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ABERCROMBIE ARCH SHELTER: AN EXCAVATION NEAR BATHURST, N.S.W.

Abercrombie Arch Shelter is situated 58 km south-south-west of Bathurst on the Abercrombie Caves Tourist Reserve (Bathurst 1/250,000 GR234809). It is at an altitude of 600 m in the foothills 40 km west of the main ridge of the Great Dividing Range.

Environment

The site faces approximately 20° and thus provides shade from the afternoon sun. Mean annual temperature is ∿13.5°C with a seasonal range of ∿14.5°C.[1]

The ground slopes down from the shelter to a sink-hole about 35 m away and an erosion gully in front of the site drains into this. The sink-hole is generally blocked and contains water, clearing only under the increased pressure of water during prolonged heavy rains. Grove Creek (perennial) is a couple of minutes walk from the site in either direction (upstream or downstream) involving a descent of approximately 30 m. A semi-perennial tributary runs in a gully about 100 m away and 10 m below the level of the site. Thus the site is always within reasonably easy access of water. Mean annual rainfall is ∿700 mm with a slight winter maximum, potential evaporation being probably about twice precipitation.[1]

As a result of the differing exposure of adjacent hill slopes due to the high local relief (predominantly straight or convex hill slopes up to 50°)[1] coupled with the range of rock types in the area the vegetation is extremely varied.[2] Whereas the site itself is immediately surrounded by open woodland with grass understorey, nearby slopes range from open to closed woodland with a wide range of shrub species in the understorey. The vegetation is denser in well watered gullies and alongside Grove Creek where alluvial flats support dense grass, bushes and sedges where wetter. The present vegetation is, however, unlikely to be a direct descendant of pre-contact vegetation, as the area was densely populated by gold-miners during the 19th century. Scattered through the region in damper places are dense masses of bramble and stinging nettle.

Description of Site

When the site was located in July 1976 a 2 m x 2 m hole had been dug at the back of the shelter (Figs. 1 and 2). This hole appeared to be fairly recent. A rescue excavation was therefore undertaken in August, and more prolonged work in November, a total of approximately 400 person-days.

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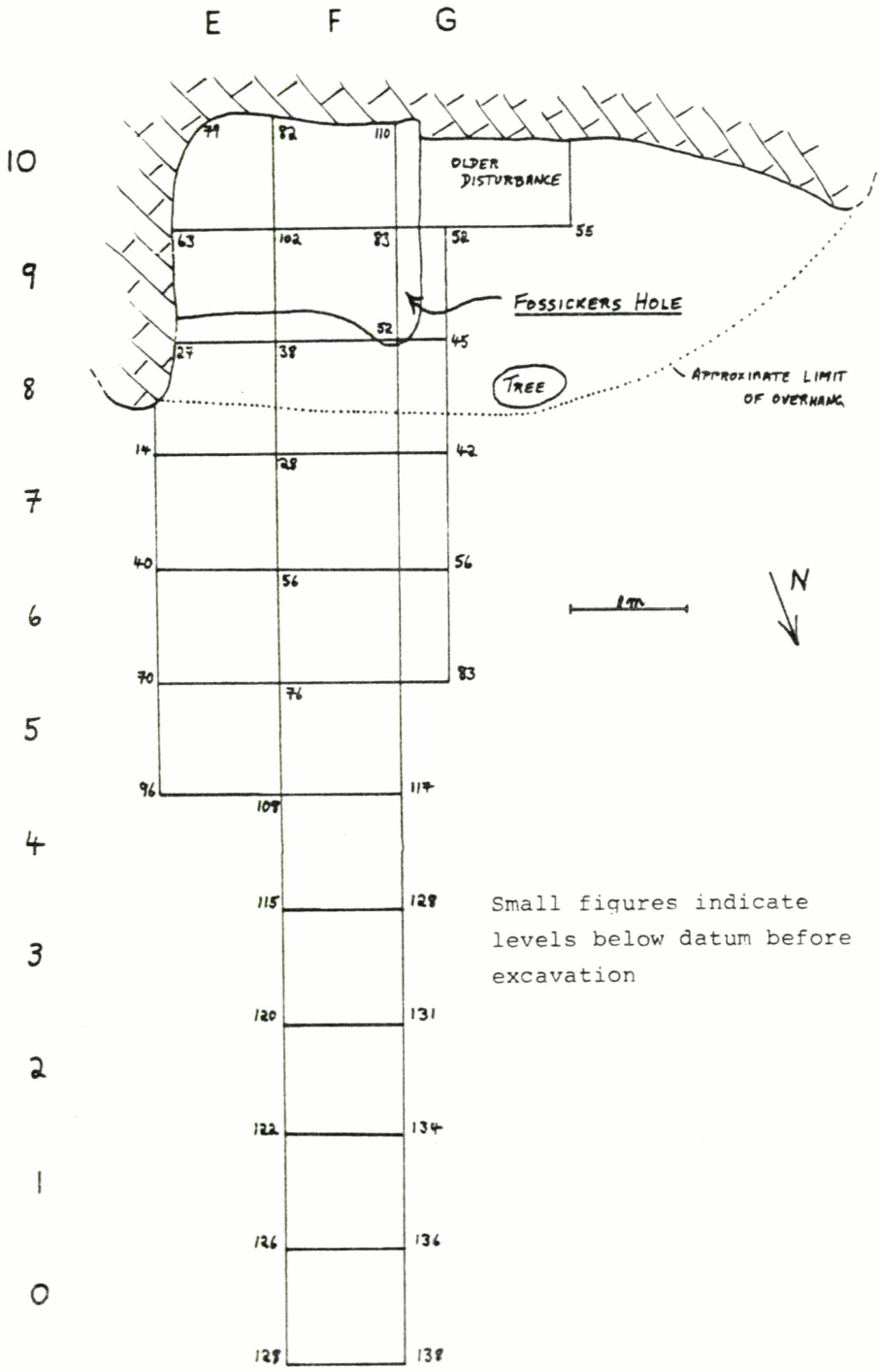
[1] Data from Frank (1972)

[2] The dominant soil groups are red earths and red podzolics (Frank 1972 after Northcote 1966)

ABERCROMBIE ARCH SHELTER

FIG 1



Small figures indicate levels below datum before excavation

The site is a small rockshelter at the base of a large outcrop of altered limestone, the 'Abercrombie Caves Marble'. It is situated in a saddle on top of the 'Grand Arch', a natural tunnel through which passes Grove Creek. The hillside slopes back from the top of the overhang to the main body of the outcrop, and the talus slope at the base of this is strewn with boulders. In the two months between our field seasons a number of new blocks had appeared on this slope. The limestone has been analysed as containing up to 10.5% angular to subround quartz, the remainder being 98% calcium carbonate (Carne and Jones 1912, *fide* Frank 1972). The shelter appears to have been formed by the action of Grove Creek when it ran as a surface stream prior to its passing through the Grand Arch from about 15,000 years ago onwards (Frank 1972). Since then it would appear to have developed by frost-weathering of the shelter walls, giving rise to rubbly sediments under the overhang. The roof of the overhang slopes sharply downwards towards the rear, where it joins the rear wall at about the level of the present surface of the sediments (see Fig. 2). The total overhang is approximately 2 m, but rain runs down the sloping roof and drips off ribbed concretions at various points within the shelter, resulting in areas of partly concreted sediments. The eastern end of the shelter is defined by a projection composed of limestone covered with stalagmitic flow. Towards the western end the shelter becomes lower and narrower, petering out after about 4.5 m.

The deposits form a ridge approximately following the limit of the overhang, and slope down towards the rear of the shelter. In front of the shelter the deposits are contiguous with the talus slope to either side of the shelter, and slope down towards an erosion gully about 20 m away. Head room at the time of earliest occupation (level VI", see later) would have been considerable, giving standing room over the whole width of the overhang. On the other hand shelter from rain from the eastern, western or northern quarters would be reduced. This might have something to do with the lack of occupation below this level. It should be stressed however that bedrock had not been reached at over 2.5 metres below the surface in square E9. The ridge of deposits following the edge of the overhang would appear to represent sedimentation by material falling over the overhang, and this is confirmed by the nature of the deposits (angular limestone blocks similar to those on the talus slope and on the slope above the shelter).

Stone Sources

Raw material for stone working is abundant in the area, the hillside to the east of the site being scattered with vein quartz of reasonable quality. Many of the hills in the region are capped with tertiary gravels containing quartz cobbles, and Grove Creek contains cobbles similar to those used as grinding and hammer stones and for pebble tools. It is probable that cherts are to be found somewhere in the complex sequence of sedimentary and metamorphosed rocks in the area, though no outcrop has been found in the immediate vicinity of the site. Silcrete occurs within

a radius of about 30 km. Very poor quality quartz can also be found in the slope deposits above the shelter, apparently weathering from veins intrusive into the metamorphosed limestone, and this quartz finds its way into the deposits together with the flaked quartz which comprises the bulk of the lithic industry.

A small test-hole was excavated in the talus slope to the east of the shelter (located in A10 approx.) and revealed the same sort of sediments as in the ridge of deposits and talus slope of the site, including the poor quartz observed on the slope above the shelter.

Co-ordinate System

The co-ordinate system used is a conventional three dimensional one with the axes divided up into sectors of one metre, each identified by a letter on the X axis and a number on the Y axis (see Fig. 1). The origin is located outside the shelter as shown. x and y co-ordinates are measured along the X and Y axes respectively within a given metre square, starting from the origin of that square. The Z axis is directed downwards, i.e. z co-ordinates are recorded as DEPTHS below datum. Sections are described by the terms "Frontal" (parallel to the shelter wall) and "Saggital" (at right-angles to this wall), and located by giving the sector number or letter through which they run, together with the y or x co-ordinate within that sector. (Diagonal sections can also be identified without reference to a section-line on a plan.)

Excavation Method

The excavation of this site posed enormous problems. Over most of the site the deposits were composed almost entirely of limestone fragments, some of which were over a metre in diameter. The situation was further complicated by concretion which shrouded the archaeological material even after wet sieving, and which gradually increased to form an entirely concreted layer at the base of the excavation from sectors 8 to 4. As a result of the rockfall, particularly the largest fragments, it proved impossible to produce sections where they were required, and the stratigraphic connections between the different sedimentation zones described in the next section are therefore only tentative. The enormous variations in thickness of layers and the pronounced and variable slope of the layers which can be seen from Fig. 2 rendered the use of any sort of spits near impossible. The following technique was therefore adopted, designed to yield information suitable for the tracing of archaeological horizons based on an increased density of finds where geological layers may not be distinguishable. It is based on a technique widely used in Europe.

A notebook was used for every metre square, and all notes about the excavation were made in these rather than in a site notebook. A further notebook gives details of auger holes and test pits (in F0 and A10). The grid system is indicated by a

series of plumb-bobs hanging at the corners of each metre square. During the course of excavation all objects over approximately 2 cms (excepting limestone fragments and unknapped inferior quality quartz likely to have come from the slope above the shelter) were numbered and their co-ordinates recorded in the corresponding notebook. Each bucketful excavated was weighed and dry sieved on a 2 mm mesh. Limestone fragments between 5 and 10 cm were weighed separately and rejected, and fragments over 10 cms were rejected unweighed. The larger of these were mapped and contoured. The sieve residue was wet-sieved in Grove Creek on the same mesh and table-sorted; all imported stone, bone and shell was saved and bagged with the specimens whose 3D co-ordinates were recorded. Thus a reasonable measure of horizontal and vertical control is possible even for those items found in the sieves (one bucketful is approximately a 3 cm spit on a 50 x 50 cm square). The 3D co-ordinates recorded for the larger objects are used to relocate each bucketful in space, and also for constructing projection diagrams for the verification of the stratigraphy and possible subdivision of geological layers on archaeological criteria (the projection diagrams are produced by a computer program and can take the form of horizontal or sloping projections depending on the inclination of the ground surface and/or geological layers observed). Work on the projection diagrams has not been completed.

Stratigraphy

The site can be divided up into three stratigraphic areas: (see Fig. 2).

A *The talus slope in sectors 7 to 4 (approximately)*

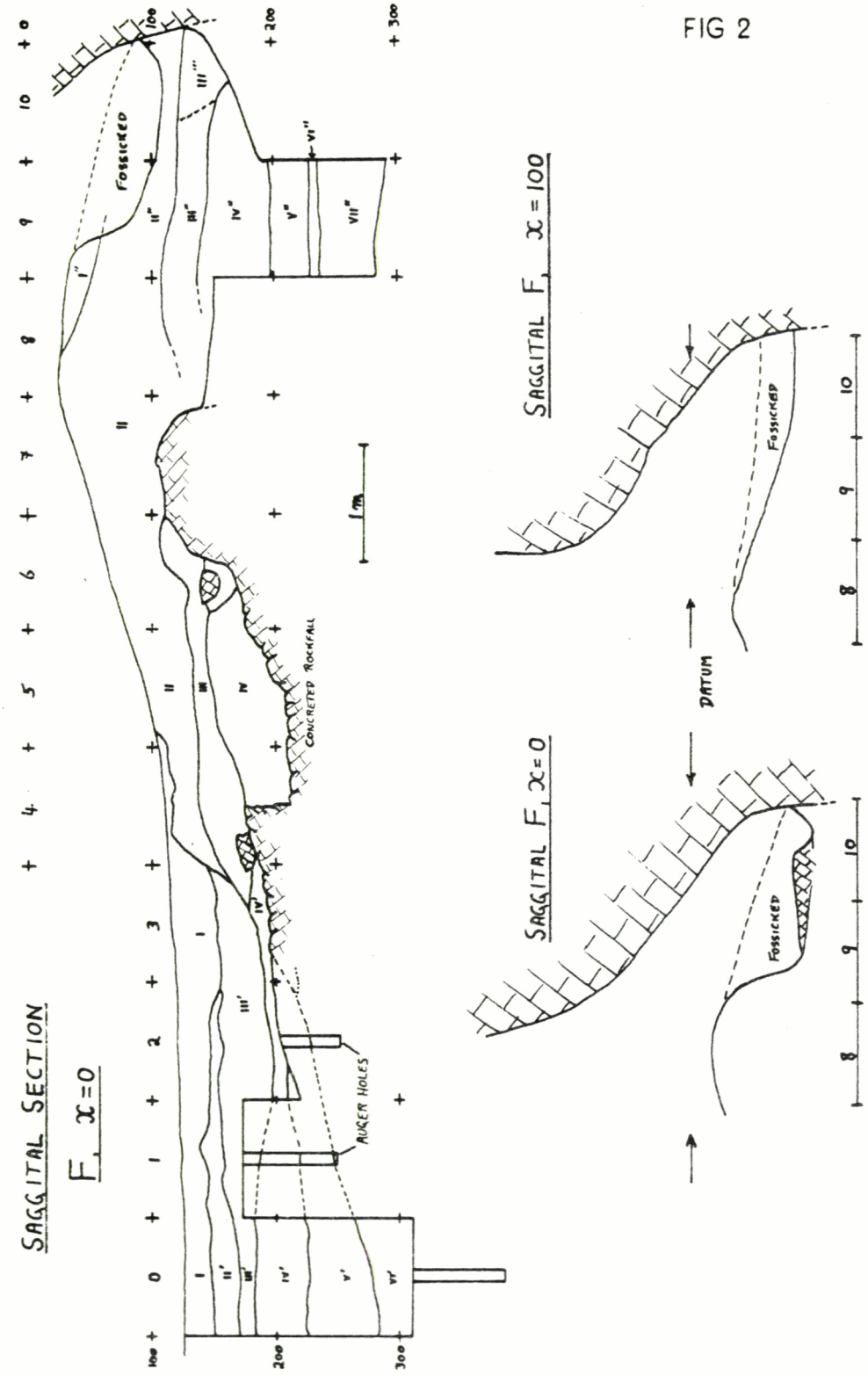
Here there are clearly marked layers :-

Layer I Black humic layer, absent in many places. Thickness 0-10 cm, increasing from sectors 7 to 4.

Layer II Rockfall, comprising at least 50% limestone fragments over 5 cms, and blocks up to 1 m diameter. This layer is from 20-70 cm thick and contains the richest archaeological material, which appears to be concentrated at particular levels. Its greatest thickness is around the dripline where deposition of fragments from the slope above the shelter has occurred. Dark reddish brown sediment (5YR2/2).

Layer III 15-30 cms of dark reddish-brown sediment (5YR3/4) with very few rocks and few archaeological remains.

FIG 2



Layer IV At the base of III objects became heavily concreted and layer IV consists of dark reddish brown sediments (7.5-5YR3/4) and rockfall, loosely cemented at the top and becoming increasingly cemented further down. Thickness excavated was approximately 50 cms in F5. There appear to be little occupation debris in this layer, but everything is heavily concreted.

B *The area underneath the overhang*

This section was stratigraphically confused owing to the presence of limestone blocks up to 0.5 cu metres, the fossickers hole and an area of older disturbance in square G9, G10 and H10. The build up of sediments in this area seems to have occurred by disintegration of the shelter roof as well as material derived from above the shelter, and may well have been further complicated by digging out of the deposits to increase the rather limited headroom during later occupations. Possible evidence of this was observed in the form of thick lenses of different sediments side by side at the same level. The whole deposit gave an impression of having been considerably disturbed down as far as level IV", but none of the disturbances were sufficiently clear to permit the distinction of definite pit outlines. One of the lenses described is visible in the section (Fig. 2) at the very back of the shelter - this appeared to be a bone dump, containing large quantities of bone with a wider representation of body parts and less fragmentation than elsewhere in the site.

The stratigraphy shown for this area in Fig. 2 is schematic and is based on field notes and sections. Some of the layers described are distinguished primarily on the basis of the archaeological material they contain rather than on geological grounds.

Layer I" Dark humic layer from 0-15 cm thick.

Layer II" Approximately 60 cm of rockfall, rich in artefacts at certain levels. The sediment is dark reddish brown (5YR3/4).

Layer III" Dark yellowish brown (10YR4/4) rock-free layer approximately 20 cms thick. This layer contains a considerable amount of bone.

Layer IV" Gravelly to rubbly textured dark brown layer (10YR4/4 to 3/3), between 60 and 70 cm thick, rich in bone at the top with decreasing finds towards the bottom, where it became more rubbly and concreted. This concretion continues into the layers below.

Layer V" Approximately 40 cm of loose gravelly textured dark brown sediment (5YR4/6 to 5/6). Less finds than in the layer above.

Layer VI" A clearly marked archaeological horizon visible in section as a narrow band approximately 5 cm thick of darker gravelly sediment (dark red 5YR3/4).

Layer VII" In sharp contrast with the preceding layer, this layer is pink in colour (7.5YR7/4) and is practically sterile archaeologically. Excavation was continued to a depth of approximately 280 cm below datum and a probe put down to over 3 metres below datum did not encounter bedrock.

All the layers from IV" to VII" have a pH of approximately 6.4 and fizz violently with concentrated hydrochloric acid, indicating that the sediment is probably composed of at least 20-30% limestone fragments. They would appear to be the result of *in situ* accumulation and breakdown of limestone roof disintegration products.

C *From sector 3 out to sector 0* the deposits consist of sandy clay/gravel interleaving with layers II to IV. The clearly distinguishable layers are identified by single primes from II' to VII'. Layer I continues over the surface of this section (see Fig. 2) Very little knapped stone and almost no bone was found in these layers which have pH of approximately 5.3 - 5.5. Hues range from 2.5 - 5YR, and value/chroma from 3/2 to 3/6, except for V' which is 5YR4/6-4/8. A Bondi point (Fig. 3, No. 3) was found in layer IV' in FO, associated with a large flat cobble (15 x 20 x 4 cm), one long edge of which was unifacially worked to form a large chopper-like implement. As mentioned earlier, these layers probably originate from slope wash carried down by the drainage system in front of the site.

Stratigraphic Connections

One can tentatively propose the following stratigraphic connections between the areas described above:

1. The earliest deposits are layers VII" to IV" underneath the overhang. It is probably these layers which have been concreted from the dripline outwards to form layer IV in the talus slope area.

2. Layer III" underneath the overhang would appear to correspond with layer III in the talus slope area.

3. Layer II" under the overhang would appear to be an extension of the accumulation of limestone fragments from above the shelter which forms layer II on the talus slope. Unfortunately the stratigraphic connections at this level have been rendered particularly difficult by the presence of the fossickers hole. Support is lent to some degree by the richness in finds of both the fossickers spoil (which would mostly have come from layer II") and of layer II.

These connections are only very tentative because of the degree of stratigraphic confusion which occurs around the dripline as a result of the important accumulation of limestone fragments. The latter include several large boulders which made it impossible to draw any sections. Furthermore the fossicked area and an area of older disturbance confused the issue. It is hoped that the projection diagrams for this area will show up the concentration

of finds noticed at a particular level in layer II and enable it to be traced back under the overhang, thus verifying the tentative connection suggested.

4. Layers V' to II' in sectors 3 to 0 appear to overlie the concreted layer IV on the talus slope. Some concretion was noted in layer VI' which might suggest its contemporaneity with the concretion of layer IV. The sequence of interleaving of layers V' to II' and layers IV - II can be seen from the stratigraphic section (Fig. 2), but not too much faith should be put in this section as the junctions were not clearly marked and an error of a few centimetres could in some cases reverse the sequence of two layers. All one can be reasonably certain of is that the alluvial sediments in sectors 3 to 0 are broadly contemporaneous with layers III and II on the talus slope. This is really sufficient as there were very few finds in sectors 3 to 0.

Lithic Materials

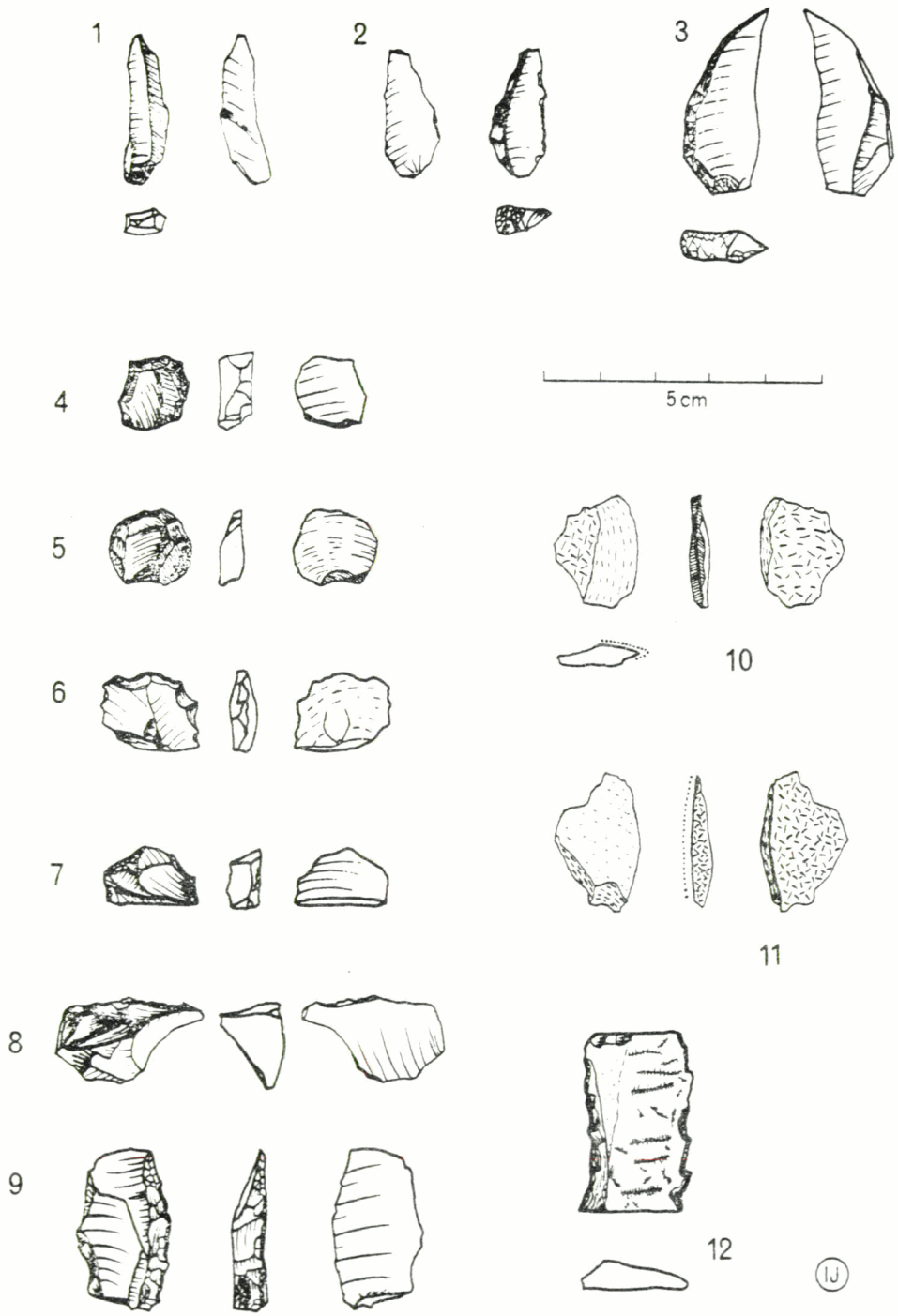
The excavation yielded a very large amount of lithic material - at least 20 to 30 kg and over 10,000 pieces excluding small chips. This, coupled with the concretion covering much of the material, has meant that it has not yet been possible to carry out even a provisional analysis of this material. The notes below are based on visual impressions obtained during excavation or during preliminary sorting.

At least 95% of the lithic material recovered was quartz, mostly in the form of irregular fragments. These fragments are what one might expect to find where attempts were made to knap the vein quartz in the locality. A proportion of the quartz is, however, of higher quality, either milky and lustrous or crystalline, and this material is often finely worked into flakes and small bladelets, many of them retouched. A cursory inspection of the quartz from sectors 0 to 6, only a small fraction of the total quartz recovered, revealed three backed bladelets, a burin, and over half-a-dozen each of notches, scrapers and scaled pieces (of which three were typical "fabricators"). These types are also present in the material from I" and II", so the total assemblage should be quite a large one. The material from the lower layers is too concreted to say whether similar types are present, though no obvious differences in stoneworking, size or raw materials is apparent. Even if these types are absent this could be a function of the sample size.

The rest of the lithic material includes fine-grained volcanics, cherts and silcrete and a number of broken or retouched pebbles. There is a great variety of different materials, and, apart from occasional groups of like material, within a limited area, there is an impression that no two pieces are the same. Most of the material is in the form of small to medium sized flakes (1-5 cm) and there is a marked absence of tiny chips or cores, suggesting that most of the pieces were brought in ready-made. At a guess approximately 20% of these pieces show signs of use and/or secondary retouch. Characteristic types include Bondi points (2 and 3)[1] a number of

[1] Numbers refer to object numbering in Fig. 3.

FIG 3



thumbnail scrapers (4-7), finely worked small scrapers not falling directly into the discoidal thumbnail scraper category (8 and 9), burins and burin spalls (1). There is at least one elouera, numerous well-retouched smallish steep scrapers and a peculiar blade fragment with one margin backed and the other dentated (12). Evidence of grinding was found in the form of a small flake with one margin finely ground on both faces to form a convex sharp edge (10), a flake from a ground-edge tool (11), and a flat pebble (9½ x 6½ x 2½ cms) with a heavily used ground edge at one end. Quartz thumbnail and similar scrapers are also present, and one quartz backed bladelet has a possible gum stain on the backing.

The assemblage appears to fit broadly within the eastern variant of the Small Tool Tradition. The presence of fabricators and ground edge tools in layers I and II/II" might tempt one to assume a relatively late date for these layers. For the moment it is impossible to say anything very positive about the layers below these, though no obvious differences are apparent.

Preliminary Faunal Reports (by K. Aplin)

Faunal remains were present in all parts of the site, with a maximum density and size range of fragments within the dripline of the shelter itself. The material is in general highly fragmented and a considerable proportion shows evidence of burning. A wide range of animals are represented, including a variety of marsupials, rodents, reptiles, birds and fish and land gastropods. Fragments of emu eggshell were also present in sectors 9 and 10. Faunal remains of any kind were almost completely absent in sectors 0 to 3.

Mammal dentaries present within each sample were separated for identification. The presence of both fish and reptile remains and of tortoise carapace were also recorded during this procedure. The concretion covering much of the material made identification practical to a family level only. The preliminary nature of this analysis is stressed and the results given are by no means considered as representative of the total assemblage but rather serve to give an indication of the range of species present in the deposit. Table 2 presents a provisional list of the genera represented by the dentaries. Table 1 shows the distribution of mammalian fauna in percentage form.

However, the initial picture gained from this analysis is one of the presence of a wide range of species, both in terms of size and favoured habitat. The presence of the marsupial carnivores Dasyurus spp. and Sarcophilus sp. raises the possibility of occasional use of the shelter by these animals.[1] The contribution of the remains of their prey to the faunal assemblage would produce a further complicating factor to be considered in any subsequent analysis.

A further analysis is planned taking into consideration such variables as anatomical location and specific identification of bone fragments where possible, the degree of fragmentation and burning, and the spatial and temporal variance of these.

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[1] Sarcophilus sp. - E9 &IV" left mandibular fragment. Adult?
- E10 &IV" right maxillary fragment. Juvenile?
both preliminary identification only.

TABLE 1 PERCENTAGE REPRESENTATION OF MAMMALIAN FAUNA

Sector	Layer	Dasyuridae	Macropodidae	Muridae	Peramelidae	Petauridae	Phalangeridae	Vombatidae	Sample Size
Fossicker's Spoil		1	71	5	10	1	9	3	89
9 + 10	I"		50		25		17	8	12
9 + 10	II"		76		3		9	12	34
9 + 10	III"	2	82				8	8	60
9 + 10	IV"	5	70		9		7	9	43
7 + 8	I		74		13		13		8
	II		89		4		4	4	27
	III		78		11		11		18
	IV		90				10		10
4 + 5 + 6	I		25					75	4
	II		79		7		14		28
	III		50		50				2
0 + 1 + 2 + 3	I + II		100						2

TABLE 2 PROVISIONAL LIST OF GENERA REPRESENTED

Dasyuridae - Dasyurus sp. (maculatus)
Dasyurus sp. (viverrinus)
Sarcophilus sp.

Macropodidae - Aepyprymnus sp.
Bettongia sp.
Macropus sp. (giganteus)
Macropus sp. (rufogiseus)
Petrogale sp.
Thylogale sp.

Muridae - Pseudomys sp.

Peramelidae - Isoodon sp.

Petauridae - Pseudocheirus sp.
Schoinobates sp.

Phalangeridae - Trichosurus sp.

Vombatidae - Phascalomys sp.

Reference

Frank, R.M. 1972 *Sedimentological and morphological study of selected cave systems in eastern New South Wales, Australia.* PhD Thesis, Australian National University

Appendix 1

List of Participants

Australian National University - K. Aplin, F. Baas-Becking, K. Barz, D. Bulbeck, E. Bunn, B. Cundy, D. Gaughwin, E. Hawke, P. Hiscock, M. Janssen, I. Johnson, M. Jones, D. Kaus, D. Llewellyn, M. Morwood, M. Nizette, F. Poldy, J. Robertson, O. Sananikone, V. Solo, H. Sullivan, L. Worrall, S. Wild

Sydney University - P. Gorecki, Université de Paris - A. Testart, Canada - J. Webber, Sydney - V. Middleton

Faunal Report :- Ken Aplin

Data Co-ordination :-

Simon Wild
Department of Prehistory and Anthropology
School of General Studies
Australian National University

Ian Johnson

Department of Prehistory
Research School of Pacific Studies

Australian National University

SUMMER FIELD PROGRAMME OF THE VICTORIA ARCHAEOLOGICAL SURVEY

Introduction

The Summer Field Programme was devised to service the needs of the annual Field School (Witter 1976). This year the School was based at Yambuk, a hamlet located approximately 20 km west of Port Fairy in the Western District (Fig. 1).

The School ran over a period of eight weeks in two four week cycles, each one offering a range of courses in archaeology. These included an Introduction to Archaeology (8 lectures), North American Prehistory (4 lectures), South-East Asian Prehistory (2 lectures), an Introduction to Australian Archaeology (2 lectures), an Introduction to Melanesian