEAE												
Terminalia aridicola			1			3			1			
CONVOLVULACEAE												
Ipomoea hastifolia				3								
CYPERACEAE												
Cyperus gilesii		2										
Cyperus javanicus												2
Cyperus victoriensis?		1										
Scleria brownii	3											
EBENACEAE												
Diospyros ferrea var. humilis					3						3	
ERYTHROXYLACEAE												
Erythroxylon australe						*	3		3			
EUPHORBIACEAE												
Croton arhemicus							3	3	2			
Croton phebalioides						3*			2		2	
Drypetes australasica					3	*		3	3			
Flueggea leucopyrus					3							
Petalostigma nummularium				3								
Petalostigma pubescens			3									
FABACEAE												
Cajanus acutifolius			3									
Glycine tabacina					3							
Hovea lanceolata							1		3			
Indigofera brevidens var.uncinata	3		3			3						
Indigofera leucotricha						3*						
Indigofera pratensis	2		3									
Rhynchosia minima		2										
Sesbania cannabina		2										
FLACOURTIACEAE												
Homalium brachybrotrys				3		*	3	3	3		2	
HERNANDIACEAE												
Gyrocarpus americanus				2								
LABIATAE												
Anisomeles malabarica												3
LORANTHACEAE												
Amyena miraculosum		3										

Table A1 Continued.

NAME	LAND UNIT 1	2	3	4	5	6	7	8	9	10	11	12
MALVACEAE												
Abelmoschus ficulneus		3										
Sida trichopoda	3											
MIMOSACEAE												
Acacia bidwillii	2		3									
Acacia farnesiana	3	3										
Acacia leptostachya									1			
Acacia multisiliqua									3			
Acacia sp.						3	1		1			
MORACEAE												
Ficus obliqua var. petiolaris											3	
Ficus opposita												3
Ficus superba var. henneana												3
Ficus virens var. sublanceolata											3	
MYRTACEAE												
Eucalyptus brownii	3											
Eucalyptus camaldulensis												2
Eucalyptus gilbertensis											3	
Eucalyptus normantonensis						3	1		3			
Eucalyptus papuana	1		3						1		2	
Eucalyptus sp. aff. E. crebra	1		1									
Eucalyptus terminalis	1		1				2		1		2	
Melaleuca bracteata					3							
NYCTAGINACEAE												
Boerhavia sp.		2										
PITTOSPORACEAE												
Bursaria incana			3									
Bursaria spinosa	3											
POACEAE												
Aristida latifolia	1	1				3	2		2	3		
Aristida leptopoda	1					3	2					
Astrebla lappacea		3										
Cleistochloa subjuncea						2*	3		1			
Cymbopogon bombycinus	3											
Cymbopogon sp.									2	3		
Enneapogon lindleyanus					3				3	3		
Eragrostis megalosperma						*			3	3		
Eriochloa crebra		3										
Heteropogon contortus	1	2	1			3	2					
Heteropogon triticeus	2											
Indeterminate	3											
Indeterminate	3		2									
Indeterminate	1											
Panicum decompositom		2										
Themeda australis	2		1			3	3					
Triodia pungens	3					1	3		2			
PROTEACEAE												
Hakea arborescens			3									
Hakea sp.	3											
Hakea suberea			3									
RUBIACEAE												
Canthium attenuatum						*			3			
RUTACEAE												
Geijera salicifolia var. latifolia					3							
SANTALACEAE												
Santalum lanceolatum		3										
SAPINDACEAE												
Alectryon connatus			3	2								
Atalaya hemiglauca		3										
Dodonea viscosa subsp. mucronata					3	3	2		3			
Heterodendrum oleifolium		3										
STERCULIACEAE												
Brachychiton australis				2				3		1	3	
TILIACEAE												
Grewia retusifolia	2											
Grewia scabrella		3							1	1	3	
THYMELACEAE												
Pimelea decora		3										
VITACEAE												
Cissus repens				2								

*These species occur within the shelter in talus associated with an opening formed by roof collapse.
?Further plant material required for positive identification.
Figures in columns indicate relative densities of species within that unit as follows: 1. Abundant, 2. Common, 3. sparse.

Table A2. Useful plants found in the Prairie-Porcupine Creek area.

SCIENTIFIC NAME	COMMON NAME	LAND UNIT	USES	SOURCE
Abelmoschus filculneus MALVACEAE	Native Rosella	2	Edible roots, shoots, leaves. Stem & root of young plant roasted in ashes.	1 8, 9
Acacia bidwillii MIMOSACEAE	Corkwood wattle	1, 3	Young roots roasted	1, 8, 9
Acacia farnesiana MIMOSACEAE	Mimosa bush	1, 2	Seeds roasted.	1, 4, 8, 9
Acacia multisiliqua MIMOSACEAE	Small-ball wattle	9	Spearheads & fish prongs	6
Boehavia sp. NYCTAGINACEAE	Tar Vine, Hogweed	2	Root roasted (B.diffusa)	1, 4, 6, 8, 9
Brachychiton australis STERCULIACEAE	Kurrajong	4, 8, 10, 11	Roots eaten	1
Capparis canescens CAPPARACEAE	Native date	3	Fruit eaten.	4, 7, 9
Carissa lanceolata APOCYNACEAE	Native scrub lime	1, 3, 6	Fruit eaten. Roots, sap, pulpwood, leaves medicinal	1, 4, 6 3, 5
Cissus repens VITACEAE	Native grape	4	Leaves, shoots eaten.	2
Cymbopogon bombycinus (syn. Andropogon bombycinus) POACEAE	Silky oilgrass	1	Whole plant medicinal	5
Cyperus javanicus CYPERACEAE	Sedge	12	Weaving	2
Diospyros ferrea var. humilis (syn. D. humilis) EBENACEAE	Ebony	5, 11	Fruit eaten	1, 6
Dodonea viscosa SAPINDACEAE	Hopbush	5, 6, 7, 9	Leaves, roots medicinal	3, 5
Drypetes australasica (syn. Hemicyclia australasica) EUPHORBIACEAE		5, *, 8, 9	Fruit eaten	2
Eucalyptus camaldulensis MYRTACEAE	River Redgum	12	Seeds eaten	2
Eucalyptus papuana MYRTACEAE	Ghost gum	1, 3, 9, 11	Gum used on cicatrices Bark medicinal; good burning	6 5
Eucalyptus terminalis MYRTACEAE	Western bloodwood	1, 3, 7, 9, 11	Kino medicinal Manna	3, 5 1, 9
Ficus obliqua MORACEAE	Fig	11	Fruit eaten	4
Ficus opposita MORACEAE	Sandpaper fig	12	Fruit eaten. Leaves for timber working Latex & leaves medicinal Bark used as tie.	4, 6, 9 9 5, 6 6
Ficus superba var. henneana MORACEAE	Sand fig	12	Fruit eaten. Root bark made into string	6 6
Ficus virens MORACEAE	White fig	11	Fruit eaten	4
Glycine tabacina FABACEAE		5	Tap root eaten	2
Grewia retusifolia (syn. G. polygama) TILIACEAE	Emu-berry	1	Fruit eaten. Fruit medicinal. Leaves, roots, bark medicinal Fibres and canes (Grewia spp.)	1, 4, 6, 8 5, 9 1, 3, 5, 6 2

Table A2 Continued

SCIENTIFIC NAME	COMMON NAME	LAND UNIT	USES	SOURCE
Gyrocarpus americanus HERNANDIACEAE	Propeller tree	4	Roots, shoots, charcoal medicinal	3, 5
Hakea arborescens PROTEACEAE	Yellow Hakea	3	Seed eaten raw.	6
Heterodendrum oleifolium SAPINDACEAE	Boonaree, Rosewood	2	Seeds eaten	1
Heteropogon contortus POACEAE	Bunch speargrass	1, 2, 3, 6, 7	Leaves medicinal, narcotic. Calendar plant, flowering indicating end of wet season	3, 5 6
P. decompositum POACEAE	Native millet, umbrella grass	2	Seeds ground & roasted	1, 7, 8
Petalostigma pubescens EUPHORBIACEAE	Quinine berry	3	Fruit, bark medicinal. Fruit, leaves fish poison.	3, 6 2
Pimelea decora THYMELIACEAE	Rice flower	2	Bark used for string (Pimelea spp.)	2
Pleiogynum timorense ANACADIACEAE	Burdekin plum	11	Fruit eaten. Fish poison.	4 2
Pterocaulon serrulatum ASTERACEAE	Toothed ragweed	1	Leaves medicinal	3, 5
Santalum lanceotum SANTALACEAE	Sandlewood, Native plum	2	Fruit eaten. Leaves, bark roots medicinal Berries narcotic.	1, 6, 7, 9 3, 5 5
Sarcostemma australe ASCLEPIADACEAE	Caustic Vine	4	Latex medicinal.	3, 5, 7
Trichodesma zeylanica BORAGINACEAE	Camel Bush	1	Whole plant medicinal	3, 5
Triodia pungens POACEAE	Spinifex	1, 6, 7, 9	Resin used for hafting	2

*Species occurs within the shelter in talus associated with an opening formed by roof collapse.

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APPENDIX 2 - FAUNA OF THE PRAIRIE/PORCUPINE GORGE SYSTEM, UPPER FLINDERS RIVER, NORTH QUEENSLAND HIGHLANDS.

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INTRODUCTION

Sites on the edge of Prairie Creek Gorge have easy access to four distinct ecological zones. The aim of this survey was to determine the faunal species currently associated with each of these zones as a basis for interpreting faunal remains in archaeological deposits. The survey concentrated mainly on the mammals as their bones form the largest and most diagnostic components of the archaeological faunas from the area. The trapping was undertaken under Q.N.P.W.S. Permit. No. T 00320.

METHODS

Elliot traps were used for a total of 386 trap-nights, of which 70 were in Prairie Creek gorge, 112 on the escarpment, 120 on the basalt plateau and 84 on the red soil plateau. Traps were reset and re-baited each night with a mixture of peanut butter and wholemeal bread for the first four nights, then peanut butter and rolled oats for the remainder.

Spotlighting on foot was undertaken on three nights using a "Big Jim" lantern, for about one to one and a half hours on each night. Spotlighting from a vehicle was not practical because of the rough terrain.

Visual observations were made during the day. Several trips were made along the gorge and the plateau for this purpose. Several individuals were photographed for confirmation of identification.

All skulls found during the survey were identified, as were post-cranial bones where possible. Isolated bones were assumed to have been transported from the place of death, they were not included as evidence for species presence in that land unit. Post-cranial bones were only included if there were a number of elements present that could by attributed to the same individual. All skeletons were examined for probable cause of death and possible predators. All tracks and scats were identified as far as possible with unknowns being photographed or collected for later identification.

SPECIES FOUND

Note that the following list describes only those species for which definite evidence was found. Other species almost certainly present include Bat, Native Cat (Dasyurus hallucatus), Rodents (Rattus tunneyi, R. villosissimus, Zyzomys argurus, Pseudomys delicatulus, Mus musculus), and feral cat (Felis catus). The range of faunal species recovered from recent archaeological deposits also includes Leggadina sp., Bettongia sp., Petauroides volans, Petaurus breviceps, Varanus sp., Boidae (python), and fresh-water mussel. See Table A3 for a summary.

Tachyglossus aculateus (Echidna). Common throughout, several sightings, distinctive scratchings and droppings found in each area.

Isoodon macrourus. (Long-nosed Bandicoot). Tracks were noted in soft sand in Prairie Creek gorge, they were indistinct, but much smaller than those of the Rock Wallabies and under a rock ledge too low to allow access to even a juvenile Rock Wallaby. Probable Bandicoot tracks were also noted by another member of the team in the gorge. No positive Bandicoot digging holes were encountered, but there were several areas where these might have been confused with Echidna scratchings or large animal tracks. There seemed to be adequate leaf litter, soft soil, and sheltered areas to support a colony of Bandicoots in the gorge even though the region was in the midst of a drought. Bandicoot bones were found throughout the archaeological excavations including a mandible. In addition, fresh remains of an immature Isoodon macrourus were recovered by a group from Townsville T.A.F.E. in Porcupine Gorge National Park (identified by Greg Gordon, Queensland N.P.W.S.).

Trichosurus vulpecula (Brushtail Possum). Several cranial portions were found in a rockshelter, all attributable to the same individual, a juvenile. Several droppings were noted on a rock ledge on the gorge wall beside what looked like a nest site. No scratchings on trees or any other evidence of their presence was found.

Aepyprymnus rufescens or **Lagorchestes conspiculatus**. Several small wallaby tracks were seen on the red-soil plateau around "One Mile Bore", but no sightings were made.

Petrogale inornata (Unadorned Rock Wallaby). Abundant along the gorge and escarpment. Two mandibles from separate individuals were found in a large rockshelter. Many sightings were made on the escarpment and in the gorge, one individual with a white tail tip was seen briefly by another member of the team in the gorge.

Macropus robustus erubescens (Wallaroo). Common to abundant throughout the area. Many sightings were made, several skeletons were found. Some had been scavenged by dogs or dingoes, while two juveniles found in the gorge had almost certainly been so killed. Males were large and very dark brown to orange in colour, females were much smaller and grey in colour.

Macropus rufus (Red Kangaroo). This species was the most common on the red-soil plateau, but did not occur in the immediate vicinity the gorges. One skull with mandibles attached was found in the gorge, but its position and condition indicated it had been washed in with the last heavy rainfall. Because of the rough terrain, this species would only be found as a transient in the gorge or escarpment areas.

Macropus giganteus (Eastern Grey Kangaroo). Two skeletons were found in the gorge. One was a complete juvenile that had been recently killed and eaten by dogs. The other consisted only of a skull, atlas and axis, which appeared to have been washed in from further upstream. Although this species was common on the lower plains around "Wongalee" homestead, no other evilence of it was found in the area surveyed. Like the Red Kangaroo, they are probably only visitors to the gorge area as the terrain is unsuitable.

Macropus Parryi (Pretty-face or Whiptail Wallaby). These were common on the red-soil plateau over 3 km from the gorge. They were in larger numbers on the lower plains.

Wallabia bicolor (Swamp Wallaby) One individual was briefly seen in the spotlight along the edges of the escarpment.

Hydromys chrysogaster (Water Rat). Several tracks were found in wet sand around rock pools in the gorge. Remains of freshwater crabs were found that indicated predation by this species.

Canis familiaris (Dingo). Fresh tracks were encountered almost every morning in the gorge. These were mostly from one individual with a possible second one appearing occasionally. Several kill-sites were also found (mentioned above). Tracks were also noted from the red-soil plateau on one occasion. No sightings were made and very few scats were found.

Table A3. Mammals present in the Prairie Creek Gorge area.

AREA	SPECIES PRESENT	EVIDENCE*	OCCURRENCE
Escarpment	Tachyglossus aculateus	A, D, E.	common
	Petrogale inornata	A,D.	common
	Macropus robustus	A, C.	abundant
	Macropus dorsalis	A (indistinct).	possible
	Oryctolagus cuniculus	A, C, D.	uncommon
	Bos sp.	B, D.	uncommon
Gorge (Prairie Creek)	Isoodon macrourus.	B,C.	uncommon
	Tachyglossus aculateus	A, D.	common
	Trichosurus vulpecula	D.	uncommon
	Petrogale inornata	A, C.	abundant
	Macropus robustus	A, C.	common
	Macropus rufus	C (wash in).	probable
	Macropus giganteus	C.	uncommon
	Hydromys chrysogaster	B.	common
	Canis familiaris	B, D.	common
	Bos sp.	C, D.	uncommon
	Equus caballus	A,B.	uncommon
	Sus scrofa	A,B,D.	uncommon
Black soil Plateau	Tachyglossus aculateus	A.	common
	Macropus robustus	A.	abundant
	Bos sp.	D.	uncommon
Red soil Plateau	Tachyglossus aculateus	E, D.	common
	Aepyprymnus rufescens?	B.	uncommon
	Lagorchestes conspiculatus?	B.	
	Macropus robustus	A, C.	common
	Macropus rufus	A.	uncommon
	Macropus parryi	A.	uncommon
	Canis familiaris	B.	uncommon
	Oryctolagus cuniculus	D.	uncommon
	Bos sp.	A,B,C,D.	common
	Sus scrofa	A,C.	uncommon

* A = sight; B = tracks; C = skeletal; D = droppings; E = scratchings

Introduced feral animals.

Oryctolagus cuniculus (Rabbit). Although no evidence of them was found by Morwood in his 1984 visit, this species was well established in June 1986 along the escarpment and plateau. Several sightings were made. Burrows were causing disturbance to the deposit in the cave.

Bos sp. (Cattle). These were found in each area but were uncommon in the gorge and along the escarpment. They were in very high numbers around the dams on the property but numbers dwindled substantially as the distance from the dams increased.

Sus scrofa (Feral pig). A large herd was observed in Prairie Gorge where scats were common. A skeleton was also found beside "One Mile Bore", and some piglets were seen in the same area one evening.

Equus caballus ('Brumbies'). Herds were observed on the red soil areas of the plateau and in the more open sections of Prairie Gorge. Together with cattle and pigs these make use of well defined 'pads' to move down the scarps from plateau areas to permanent water holes within the gorge systems.

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