The Artefact 12 (1987/88)

The Cave Art of Western Australia

Robert G. Bednarik*

Since the discovery of extensive anthropic markings in Koonalda Cave (Gallus 1968), a major corpus of cave art has been discovered along the Southern coast of Australia. It includes the worlds largest regional concentration of cave art, a series of twenty-five sites near Mount Gambier, South Australia. Five basic petroglyph types have been distinguished and it has been established that they represent at least three temporally discrete traditions. The two older ones are believed to be of Pleistocene age (but see Frankel 1986), although absolute dating remains elusive. Direct radiometric minimum dating is available from Malangine Cave (Bednarik in prep. a). Circumstantial minimum dating has been attempted at Koonalda Cave (Wright 1971), and can be inferred in Orchestra Shell Cave (Hallam 1971).

It should be emphasised that the term 'cave art' is restricted here to prehistoric, consciously modulated markings on the walls and ceilings of caves, specifically deep limestone caves. Twenty years ago there was no evidence that prehistoric Australians had ventured into deep caves, let alone had undertaken long and arduous subterranean journeys, as their Pleistocene contemporaries of western Europe certainly did. Lane and Richards (1966) mentioned that occurrences of hand stencils were recently located in Old Kudardup Cave, in the south-west of Western Australia (Morse 1984). These paintings are located close to the entrance of the cave, well within the reach of daylight. They are not evidence of a prehistoric predilection for deep caves, and the same applies to the numerous art sites in the cave district and Chillagoe, north Queensland (David and David 1988). The sixteen red hand stencils in Ballawine Cave, however, are well beyond the limit of daylight, and the art in this south-western Tasmanian cave has been suggested to be of Pleistocene age (Brown 1987).

The considerable scepticism Gallus (1986) aroused when he announced that wall markings in Koonalda Cave, up to three hundred metres from the entrance were made by humans in the late Pleistocene, is understandable. What made his claims even more incredible was his insistence that early Australians had engaged in systematic underground mining of chalcedony (but cf. Bednarik 1986 a).

Incredible as they may have appeared, most of Gallus's claims have since been authenticated (Gallus 1986), but one important aspect of the Koonalda markings remains neglected. As in Australia, rock art in western Europe commences apparently with finger flutings in caves. Is this striking parallel based on diffusion, or on a similar but autochthonous development in two regions which are not only as far apart as is geographically possible, but which also mark the two extreme ends of the territory known to have been occupied by modern humans around the time they emerged? In the thirty years since the discovery of the Koonalda markings (in 1975), few people have pursued the weighty questions posed by their presence. The Parietal Markings project (Bednarik and Bednarik 1982; Aslin, Bednarik and Bednarik 1985) is concerned not only with these questions, but also with various related topics, such as resolving the Australian controversy on distinguishing artificial cave markings from natural ones (Bednarik in prep b). The polarisation of opinions in this area was predictable, but in view of our extensive study on this subject, gained through a definitive study covering hundreds of caves in many countries, we consider the matter as largely resolved. We have also added considerably to the knowledge about some of the French sites of archaic cave art (Bednarik 1986 a, b).

Two of the Pleistocene cave art sites presently known in Australia are in Western Australia and although they are comparatively minor they are noteworthy as the western-most examples of the tradition. In this paper, I will discuss them as components of the southern Australian cave art tradition rather than as isolated phenomena.

Orchestra Shell Cave Revisited

Hallam's (1971) description of this cave, and the markings she observed in it, is admirably complete and there are only a few comments I should add. I am in agreement with her tectonic interpretation of the cave (Aslin and Bednarik 1984a:39), with her statement regarding the chronological position of the markings relative to the evidence of geomorphological processes active in the cave (tectonic adjustments, speleothem formations), and with the postulation that the markings were not made by animals. Animal scratch marks are common in caves throughout the world and I have studied them in some detail in over 240 caves. Contrary to the belief of some writers (e.g. Walsh 1964), animal marks commonly occur on flat cave ceilings, therefore a ceiling location as such is no evidence of human involvement. The artefactual status of the patterns in Orchestra Shell Cave (OSC) is not derived from their position on the ceiling; it is demonstrated by their having been made by human fingers and, in a few cases, by hand-held

pieces of the local aeolian limestone. They were originally executed on the soft Montmilch [a pasty, white precipitate in caves (see Schmid 1958)] which Australian speleologists call 'moonmilk' deposit. The finger flutings were later masked by an extensive growth of speleothems (Moor 1952). The behaviour of the migratory carbonates determined the eventual contour of each groove's cross-section, and the groove width is now a function of precipitate density. The cross-section is also influenced by the inclination of the cave ceiling. Hallam's (1971:Fig. 3) 'Exaggerated Section of X' in fact illustrates very well the results of this process on a sloping ceiling, and this form of speleothem deposition has been described in detail (Bednarik 1985, in prep. a).

It is difficult to see how Hallam arrived at her view that the markings 'were almost certainly not done with fingers' (Hallam 1971: 100). She appreciates that the surface must have been softer than it is today, that the exudations postdate the grooves, and even that the 'perhaps most important feature of the engravings is their relationship to the calcitic excrescences'. She mentions the unmodified finger marks in nearby Ross's Cave (which are modern, as she suggests), and she even observes the 'flat-bottomed, relatively wide and shallow' section of at least some of the grooves (Hallam 1971: 95, 97). Indeed, none of the markings in OSC resemble claw scratches.

Finger markings masked by practically identical deposits of younger precipitate occur at several other of the approximately thirty-five sites of prehistoric finger fluting presently known in the world. At Malangine Cave these formations were in fact used to obtain a minimum radiometric age for the preceding petroglyphs. Both there and at Croze a Gontran (Dordogne), I have observed examples of well preserved, unmodified finger grooves that enter zones of heavy speleothem growth where they disappear under the cauliflower-like deposit, recognisable and are only by a thin cleft in the sometimes several-centimetre-thick growth (Bednarik 1985: Fig. 60). There are other sites with such deposits over finger fluting, especially in the western part of the Snake Hill Complex and Karake Cave (Aslin and Bednarik 1984b).

Another factor likely to persuade an observer that the lines in OSC could not have been produced with finger tips is their spacing (Hallam 1971: 100). The average value for the sets in Hallam's Figure 3 is 15.5 mm, which compares closely with my data from other Australian sites, as well as those of European sites. [I have not taken measurements of those markings in the cave that Hallam examined, only of those she did not see.] The lowest mean values I determined so far are 12.7 mm and 11.8mm. The former being for the eighteen surviving identifiable sets of what I regard as the oldest

of the three generations I postulate for the finger markings at Baume Latrone (southern France), and the latter for the few sets in Koorine Cave (Aslin and Bednarik 1984 c). Juvenile sets of finger lines are well represented at most known sites on both continents, and this has been interpreted as evidence of initiation rites in the so-called 'sanctuaries' deep in the caves. Elsewhere, I have discussed the incidence of juvenile finger markings in considerable detail (Bednarik 1986 b).

Hallam realises that the arrangement and location of the markings she describes renders an identification of them as animal scratches as unlikely, and by 'emphatically' discounting their being finger grooves, she forces herself into proposing the implausible involvement of a hand-held animal claw. But such an implement would be unlikely to produce the flat-bottomed marked she observes, or the splayed sets which are in fact a hallmark of the digital fluting tradition. I have reviewed - and, I think, refuted - the 'hand-held claw hypothesis' (Bednarik, in prep. b).

Although I recognised the significance of the markings in OSC at my first visit in 1978, by a return visit in 1984 I had acquired much more knowledge about parietal markings. Some very salient features in Hallam's part of the cave which I had not noticed earlier now appeared obvious, such as traces of former floor travertine (carbonate speleothem) deposits and clues to the cave's past environments. A group of markings on the underside of a very large, detached and lowered roof slab in the eastern part of the cave now warranted detailed examination because of their potential in dating the rock art. The dense travertine skin on part of the slab's underside differs from the general ceiling deposit; the variation may be attributable to the different hydrological conditions created by the rock fall, or to different conditions of preservation. The markings on the slab form a series of nineteen flat grooves, 6-10 mm wide and 33-65 mm long. They are subparallel but individually made, very well preserved, fully hardened and almost free of subsequent deposit. The markings possess distinct longitudinal, parallel striations which show very clearly that they were executed with an object (or objects) whose blunt working point had fine irregularities. I have noted similar striations at several other Australian sites, in tool markings associated with finger fluting, especially in Nung-kol Cave (Mount Gambier) where they are very common and particularly well preserved.

OSC is located near a small, swampy lake, Lake Neerabub, whose low ph water buffers a phreatic reservoir that has caused several subsidences along the side of a low limestone ridge. The cave was formed by one of these subsidences and its entrance lies on a fault line that can be easily discerned over a length of about sixty metres. Cavities

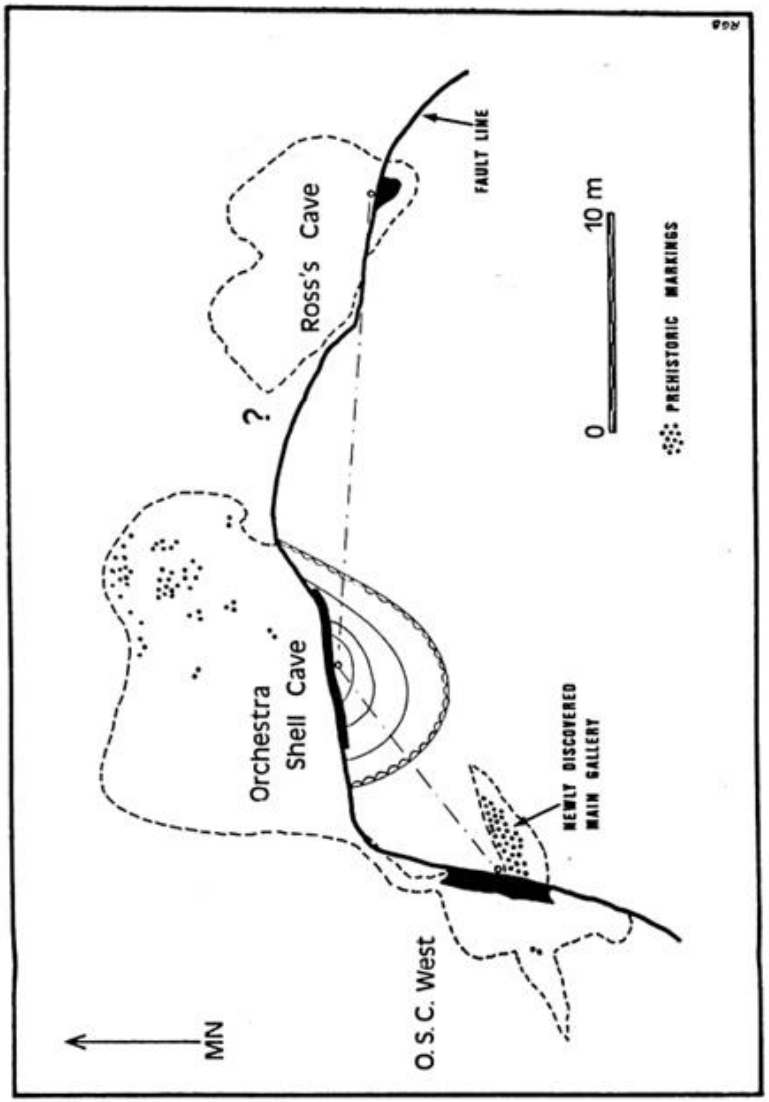

Figure 1 Orchestra Shell Cave.

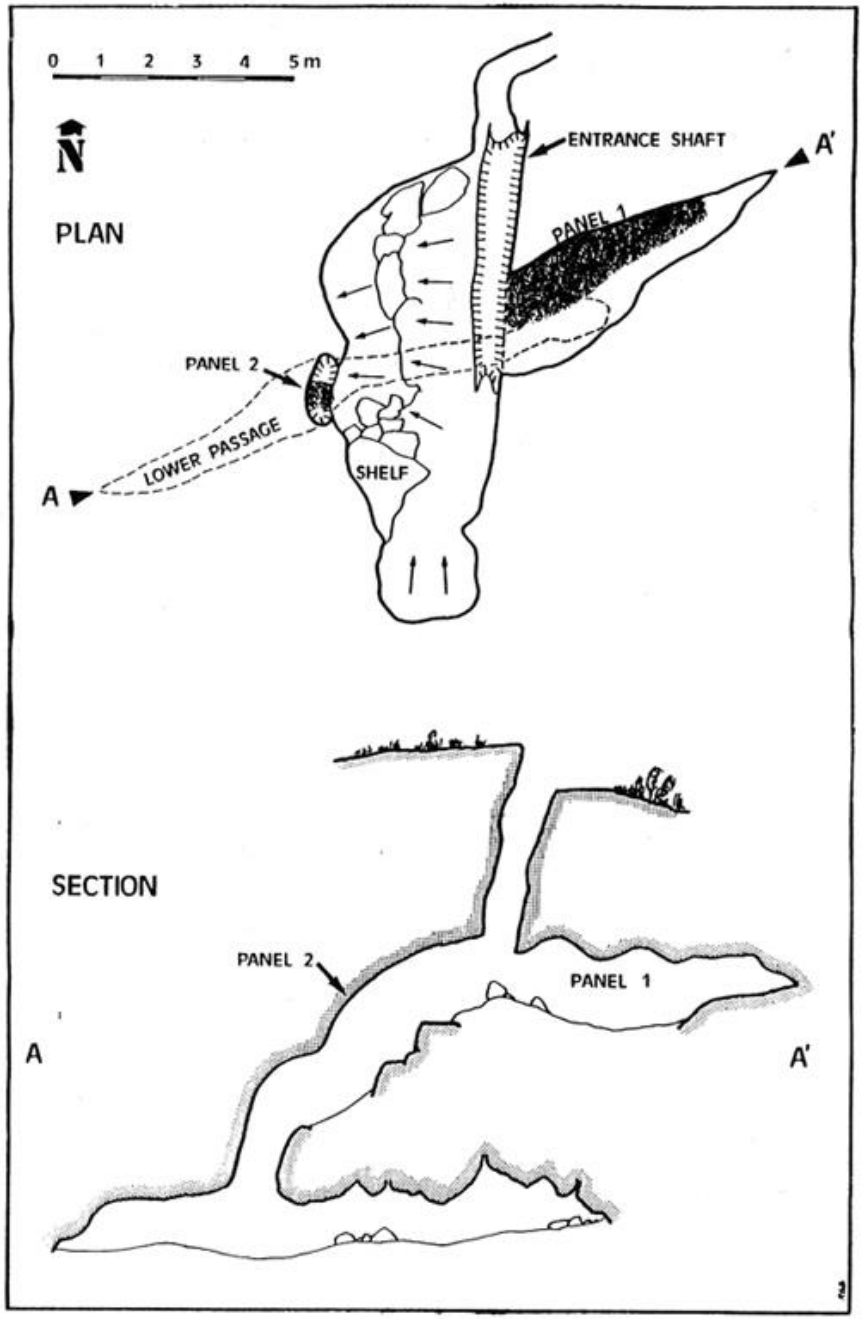

Figure 2 Orchestra Shell Cave.

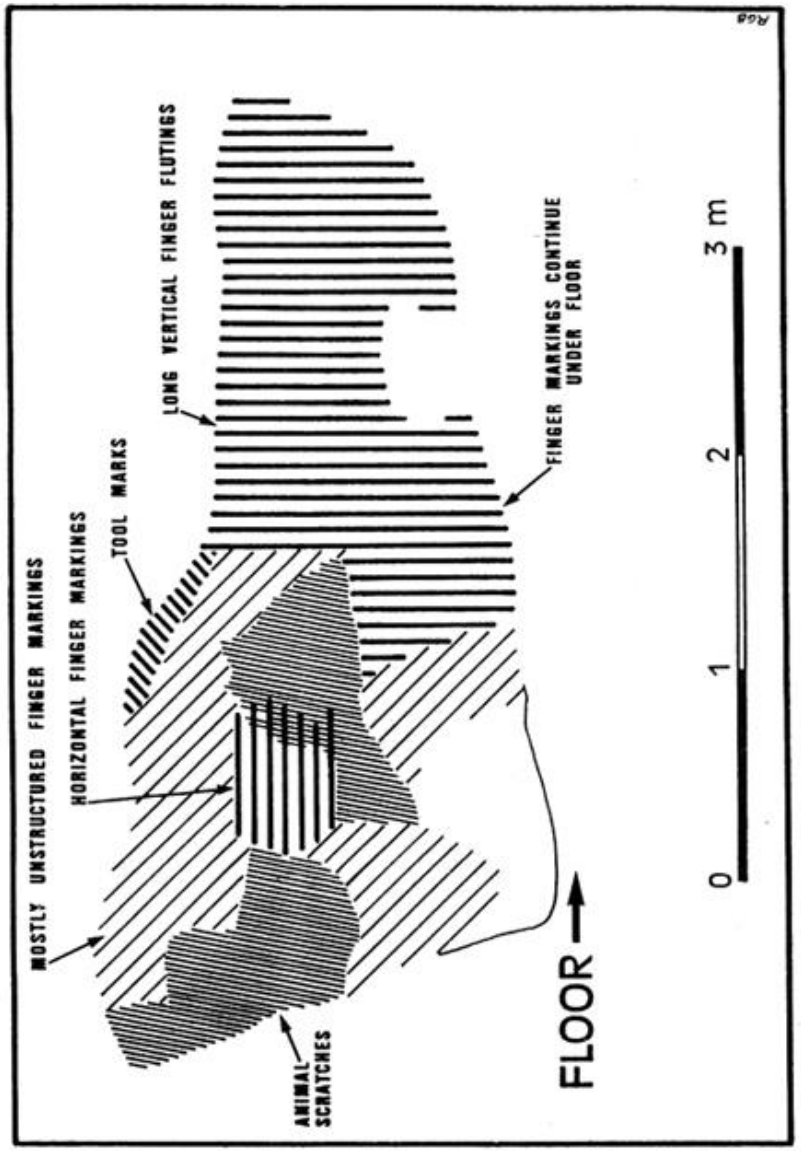

Figure 3 Orchestra Shell Cave; art panel.

exist all along this fault, but human access is only possibly in three places (Fig. 1). The easternmost entry is a small hole leading into Ross's Cave, which is morphologically part of the OSC complex, although not accessible from the main cave. Substantial soft Montmilch deposits are up to 70 mm deep here and cover most surfaces up to about six metres vertically below the surface. This recent, still 'active' deposit bears copies of the prehistoric markings in the nearby main cave, but they are obviously modern, although I am mystified by Hallam's comments attributing them to children; their spacings are among the largest I have ever seen. Modern finger markings in caves are a surprisingly rare phenomenon; I have observed them in only five other sites in Australia.

West of the large, downward-sloping entrance to OSC the fault turns south, consisting in part of a vertical crevice that is just wide enough to permit access by humans. Some athletic effort is required to descend the four metres to reach the floor of this crack (Fig. 2) and enter a small room that slopes down steeply over large boulders, to terminate in short, horizontal passage about nine metres below the surface.

At the bottom of the entry shaft, a well-concealed passage leads off towards north-east, accommodating the main art gallery of the OSC complex. It is of triangular section, roughly horizontal and has a dark, humic floor deposit. Initially over two metres wide and about 1.2 metres high, the passage gradually narrows and becomes impassable after six metres. The south-east wall is almost vertical and has a heavy growth of mushroom-like carbonate speleothem which is still slightly soft. The north-west wall has a cutaneous deposit of around 10 mm thickness which is fully hardened and has experienced local exfoliation, but generally remains very stable. This entire wall of almost seven square metres is completely covered with markings, most of which are of human origin. Just next to the entrance of the passage are concentrations of animal scratch marks which are superimposed over finger lines and which evidently cover a long time span: some were done when the surface was only partly hardened, others when it was almost completely stabilised. The width of individual claw incisions never exceeds 1 mm and some arrangements suggest 'vertical clawing' by a single species (Bednarik, in prep. b). These scratch marks are restricted to the first half of the panel and appear to have been caused by a species lacking climbing ability.

In contrast to the markings described by Hallam, the finger lines in this newly-discovered gallery are mostly free of subsequent precipitate deposit, are fully hardened and are very well preserved, although surface corrosion by condensation water and damage by animals is evident.

Vertical, 'flowing' arrangements dominate, but there are also horizontal sets and less clearly structured areas. Some of the long, vertical flutings continue below the present floor deposit and since the lower part of the visible panel is practically beyond human reach now it is reasonable to assume that the floor was quite different at the time these markings were produced.

The north-eastern half of the panel (Fig. 3) is better preserved and it appear to have been re-worked with fingers many times. The upper margin of this part of the panel is formed by a recent fracture where a block has become detached, truncating finger lines. The fracture surface thus exposed has a later deposit of fairly stable 'cauliflower travertine' of 10-20 mm thickness, traces of which are also present on some finger lines. This deposit seems therefore suitable for radiometric minimum dating, as is being conducted at other Australian sites.

At the upper margin of the panel (Fig. 3) are several sets of nonparallel, singly-executed grooves which were certainly produced with a tool. They are very short (40-60 mm), deep, and distinct striations are particularly well preserved in them. These tools marks were superimposed over the finger markings before the deposit became hardened.

Thirty-four sets of two to four finger grooves are sufficiently well pronounced to permit metrical survey. Their minimum mean spacing of 11.2 mm is the lowest ever recorded, and their location confirms what I have emphasised about juvenile finger markings in caves (Bednarik 1986 b: 48-49). Only one set is on the splayed type (4-62-44), most are 'well-flowing', parallel, wide grooves. Long vertical sets in the north-eastern part of the panel flow and emphasise the curvatures of the rock surface, presenting stream-like arrangements. A few intersecting sets, curved sets and horizontal sets occur in the central part of the panel.

In addition to this densely-marked, outstanding panel (it is among the twenty best preserved panels of prehistoric finger patterns in Australia) there is a second, albeit minor, remnant of markings in this new part of the cave, on the ceiling just above the shaft leading down to the lower part. These finger markings are very corroded and barely discernible, covering half a square metre at most.

The described cave is connected to the main cave by a narrow passage which may have permitted access in prehistoric time. The excellent preservation state of the main panel, in comparison to Hallam's markings in the main cave, is attributable to the configuration of the cave spaces and its effect on speleoatmospheric conditions. The ceiling at

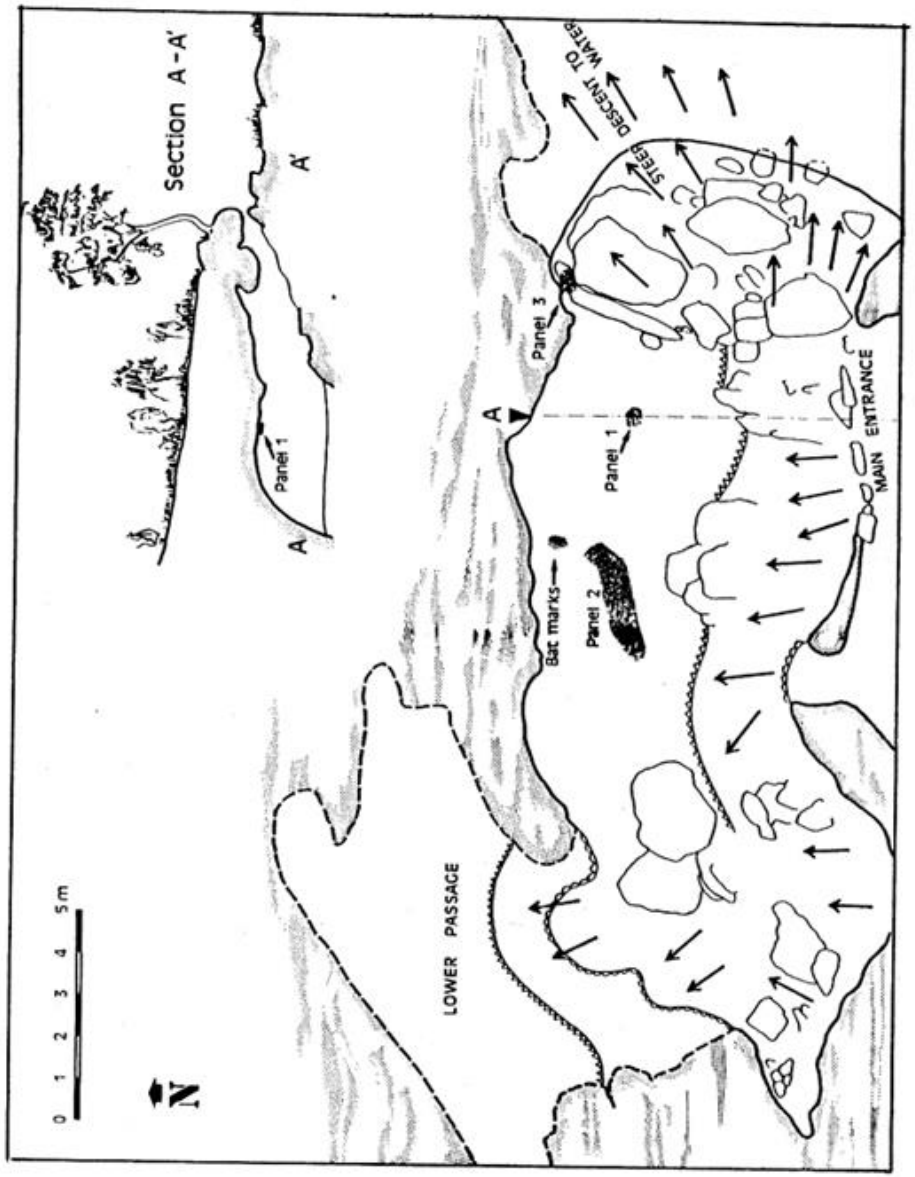

Figure 4 Mandurah Cave.

Hallam's site slopes upwards to the entrance which facilitates air movement and convective temperature exchange; producing the forms of precipitate typically associated with such conditions. The new site is comparatively well sealed and has consistently high relative air humidity (the lowest observed was 89%, when external conditions were 23%) and temperature stability, despite the closeness of the passage to the surface. (I have considered the relationships of finger line preservation, speleoclimate and roof thickness in some detail; Bednarik, in prep. a).

OSC permits other, more important observations but these can only be discussed in the context of the represented 'artistic tradition' as a whole, which is not the intent here. Without relating the site to a large number of other similar sites and systematically eliminating 'irrelevant' data, it is difficult to assess OSC. Considering that Hallam wrote her description of the cave without having seen a similar site, her 1971 paper is an outstanding achievement. It should be noted, for example, that her work is the only description of Australian cave markings prior to 1980 in which the medium is correctly identified, and the only such study that attempted detailed quantitative assessment.

Mandurah Cave

Another cave with markings, south of Perth, is mentioned by Hallam (1975: 84) without further discussion. Dortch (1976: 41-42) briefly mentions markings in a site he call Morfitt's Cave, which appears to be the same site.

A fault along a rocky scarp of aeolioan limestone following the western shore of Harvey Estuary has produced a number of small caves that have a tectonic history not unlike those at Wanneroo. At Mandurah Cave, a major system of collapsed spaces is now accessible at three points. The main entrance is four metres wide and 0.9 metres high, opens south and gives access to the eastern part of a hall that descends in a northerly direction and is mostly 1.5 to two metres high (Fig. 4). Prehistoric human markings are restricted to this part of the cave while animal markings are prominent in the north-eastern passage which leads steeply down to the water table exposed about fifteen metres below the entrance. Extensive modern finger lines occur in the western part of this large cave system, on a white Montmilch deposit that is still forming.

All speleothem formations in the hall adjoining the main entrance are completely hardened and mechanically stable, and most remaining markings are in an excellent state of preservation. This includes even very fine lines which I have interpreted as bat markings, and some faint marks near the entrance that appear to relate to a swallow nest site.

About six metres from the main entrance are a few clearly discernible finger markings on the ceiling, forming Panel 1. Individual grooves are well-rounded in section, totally hardened now and concealed by little precipitate growth. Three sets possess similar finger spacings of about 15 mm, suggesting that they could all have been shaped by the same hand. Other faint grooves are also present.

Panel 2 consists of several groups of mostly short grooves, numbering some hundreds and executed with blunt tools. Striations are clearly visible in more than half the grooves, which cover about two square metres of the horizontal ceiling. In some cases, the cross-sections of individual adjacent grooves as well as the striation spacings in them correspond so closely that we can reasonably assume the repeated use of the same tool. The striations can be easily discerned with the unaided eye and the panel's central group is so well preserved that the scrapings along the groove edges demonstrate the consistency of the medium at the time these markings were made. The grooves themselves vary greatly in width and cross-section, ranging from 1.5 to about 7 mm, but most are around 5 mm wide. There are also a few impact pits where a tool struck the ceiling without abrasive action, suggesting that a tool with a blunt point was involved. At least two point sizes are represented.

At the Mount Gambier cave sites the striations in the tool grooves are more irregularly spaced and sized than at Mandurah Cave. I have conducted experiments with potential tool materials in both regions, using a medium of a consistency similar to that of soft Montmilch (soft cheese to be precise). Neither the end of a green branch, a dry branch, polished wood, or chert produced markings corresponding to those in the caves. But, by using the local Tertiary limestones I could produce striations matching those in the respective regions, and the differences in striation spacing and patterning reflect differences in the limestones' grain structures. This leads me to suggest that the people who produced the tool markings used the resource that was most readily available to them; the clastics on the cave floor they were standing on (cf. also Aslin and Bednarik 1985). But, I am not convinced that the impact marks were also produced with such rocks. They remind me of the gash marks at Malangine Cave (Bednarik, in prep. c) and even bring to mind the behavioral pattern evidenced by the densely-scored panels of rock that take on monumental dimensions in Karlie-ngoinpool Cave (Aslin and Bednarik 1984) a, Plate 3).

In the eastern part of the described panel, a few definite finger markings can also be discerned, others are too faint to permit positive identification or appear to have been

distorted by alterations of the medium. One curved distinct set of finger lines appears to be right-handed because it would be difficult to perform the necessary hand movement with the left hand.

Panel 3 is again very small, extending over 0.25 square metre. The grooves are difficult to identify here because some subsequent 'swelling' of the precipitate medium has occurred, but distinct striations are present in a few of the grooves and finger lines may also be present.

It is quite possible that prehistoric markings were formerly more extensive in this cave. Much of the ceiling is covered by precipitate which, where it adjoins human markings, clearly postdates them. The paucity of animal scratches, except on the way to the water, is conspicuous in this cave, as it is in south-western Australia generally. Most of the approximately twenty caves I have investigated in this region are not animal traps, but the animal scratches elsewhere are certainly not restricted to cave that acted as traps. Although I have not been able to explain this satisfactorily, the answer is probably to be found in such factors as the availability of alternative water sources, or differences in the eligible species.

Summary

Australian cave art does not present us with artistic masterworks and lively images of a long-gone past It has a far greater importance; it confronts us with externalisations of human concepts of reality that differ significantly from those which have been regarded for obscure reasons, as the only valid ones. Australian cave art does not consist of a single tradition, nor have its traditions all been restricted to caves. At the numerous sites near Mount Gambier, we now distinguish five types of petroglyphs belonging to at least three stylistically and temporally distinct traditions. At New Guinea 2 Cave (Buchan, Victoria), we still have finger flutings identical to those near Perth, and short grooves produced with tools. Even in the corroded markings of this poorly preserved site, some very faint striations can just be discerned in a few instances.

Seen in proper perspective, OSC and Mandurah Cave are geographically peripheral sites with fossilised traces of a very homogeneous tradition of human behaviour. I share Hallam's view that these archaic cave markings are important to us. I suspect, however, that to concern ourselves with questions such as their mythological context (as has been attempted by some researchers) would lead us nowhere. The markings were certainly done intentionally, by which I mean that they are not an incidental product of some other

process. These traces of prehistoric behaviour have a psychological dimension, and Professor Hallam deserves praise not only for recognising their significance, but also for maintaining her conviction for years, in the face of a sceptical archaeological establishment

Addendum

150 metres south of OSC, at the foot of a gently curving, vertical limestone cliff, lie three more caves. During further reconnaissance, in September 1988, I found prehistoric finger markings in the Middle Cave. This site consists of an oblique, fairly narrow cleft, and the markings are located about seven metres from the entrance, still within the reach of daylight. In all, they occupy only about a half square metre. There are five discernible sets of marks, but they are mostly faint. Only two are clear enough to permit reliable measurement, providing an average finger width of only 10.1 mm. The markings were thus clearly made by juveniles, and they are probably only a remnant of a formerly more extensive panel of finger flutings. Nevertheless, they provide the Perth region with a third site of this phenomenon.

Acknowledgements

I wish to acknowledge my indebtedness to Professor Sylvia Hallam and to the Western Australian Department of Aboriginal Sites. For assistance in the field work on which this paper is based, I thank my brother Gerhard A. Bednarik.

REFERENCES

Aslin, G.D. and R.G. Bednarik 1984 a. Karlie-ngoinpool Cave: a preliminary report. Rock Art Research 1: 36-45.

Aslin, G.D. and R.G. Bednarik 1984 b. Karake Cave - a preliminary report. The Artefact 8: 33-35.

Aslin, G.D. and R.G. Bednarik 1984 c. Koorine Cave, South Australia. Rock Art Research 1: 142-144.

Aslin G.D. and R.G. Bednarik 1985. Mooraa Cave - a preliminary report. Rock Art Research 2: 16-165.

Aslin G.D., E.K. Bednarik and R.G. Bednarik 1985. The 'Parietal Markings Project' - a progress report. Rock Art Research 2: 71-74.

Bednarik, R.G. 1985. Parietal finger markings in Australia. Bollettino del Centro Camuno di Studi Preistorici 22: 83-88.

Bednarik, R.G. 1986 a. Cave use by Australian Pleistocene man. Proceedings, University of Bristol Spelaeological Society 17: 227-245.

Bednarik, R.G. 1986 b. Parietal finger markings in Europe and Australia. Rock Art Research 3: 30-61, 159-170.
Bednarik, R.G. in prep. a. Finger lines, their medium and their dating. In K.J. Sharpe (ed.), The Australian Meander Tradition.
Bednarik, R.G. in prep. b. On natural cave markings. In K.J. Sharpe, op. cit.
Bednarik, R.G. in prep. c. Malangine and Koongine Caves, South Australia. In K.J. Sharpe, op. cit.
Bednarik, E.K. and R.G. Bednarik 1982. The Parietal Markings Project. Bulletin of the Archaeological and Anthropological Society of Victoria No. 3, pp.3-4.
Brown, S. 1987. The 1986n AURA Franco-Cantabrian Field Trip: summary report. Rock Art Research 4: 56-60.
David, B. and M. David 1988. Rock pictures of the Chillagoe-Mungana limestone belt, north Queensland. Rock Art Research (in press).
Dortch, C.E. 1976. Two engraved stone plaques of late Pleistocene age from Devil's Lair, Western Australia. Archaeology and Physical Anthropology in Oceania 11: 32-44.
Frankel, D. 1986. Excavations in the lower Southeast of South Australia: November 1985. Australian Archaeology 22: 75-87.
Gallus, A. 1968. Parietal art in Koonalda Cave, Nullarbor Plain, South Australia. Helictite 6: 43-49.
Hallam, S.J. 1971. Roof markings in the 'Orchestra Shell' Cave, Wanneroo, near Perth, Western Australia. Mankind 8: 90-103.
Hallam, S.J. 1975. Fire and Hearth. Australian Institute of Aboriginal Studies, Publication No. 58, Canberra.
Lane, E.A. and A.M. Richards 1966. Hand paintings in caves. Helictite 4: 33-50.
Moore, G.W. 1952. Speleothem - a new cave term. National Speleological Society News 10: 2.
Morse, K. 1984. First record of painted Aboriginal rock art in a south-western Australian limestone cave. Records of the Western Australian Museum 11: 197-199.
Schmid, E. 1958. Hohenforschung und Sedimentanalyse. Schriften des Institutes fur Ur-udn Fruhgeschichte der Schweiz, No. 13. Basle.
Walsh, W.P. 1964. Unexplained markings in Kintore and Cutta Cutta Caves, Northern Territory, Australia. Helictite 2: 83-91.
Wright, R.V.S. 1971. The cave. In R.V.S. Wright (ed.) Archaeology of the Gallus Site, Koonalda Cave, pp. 22-28. Australian Institute of Aboriginal Studies, No. 26. Canberra.

FOOTNOTES

1. Readers seeking the antecedents of finger flutings in western Europe might contemplate the fact that several experts, particularly those who have studied most closely, now tend to attribute the older ones to the Mousterian.

2. The term 'tectonic' is not synonymous with seismic, contrary to the belief of some reviewers of this paper. The word refers to structure and in its geological application to the forces and conditions within the earth that cause movements in the earth's crust.

ABSTRACT

Since the discovery of rock markings in Koonalda Cave, evidence of a Pleistocene tradition of cave art has begun to emerge along the southern coast of Australia. It has so far been identified at twenty-seven sites, two of which are located near Perth. The Western Australian sites represent the entire evidence of cave art presently known in that State. This paper considers their characteristics in the context of the archaic tradition as a whole. It also reports the discovery of a new gallery of this cave art.

* Robert G. Bednarik
Australian Rock Art Research Association (AURA)

PO Box 216
CAULFIELD SOUTH. VIC. 3162

Private Address:
3 Buxton Street,
ELSTERNWICK. VIC. 3185.