ARCHAEOLOGICAL FEATURES OF AUSTRALIAN CAVES

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Abstract

Throughout Australia many valuable archaeological sites occur within caves and rock shelters. These consist mainly of art sites - paintings and engravings - and occupation sites - habitation sites or places of other activities such as flint mining or burials. It seems likely that many more sites will be found and in many cases they will be in caves that have been frequently visited by speleologists and others prior to their recognition as sites. This paper endeavours to describe the features of archaeological sites most likely to be encountered in Australian caves. Hopefully this may lead to earlier identification of new sites enabling proper investigation, curation and management to protect them from any unnecessary, inadvertent or wilful damage. Some aspects of site protection and preservation including the relevant legislation and authorities are discussed. A basic outline of the sort of information speleos could usefully record is given.

INTRODUCTION

Caves and rock shelters potentially contain some of the most valuable archaeological sites within a particular area. This is because the cave environment is often well-suited for the preservation of the more perishable items in the archaeological record. For paintings, delicate engravings and stone or other arrangements, a cave may be the only place where long-term preservation will occur. In the case of occupation sites, organic habitation debris such as bone, wood, egg and mollusc shell, etc., has a far better chance for survival in a cave compared to a site exposed to surface weathering.

Frequently cave occupation deposits also contain valuable associated palaeontological material which apart from being of interest in its own right may be relevant to sorting out the associations of extinct fauna with prehistoric aborigines.

LEGISLATION AND AUTHORITIES

The protection and management of archaeological sites ultimately lies with the relevant agency set up under the "Archaeological and Aboriginal relics preservation Act" within each state. In general these acts prohibit unauthorised damage, defacing, disturbance, buying, selling, bartering, etc., of any archaeological sites, materials and artefacts. They also set up systems for recording, documenting, investigating and managing sites, undertaking public education and regulating archaeological excavations. Most provide for the declaration of "archaeological areas", which protect and restrict access to important sites.

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Any sites or suspected sites discovered in caves ought to be reported to the agency concerned (see Appendix) so that it may be checked against recorded sites, registered or noted for further investigation. Most welcome such information and although pressed for staff are usually quite helpful if anyone wishes to further their interest. These agencies usually have available a variety of pamphlets and publications about the sites in their state.

ARCHAEOLOGICAL SITES - GENERAL

The recognition of archaeological sites involves careful observation to discriminate between natural features, materials and processes (including animals, weathering, etc.), and those caused by man. Often it is a case of "picking the odd man out" or noticing something that might not have got where it is on its own, or something that is out of context.

In the past speleologists have played a useful role in discovering cave sites, often in remote areas. With increasing mobility, greater numbers of speleos and more frequent trips to outlying areas, doubtless more sites will be found. The following is an outline of useful information that speleos could record should they find any sites.

o sufficient information to accurately relocate the site preferably on a standard survey or cadastral map.

o a location sketch to fill in the finer access and location details.

o a scaled and oriented site sketch showing any relevant features or details such as its extent, location of any artefacts, hearths, disturbances, etc.

o other useful information is the site's setting, the general topography of the area, the dominant vegetation types, and its proximity to water - close or distant, permanent or ephemeral. This helps to give an indication of the sort of food and other resources that may have been exploited from the site.

o a general assessment of a site's preservation, any current degradation or threats of continuing or new degradation or damage.

In no way should sites be interferred with or disturbed nor any material be collected or removed from a site.

For descriptive purposes it is easiest to describe each type of site separately. However, this does not mean that sites will occur in isolation of each other. For example, at Koonalda Cave, a "declared" site interest was originally aroused by a surface scatter of flint flakes adjacent to the doline. This led to the discovery of flint mining and engraving sites inside the cave along with such items as hearths, burnt torches, bone arrangements and an occupation deposit in the doline. Later on it was noticed that many of the engraved boulders had been placed and oriented to indicate pathways through the cave. Similarly, many painted galleries have occupation deposits in their floors.

TYPES OF SITES

ART SITES

Paintings. Most painted galleries in Australia occur in open rock shelters with only a few known from the darker zones of actual caves. The paintings

tend to be fairly simple in style often using only one colour, chiefly reds. This is especially so for south-eastern Australia. However, further north in central north-western and northern Australia styles tend to be more intricate and multi-coloured. The subjects depicted include human figures, hand stencils, spiritual beings, mythological creatures, animals and their tracks, implements, weapons, linear markings and indeterminate figures. The pigments were mainly derived from oxides of iron, other minerals, clays and ochres. These were pounded or ground to a powder and mixed with water or animal fat. The paint so prepared was then applied either by finger, a brush made from a twig, or could be sprayed on with the mouth to cover large areas or make stencils (Plate 1). It is possible that remants of paint preparation, small grindstones and pounders, brushes, faceted or unground pieces of ochre may still be present in the galleries. Many of the sites are in a poor or degrading state of preservation often being badly faded. This is due to a variety of factors including aerial weathering, break-down and flaking of the rock surface, rain, insects, dust, lichens, algal growth and graffitists but once aboriginal traditions broke down the periodic repainting of sites ceased.

The recognition of a gallery and its full extent may take quite some time if the paintings are faded. Lighting and humidity can make a great difference: some parts may be visible under specific conditions only. Under no circumstances should anything be applied to a gallery to enhance, fill in or delineate any paintings as this can easily cause irreparable damage.

Plate 1. Hand stencils, on ceiling Murrawijinie Cave, S.A.

A variety of methods exist for recording rock paintings. These include the use of sketching grids, transparent overlays for tracing on, photogrammetry using precision survey or stereo cameras and a stereo plotter, or just using a standard camera. The latter is most suited for making a general record. Any methods involving actual contact with the paintings ought not to be used without consulting the local archaeological agency.

Colour film probably gives the best results however the type of lighting (direct sunlight, shaded, blue sky, flash, etc.), can appreciably affect the colour balance of the result. With black and white film results may be enhanced by the use of contrast filters, for example, green and blue filters will darken reds against a light background. The use of orthochromatic films has also met with some success. In some cases ultra violet photography has brought out faded paintings.

Some simple techniques exist for multiple-flash illumination of larger areas. Figure 1 uses a slave to activate a second flash under fairly bright lighting conditions. Figure 2 shows the open shutter flash painting method for use under low lighting conditions. Two methods for obtaining multiple exposure panoramas of larger galleries are shown in Figures 3 and 4 - one by rotating the camera on a tripod , the other by offsetting along a baseline parallel to the gallery.

Things that could be usefully noted are the colours used, if there is any superimposition of paintings, any styles or motifs used, comparisons with any other galleries nearby, any suspicious modern additions, the general state of preservation of the site and any threats to its preservation.

Engravings. Several types of aboriginal engravings occur throughout Australia. These vary from fine stick and finger markings on soft cave walls to designs pounded or ground into hard sandstone surfaces. The former are the most abundant in caves having now been reported from caves on the west coast of Western Australia, the Nullarbor, Naracoorte, and East Gippsland.

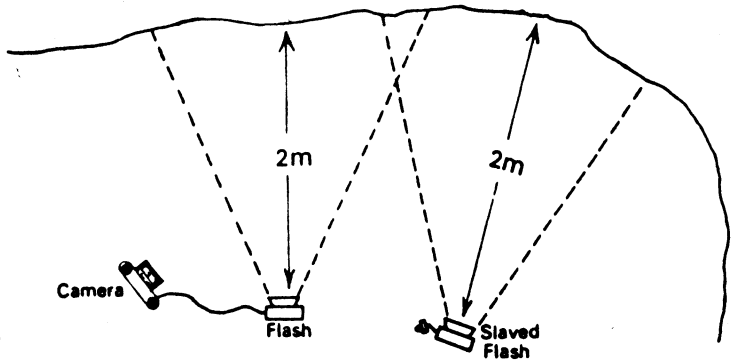

Fig. 1

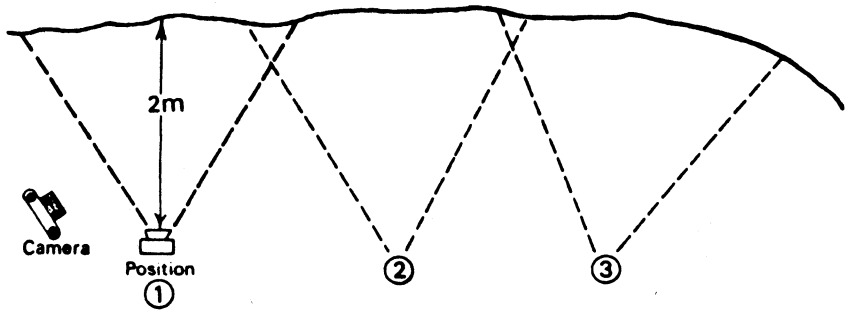

Fig. 2

Figures 1 & 2. Multiple flash lighting techniques (after Fillery 1977).

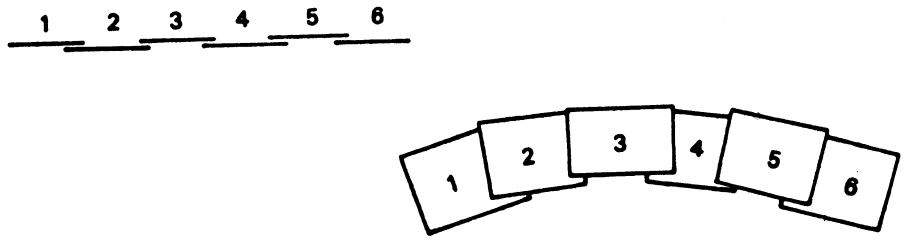

Fig. 3

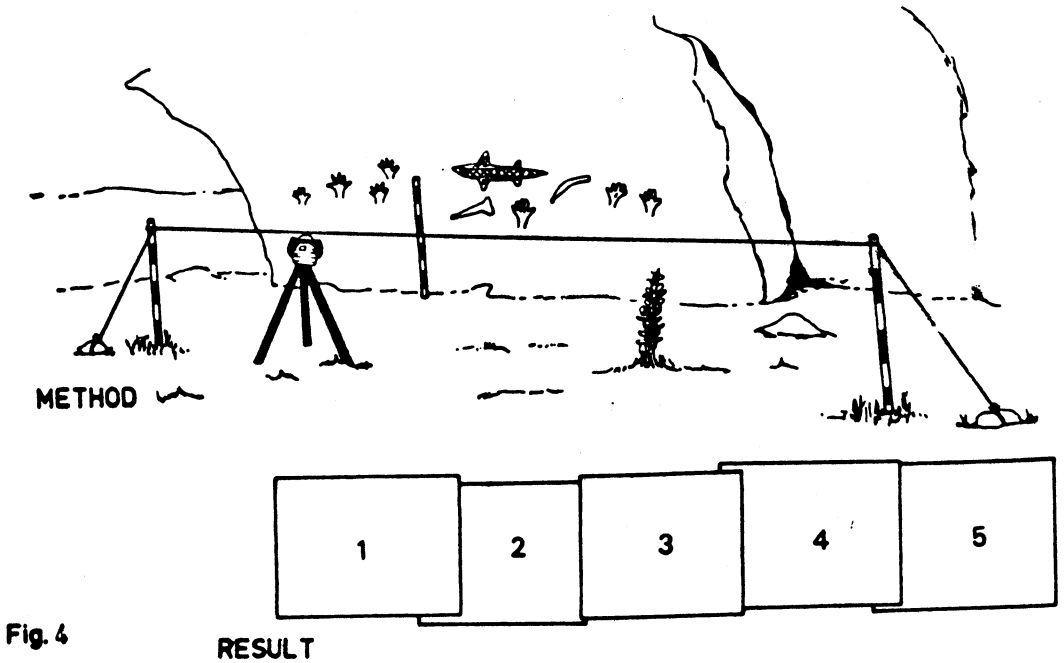

Fig. 4

Figures 3 & 4. Panoramic photographic techniques (after Fillery 1977).

Cave engravings are often difficult to detect because of both the low level of lighting used and that the lighting is fairly direct, that is, a headlamp. As most engravings are executed on a dull contrastless surface, direct lighting makes them appear quite featureless and blend in with the cave wall. Side lighting, often quite acute and from a specific direction may be the only way to see them.

Some care needs to be taken in identifying engravings as a variety of natural and modern human features may look similar. Weathering of joint and bedding features especially in dolomites can etch out nice "incised" grids and triangular patterns. Solutional features such as fine anastamosies and karren can form a variety of intrigueing patterns. Animals including birds, bats, possums, kangaroos, wombats, wallabies, goannas and dogs can leave quite a variety of markings on a soft cave wall.

Some modern human activities may unintentionally leave confusing markings in caves. Hobnailed or tricounied boots can leave incised marks on quite hard rocks. Any works that have been undertaken such as guano mining, tourist cave development, gating and digging for new caves, including the use of explosives, may also leave their mark, not to mention any casual marks as a result of routine visitation.

A variety of deliberate modern human markings may also be found. These include the blatant graffitist intent on naming and dating his activities wherever possible, the casual doodler who has just found a nice medium to indulge in, and also the intrigued discoverer who having found some engravings proceeds "in the name of science", to make his own set to work out how the originals were made and thus only confuses the issue further as in time they may be indistinguishable from the originals.

Usually a close and rational examination will determine whether engravings are likely to be genuine and the sort of implement used to make them. Things to be taken into account are whether there is any style or design to the markings, for example, figures, patterns, grids, concentric, parallel or bifurcating lines, any enhancement of natural hollows or protruberances.

Finger markings. These are made by drawing three or four fingers across a soft weathering mantle or clay deposit on the cave wall leaving a series of meandering grooves. They may cover quite a large area forming a variety of patterns (Plate 2).

Fine implement markings. These occur in similar soft material as the finger marks above but were executed with either stick, stone or bone. The designs made were largely as strokes, often as grid patterns both straight and curved and may enhance natural features.

Fine incised markings. These have similar patterning to those above but occur on harder rocks having been incised or ground in with a piece of stone. They have also been found on boulders as well as on walls. Fine grooves that occur on rocks harder than limestone may have been used as sharpening grooves.

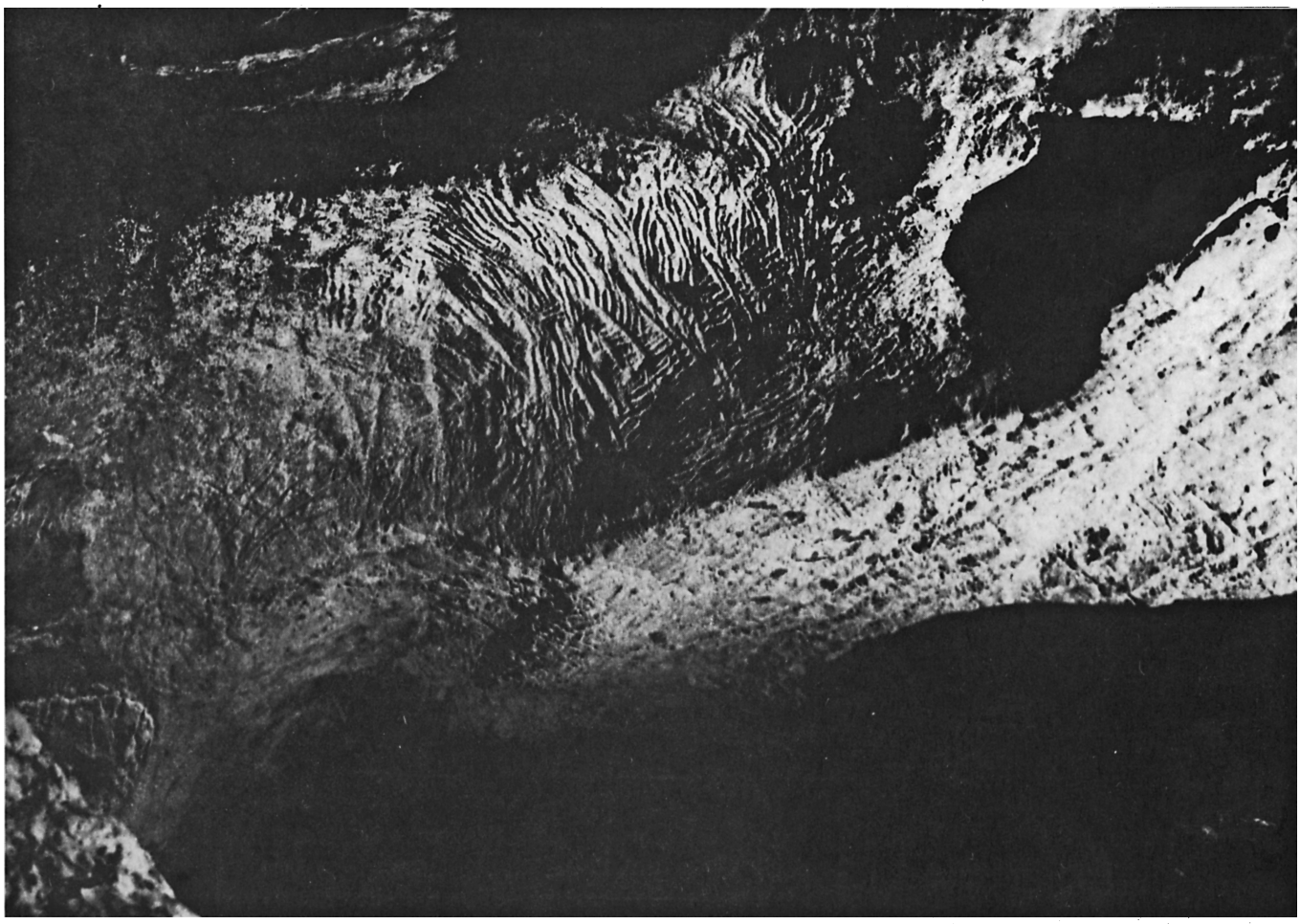

Plate 2. Finger markings, in soft mantle on ceiling N.G.-2 Cave, Vic.
Note: Finer rectangular grid on left.

Other markings. The following appear not to have been recorded from caves but are included for completeness. Large abraded grooves occur, sometimes outlining animal figures several metres across or just as a series of parallel grooves, or sometimes in harder rocks as sharpening grooves. Percussive engravings or pecked intaglio are usually found on flat rock slabs having been made by pounding the rock surface with another rock so that circular spalls break off. By repeated spalling, patterns can be engraved.

For the delicate engravings in soft walls the only acceptable method for recording is photographic. The most sophisticated method involves survey or stereo cameras and a stereoplotter which enables the engravings to be accurately mapped or even contoured. Using standard 35 mm cameras a useful stereo effect can be achieved by moving the camera several centimetres in the plane of the engraving between successive shots. A good degree of side-lighting is required to highlight the engraving's relief. Under no circumstances should anything be applied to the engravings to improve their appearance.

OCCUPATION SITES

Where a cave has been regularly or intensely occupied by prehistoric aborigines a rich black occupation soil is often found. This organic rich soil was formed from the debris of the materials and food resources and its processing, which the aborigines were exploiting at that site. This includes the ash and charcoal from fires, burnt and unburnt fragments of bird, mammal, fish and reptile bone, pieces of egg and mollusc shell and any waste material from the making of stone, bone or wood implements. Of these the stone is most abundant (Fig. 5). Occasionally a stone implement may be found but it has often been discarded or broken. Other things that may be found are pieces of ochre, stones foreign to the immediate area including grinding stones and hammer stones, burnt stones and burnt clay lumps.

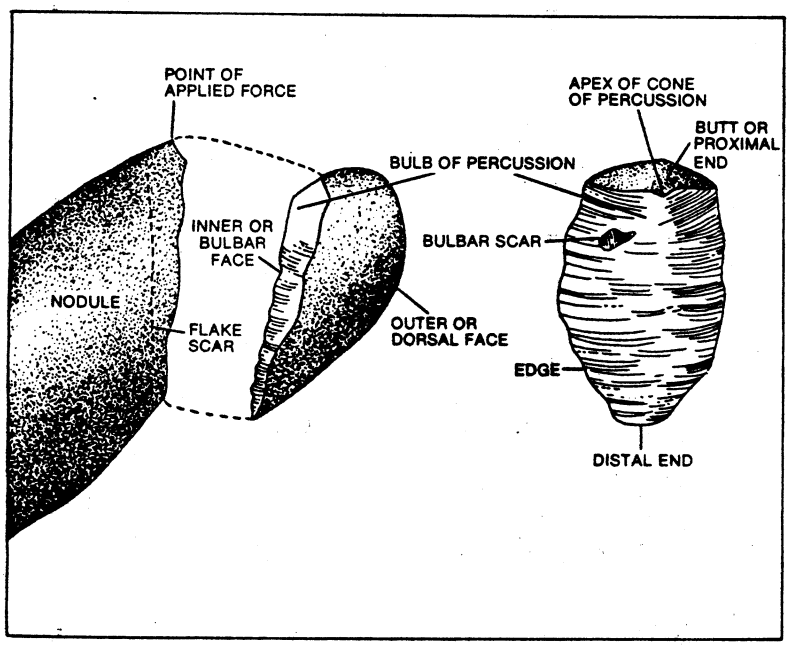

Figure 5. Features of a stone flake made by percussion typical of many waste flakes found in stone working, quarry and occupation sites (after J. Bordaz, *Tools of the Old and New Stone Age*).

Occupation sites tend to be found in caves or shelters that under most circumstances would make pleasant and protected camp sites. They seem to be restricted to the light or twilight zone.

The recognition of an occupation site may at times be quite difficult and requires the identification of one or more of the features described above being out of their natural context. This may involve much tedious and careful searching, for example, the finding of a stone pebble or flake in a shelter with no obvious gravel deposits associated with it, or a piece of freshwater mussel in a cave above any flood level or perhaps adjacent to a now dry or saline lake or watercourse, would be a positive indicator that an occupation site may be at hand. Often occupation deposits may be buried under more recent debris and soil. In such cases close inspection of any disturbances could yield a clue. Rabbit and other animal burrows can bring underlying material to the surface. The walls of burrows may also be revealing. Any erosion gullies may have material exposed in the walls. Heavier material such as stone waste flakes may remain at the base of the gully as a lag. Frequently careful scrutiny of any slope approaching a cave may yield things of interest, especially around the dripline where erosion pools with lags of coarser materials occur.

Under no circumstances should any artefacts or any other materials be collected or removed from their original position on a site nor should any digging, augering or scratching about the surface be indulged in. Obviously if every party visiting a site made their own collection and dug their own little hole a large amount of disturbance would occur eventually rendering the site archaeologically valueless. Detailed site assessment is best left to someone working for or with the local archaeological agency.

Details worth noting about a site would include a sketch map or plan of the site showing any features such as artefacts, hearths, any disturbances, the apparent extent of the deposit, a detailed list of any archaeological materials that derive from the site, and any other details that appear to be useful.

FLINT MINING

Flint is a homogeneous fine-grained siliceous material which is well-known for its workability for making stone tools and as such was sought after by prehistoric aborigines. It is deposited as a concretion in limestone often within a particular layer. To date the only known flint-mining sites are from the Nullarbor where bands of flint nodules outcrop in the walls of several caves. These nodules were dug out and/or broken off leaving hollows with digging scars in the limestone, often the innermost pieces of the nodule staying behind (Plate 3). A relative age, modern versus ancient, of this quarrying can be given by surface weathering on the hollows and mineral growth on the remaining flint. Any suspected flint encountered should be closely inspected to see if any pieces were broken by natural weathering or by deliberate human percussion, in which case they would have features as shown in Figure 5. However, some confusion can occur where modern rock-hounds or specimen-seekers have been collecting flint, in which case characteristic marks of the geological pick and steel chisel may be present.

Where flint was quarried in complete darkness or in a dull twilight zone, burnt-out torch stubs and hearths may be found. Such items can be used for radio-carbon dating of quarrying activities provided they are not disturbed or contaminated.

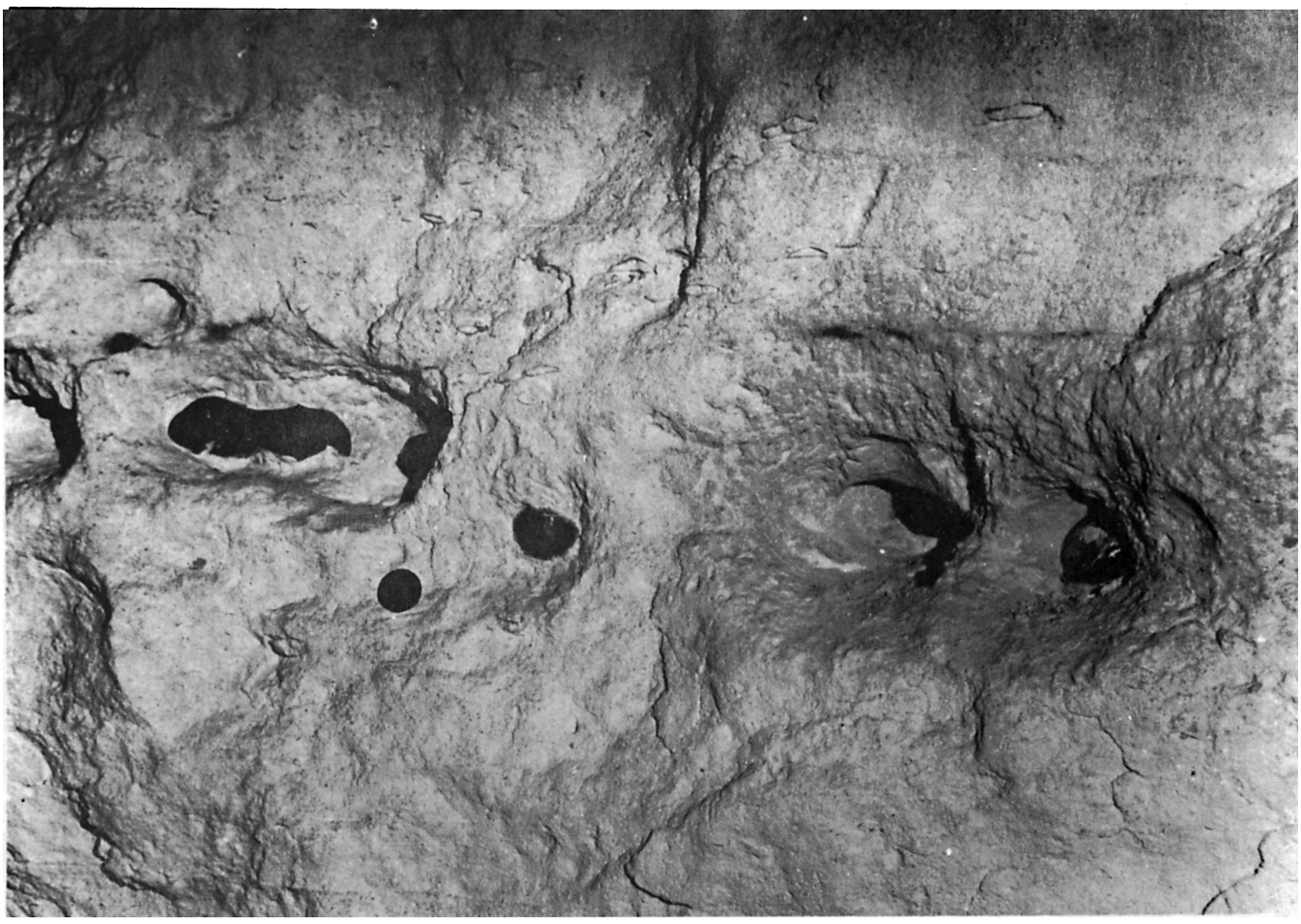

Plate 3. Flint quarrying, showing remnants of flint nodules at base of excavated holes in wall. Note: 5 cm diameter lens cap and original flint/limestone contact surface in second hole from right. Weebubbie Cave, W.A.

SKELETAL SITES

Some caves from north-west Australia have been used by aborigines as burial sites or repositories for skeletal material. If discovered they should be left undisturbed.

STONE AND OTHER ARRANGEMENTS

Stone and bone arrangements and placements have been found in caves. These may consist of singly-placed boulders or a number of boulders to form a design or cairn. In Koonalda Cave a series of placed boulders bearing engravings appear to mark paths leading to varous features including bone placements. Once again the key to identification is whether the rocks, bones, etc., could have got into their position or orientation by any natural process other than human. If not one must take care not to overlook modern activities like survey cairn building. The presence of engravings, artefacts, etc., may help to weight one's conclusion.

SACRED SITES

Caves, painted shelters, burial caves and other features may still be sacred to Australian aborigines and the people of Papua New Guinea. If such a situation is thought to exist any visitation, recording, photography and publication should only be undertaken with prior discussion and permission of the people concerned.

MISCELLANEOUS SITES

It seems likely that in drier areas suitable caves would have been used as water sources. Certainly on the Nullarbor "gnamma holes", small solutional rock-holes in limestone pans, were periodically used for water.

Although unrecorded to date, cave-dwelling bats could have been used as a food resource. Often scatters of odd stone waste flakes and implements occur near such features of interest.

Dessicated human palaeofaeces from some American caves have yielded valuable insight into the diet and diseases of prehistoric people. Although apparently unrecorded in Australia they could occur in a very dry environment.

Even prehistoric footprints have been reported from quite inaccessible places in some French caves.

SITE MANAGEMENT AND PROTECTION

A variety of threats and causes of damage to sites exist. These may be either wilful or inadvertent. The latter is largely caused by ignorance of a site in a particular cave or by ignorance and/or non-recognition of the features associated with the site concerned.

Wall or boulder engravings can easily be modified or obliterated by leaning on, brushing against, bumping one's head into, dragging one's tripod across or even just by kicking up some dust. Walking over unobserved stone or bone arrangements, surface scatters of artefacts, debris from flint-quarrying sites, hearths, torch stubs, etc., can destroy or bury such features. The uninformed digger on a quest for new caves could easily disturb or bury an unrecognised site. Over-crowding, lack of time and organisation whilst inspecting or photographing sites, especially engravings and paintings, greatly increases the chance for damage to occur as these conditions can contribute to unnecessary haste and clumsiness. In the often delicate environment outside a cave or in its doline heavy use of access tracks along a poor route can lead to excessive erosion. This may disturb or bury sites both archaeological and palaeontoligical. Grazing stock, rabbits and other animals can cause similar problems. Some obvious causes of wilful damage include the graffitist and art imitator, the collector rummaging through sites for artefacts and the rockhound after flint.

Once a site has been recognised, its management is the responsibility of the local state archaeological agency. This may involve some access restrictions but ought not of necessity lead to total closure. In most cases a suitable access policy should be able to be sorted out between speleos and the agency concerned. This would be very much dependant on the type of cave and site and may involve using guides, either official or honorary that are fully aware of the cave and site concerned. Restrictions may be placed on party size or visitor/guide ratios and minimum lighting and other equipment might be specified. This along with perhaps track-marking and the provision of simple aesthetic guiding rails where appropriate (for example, around

excavations or especially in front of engravings) in constricted areas, should give adequate protection to sites during visitation. For remoter areas with little or no onsite management personnel where a site is well known, the provision of some "in cave" interpretation in the parts of the cave concerned, so as not to attract undue attention except to those who have stumbled across the feature, may present a suitable alternative. This could be something along the lines of the "self-guided" tourist cave. The removal of any graffiti and rubbish from a site is always desirable as their presence only attracts more. Where a cave has been gated to protect a site it is important that a suitable explanatory sign be included. This should state the reasons for gating, give some basic information about the site and say where further information and possible access could be obtained.

CONCLUSION

Caves and rock shelters are known to contain some valuable relics of prehistoric aboriginal activities and doubtless more will be found especially with the current increase amongst speleos of concern and interest in the caves they visit and what is happening to them. A greater awareness of archaeological features by speleos should both enrich their experience and the general knowledge of this unique heritage.

FURTHER READING

As this paper was mainly concerned with promoting a greater awareness of archaeological features of caves it has not been referenced. However, much of the information is derived from the following selected list of references which gives a general coverage of archaeology and archaeological cave sites in Australia. Additional references can be obtained from the various editions of *Australian Speleo Abstracts*.

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APPENDIX: ARCHAEOLOGICAL AGENCIES

Queensland:	Department of Aboriginal and Islanders Advancement, 418-424 Ann Street, BRISBANE, Qld. 4000
South Australia:	Aboriginal and Historic Relics Preservation, 43 Fullarton Road, KENT TOWN, S.A. 5067
New South Wales:	National Parks and Wildlife Service, A.D.C. Building, 189-193 Kent Street, SYDNEY, N.S.W. 2000
Tasmania:	National Parks and Wildlife Service, P.O. Box 210, SANDY BAY, Tas. 7005
Northern Territory:	Museum and Art Galleries of the Northern Territory, P.O. Box 4646, DARWIN, N.T. 5794
Victoria:	Victoria Archaeological Survey, 29-31 Victoria Avenue, ALBERT PARK, Vic. 3206
Western Australia:	Western Australian Museum, Francis Street, PERTH, W.A. 6000
Papua-New Guinea:	Niugini Archaeological Survey, Department of Anthropology and Sociology, University of P.N.G., Box 4820 P.O. University.