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Results of an Archaeological Survey of the Hunter River Valley, New South Wales, Australia

Part 1: The Bondaian Industry of the Upper Hunter and Goulburn River Valleys

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Plates 4–14. Figures 1–28. Manuscript received, 9th May, 1969

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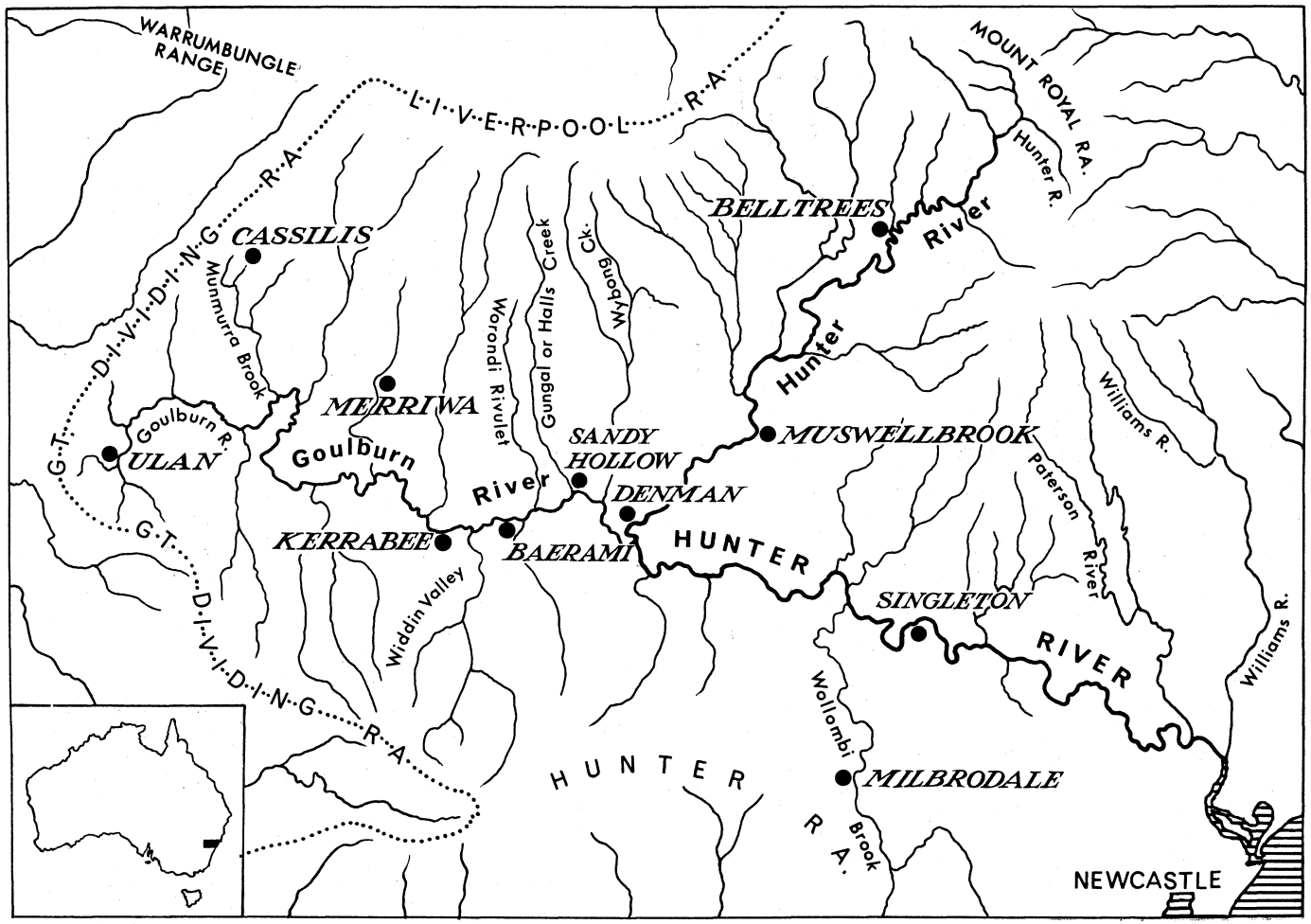


Locality Map: Hunter and Goulburn River systems

INTRODUCTION

Geography

The Hunter River rises in the Mount Royal Range and winds through rolling hilly country in a southwesterly direction as far as Denman, where it is joined by the Goulburn River. Thence it proceeds eastward through an ever-widening valley, mainly in great S-curves, and is joined by several other tributaries, notably Wollombi Brook and the Paterson and Williams Rivers. The Hunter estuary, a complex system of swamp and mangrove, extends from about Raymond Terrace and reaches the ocean in an area of rocky bluffs and sand-dunes at Newcastle.

Since European occupation, the Hunter Valley has suffered periodical floods, but it is likely that flooding was much less severe in the days when only Aborigines inhabited it. Though the flat valley floor and most of the subsidiary valleys have now been cleared by pastoral and agricultural exploitation, at the time of first settlement they were in the main lightly forested (Mitchell, T. L., 1838) and this would have prevented the rapid run-off which now occurs at times of heavy rain.

The Goulburn River, which rises in an undulating section of the Great Dividing Range near Ulan, cuts tortuously through rugged gorges in a generally easterly direction, until it reaches Kerrabee, after which it snakes along a widening valley until it joins the Hunter at Denman. In the course of cutting through the ranges, the Goulburn has carried down a considerable variety of boulders and pebbles, in which cherts and quartzites predominate, and these have been deposited along its lower course and, to a lesser degree, extend into the Hunter itself.

The conglomerate sandstone cliffs which edge the Goulburn and middle Hunter valleys are prone to undercutting and the formation of rock overhangs. The valley fringes are also scattered with huge conglomerate boulders which have fallen from the scarps.

Early observers comment on the well-grassed areas and the park-like appearance of the valley, so in general the Hunter region in its pre-settlement state would have provided excellent hunting grounds with an amplitude of kangaroos, possums, birds, lizards, snakes, and honey, while the rivers themselves would have carried an abundance of fish and shellfish. We can assume also that vegetable foods, nuts, and berries would have been plentiful.

History

The lower Hunter was discovered by Lieutenant J. Shortland in 1797 and was examined by Lt-Colonel William Paterson in 1801, as a result of which a settlement was founded at Newcastle to mine coal and burn shells for lime. Subsequently cedar-cutters gradually penetrated the estuary and lower tributaries as far as where Maitland now stands. The middle and upper Hunter were not settled until after 1819, when an overland route was discovered from Windsor to Singleton by John Howe. The occupation of the Hunter Valley followed rapidly after Benjamin Singleton took up land near the Hunter-Wollombi Brook junction in 1821 and John Howe at Patrick's Plains in 1823.

By 1826 the settlers were petitioning Governor Darling for military protection against the depredations of the Aborigines. When Sir Thomas Mitchell passed through the valley in 1831 on his way to survey the Liverpool Plains, the Hunter was settled as far up as Segenhoe, near Scone.

The history of relations between the early settlers and the Aborigines of the Hunter Valley is poorly documented, but from official records it seems clear that the usual pattern was followed—friendly interest at first, followed by increasing conflict, and ultimately capitulation and disintegration on the part of the Aboriginal local groups. On the other hand, there are also indications that Aborigines were employed on some pastoral properties from the start of settlement, so that relations cannot have been uniformly hostile.

These early accounts have been brought together and analysed by Helen C. Brayshaw, of the University of New England, in an unpublished B.A. thesis (1966) and need not be repeated here. Two points noted in the early accounts are, however, of importance in any consideration of the archaeology of the valley. Firstly, it is stated in a number of places that there was considerable contact, both friendly and hostile, between the Wonarua people of the Middle Hunter and the Gamilaroi of the western slopes of the Dividing Range. There is a specific account of a fight between members of these tribes as far down the valley as the junction of Wollombi Brook and the Hunter (Breton, W. H., 1833). This contact seems to have been made chiefly through what is known as the "Cassilis Gap", an easy way through the otherwise rugged ranges along the line Cassilis-Merriwa-Sandy Hollow. Howitt (1904) states that the Gamilaroi "followed down the heads of the Hunter across from the Talbragar to the Nunmurra waters, and even occasionally made raids as far as Jerry's Plains". He adds that a section of the Gamilaroi "occupied the upper water flowing into the Hunter River, and those which formed the heads of the Goulburn River, for instance the Nunmurra Creek". Since Nunmurra (now Munmurra) Creek flows into the Goulburn between Kerrabee and Wollar, this would seem to imply that the Gamilaroi also came into the Hunter Valley via the gorges of the upper Goulburn. These incursions seem to have been chiefly for trading and to obtain wives, and the latter was probably the cause of the "battles" which are frequently mentioned.

The other information from the historical records which is of immediate interest is that the Wonarua seem to have numbered some 500–600 and occupied the valley from about Sandy Hollow down to about Maitland (Fawcett, J. W., 1898; Miller, R., in Curr, E. M., 1886). The upper Hunter from Muswellbrook northward was the territory of another tribe, the Geawegal. The estuarine part of the lower Hunter appears to have been inhabited by the Gaddhang (or Worimi), who extended north to Port Stephens. There is evidence also for trade between the predominantly coastal Gaddhang and the riverine Wonarua, and of contact between the valley tribes and those to the south, the Awabagal of Lake Macquarie and the Darginung of the Hawkesbury Valley (Dawson, 1830; Howitt, 1904; McCarthy, 1939).

The area we are predominantly concerned with in this report is, then, that of the Wonarua and of their inland contact with the Gamilaroi. However, it would be misleading to give undue prominence to the early reports, since we are dealing with the prehistory of the Hunter Valley and there is not even any guarantee that the people of the upper Hunter during the prehistoric period were ancestral to the historic Wonarua; Aboriginal society was far from static, as we know from important technological changes in the archaeological record elsewhere and from the work of social anthropologists in other parts of the continent.

Previous Research

Although from the very early days settlers have been finding edge-ground axe-heads (called locally "mogos" from a Wonarua term) when ploughing in the Hunter Valley, little interest was taken either in the culture of the surviving Aborigines of the region or in prehistoric remains there. There are, however, a great many relics in the area and no doubt a number have disappeared or been destroyed since

settlement. Along the floor of the valley itself the severe flooding, already mentioned, has obliterated practically all traces of prehistoric and post-settlement Aboriginal occupation, but along the scarps and side valleys many interesting relics still survive. These include painted caves, rock engravings, axe-grinding grooves, workshops, and camp sites.

Probably the first person to attempt to record these relics systematically was W. H. Matthews, a surveyor, who in his travels between 1870 and 1910 became deeply absorbed in Aboriginal culture and has left many accounts and scale drawings of Aboriginal relics in various parts of New South Wales and Queensland. While stationed at Singleton Matthews (1893) recorded a number of cave paintings and rock engravings in the Bulga-Milbrodale-Wollombi area, and some of these sites remain intact. Several local residents made extensive collections of Aboriginal artefacts from occupation sites. Notable among these were A. Eather, of Bulga, part of whose collection is in the Australian Museum and part in the Singleton Historical Society's museum, and F. A. Davidson, of Singleton, who collaborated with F. D. McCarthy in investigating the 200-ft terraces bordering the Hunter upstream from Singleton.

McCarthy, while Curator of Anthropology at the Australian Museum, conducted a number of archaeological reconnaissances in areas of importance, and one of these trips, in 1939, was an investigation of the Hunter and Wollombi Valleys. The report of this reconnaissance (in typescript at the Australian Museum) gives a number of useful leads to promising rock shelter deposits and camp sites.

The only other work of direct relevance to the archaeology of the Hunter is the excavations carried out in 1958–1961 by McCarthy and in 1961 by Tindale in the Capertee Valley, some 50 miles southwest from the Hunter as the crow flies. Although there is no easy direct route across the Dividing Range between the Capertee and Hunter valleys, these are the only excavations of stratified sites undertaken scientifically in the locality and are, therefore, useful for comparison when interpreting material from the upper Hunter region.

The Australian Museum Survey, 1965–1967

When the writer commenced work at the Australian Museum in 1965 most of eastern New South Wales was already being covered by other resident archaeologists—Miss (now Dr) Isabel McBryde, of the University of New England, was in the middle of a careful and detailed survey of the Aboriginal relics and occupation deposits of New England and the North Coast, R. V. S. Wright, of the University of Sydney, was doing periodic excavations in the Hawkesbury-Broken Bay areas, while J. V. S. Megaw, also of the University of Sydney, was concentrating on the Botany Bay-Royal National Park region. The coast and ranges south of Wollongong were being systematically surveyed and excavated by members of the Australian National University in Canberra, under the direction of J. Golson.

This left only the Hunter River-Port Stephens area unconsidered, and so it seemed obvious that this was one gap the Australian Museum could fill. It had the great advantage that it was within easy reach, so that trips of only a few days or a week could be expected to achieve worthwhile results.

On studying the accounts of previous work in the Hunter Valley, it became apparent that virtually every side valley contained important relics and probably also occupation deposits. However, the Museum's project, as I saw it, should be strictly confined to the valleys of the Hunter and Goulburn Rivers, since the long-term objective was to attempt to reconstruct the prehistory of the valley peoples, both on the upper freshwater reaches and in the estuary. It seemed, therefore, essential not

to be led away from the main objective up the interesting side valleys, otherwise little or no progress would be made on the main project. At the risk, then, of missing possibly more important sites in, for example, the Wollombi and Widdin Valleys, the survey has been concentrated on the main valley, with only brief excursions up the ancillary river systems.

In undertaking this archaeological survey and excavation of selected sites, the basic questions for which answers were sought were these:

(i) When was the valley first occupied?

(ii) What changes in culture, through time, could be recognized in the stratigraphic record?

(iii) What differences in basic tool-kit could be detected by a comparison of freshwater and estuarine assemblages in each period?

(iv) Were there any evidences in the archaeological record of the known historical contacts between the Hunter peoples and the adjacent tribes to their north, south, and west?

(v) How did the culture or cultures of the Hunter Valley compare with those already under investigation on the north and south coasts of New South Wales and with the situation on the inland river systems west of the Dividing Range?

The survey commenced in September 1965, when the upper Hunter between Belltrees and Muswellbrook was examined and considered archaeologically unpromising, the Goulburn Valley between Cox's Gap and Denman appeared more likely to be productive of sites, and the valley through the range from Sandy Hollow to Merriwa and Cassilis was found to provide easy access from the headwaters of the inland rivers into the upper Hunter Valley.

The area of the Hunter-Goulburn junction contained a multitude of steep conglomerate scarps with much undercutting, but detailed examination of many of these overhangs failed to reveal any sign of Aboriginal occupation. However, a number of large boulders fallen from these scarps contained considerable cavities forming caves and several of these were found to have occupation debris and artefacts scattered on the surface of the deposits within them. The most promising of these, situated adjacent to the Goulburn River, near the town of Sandy Hollow, and designated SH/1, was excavated between November 1965 and March 1966 and produced artefacts and food remains to a maximum depth of 3 feet 6 inches. It was clearly a flake and backed-blade industry, with the Bondi point predominating.

Attention was then turned to the Singleton area and, in particular, to the situation reported by McCarthy and Davidson (1943) and previously mentioned; that is, the erosion of large quantities of artefacts along the 200-foot contour at a number of points in the near vicinity of the Hunter southwest of Singleton. In an attempt to establish the exact provenance from which these artefacts were eroding, during June 1966 several series of test trenches were dug into the shallow topsoil at a number of points on the 200-foot terrace and produced small quantities of material similar to that surface-collected by McCarthy and Davidson. Close inspection of the Hunter banks and lower terraces, both above and below Singleton, failed to reveal any evidence of Aboriginal activity.

The next excavation was of an occupation deposit in a normal rock shelter (designated M/1) adjacent to a fine painted shelter on Bulga Creek at Milbrodale, on the southern fringe of the Hunter Valley. This deposit proved to be a shallow one, the deepest squares reaching the base rock shelf at 24 inches. Again this was a flake

and backed-blade industry, with Bondi points and microliths occurring throughout. A second shelter in the same locality (M/2) was also excavated because a human mandible was found on the surface, but only a few fragments of bone and some flakes were found.

Before continuing the survey downstream to the Maitland-Cessnock area, it was decided to seek a site at the western outlet of the Cassilis Gap, since it was thought that this might provide useful comparative material and possibly throw further light on the upper Hunter industry. After survey in the area of Gulgong-Ulan-Cassilis, a small rock shelter on Bobadeen property (designated BOB/1), close to the source of the Goulburn River and almost on the watershed of the Divide, was excavated during March-June 1967. This proved to be an extremely productive deposit and again contained a flake and blade industry, with Bondi points and microliths throughout, though there were marked differences from the upper Hunter sites.

Sufficient material had now been obtained to commence an evaluation of the upper Hunter industry, and it was decided to finalize the analysis of all the material so far excavated and write a full report for publication, before proceeding to the second half of the survey on the estuarine part of the lower Hunter Valley. The remainder of this report, therefore, contains detailed descriptions of the sites excavated and the material identified, together with a comparative analysis of the artefacts obtained and a summary of findings up to this point. This first part of the Hunter Survey presents only basic data for the upper and central region of the valley. Detailed comparisons with relevant work elsewhere in eastern New South Wales will be made in the second half of the report, when the whole survey has been completed.

Before proceeding to the excavation reports, it is necessary to describe the system by which the implements were classified. It was decided that for the purposes of an extensive survey of this type it was desirable to utilize a fairly simple typology, but one which would enable comparison to be made with assemblages from other areas at an elementary level. After considerable study of the artefacts obtained from the sites so far excavated, it was decided to type them according to the following system:

Firstly, all BACKED BLADES are grouped together, but subdivided into Bondi; Elouera; Geometric Microlith; and Other (see plates 12, 14).

A variety of flakes with obtuse-angled cutting edges are classified as ADZE FLAKES. Although some of these resemble unused tulas, they could not be definitely classified as such, particularly as no tula slugs were found. However, all flakes included in the adze category show either retouch or work-use (see fig. 2).

The SCRAPERS, which include both flakes and blades with acute-angled cutting edges, are subdivided only into Side and End, according to whether the retouch and/or work-use are on the longer or shorter margin.

FABRICATOR (see fig. 1) was included as a main category, according to the definition of McCarthy (1946, 1967). Some tools of this type found in all three rock-shelter excavations had two opposing margins with the peculiar crushing work-use diagnostic for the type, but others had only one such edge. All such implements were included, since they were obviously used for similar purposes. It is possible that specimens with only one used margin are broken, so that the second edge is missing.

A variety of points were encountered, some uniface and resembling untrimmed pirris, others, mostly of quartz, like Bondis without backing, but showing signs of use. The category WORKED POINT was, therefore, subdivided into Point, Uniface, and Other (see figs 1, 2).

Numbers of amorphous UTILIZED FLAKES, without secondary working were encountered. These are subdivided into Blade and Other.

The remaining categories take care of all other tool types encountered in this particular region. Cores which showed work-use on any margin are included as implements under the heading CORE, UTILIZED; GROUND-EDGED AXES were found at Milbrodale and Bobadeen (see fig. 1). A number of natural pebbles, without flaking but showing signs of percussion or grinding are called PEBBLE, UTILIZED. Finally, a MISCELLANEOUS category is added for unidentifiable types which show undoubted signs of manufacture or utilization.

Waste flakes are divided into micro and macro categories, according to whether their maximum length falls below or exceeds 2 centimetres. Cores are similarly graded, with a maximum measurement of 3 centimetres as the dividing line.

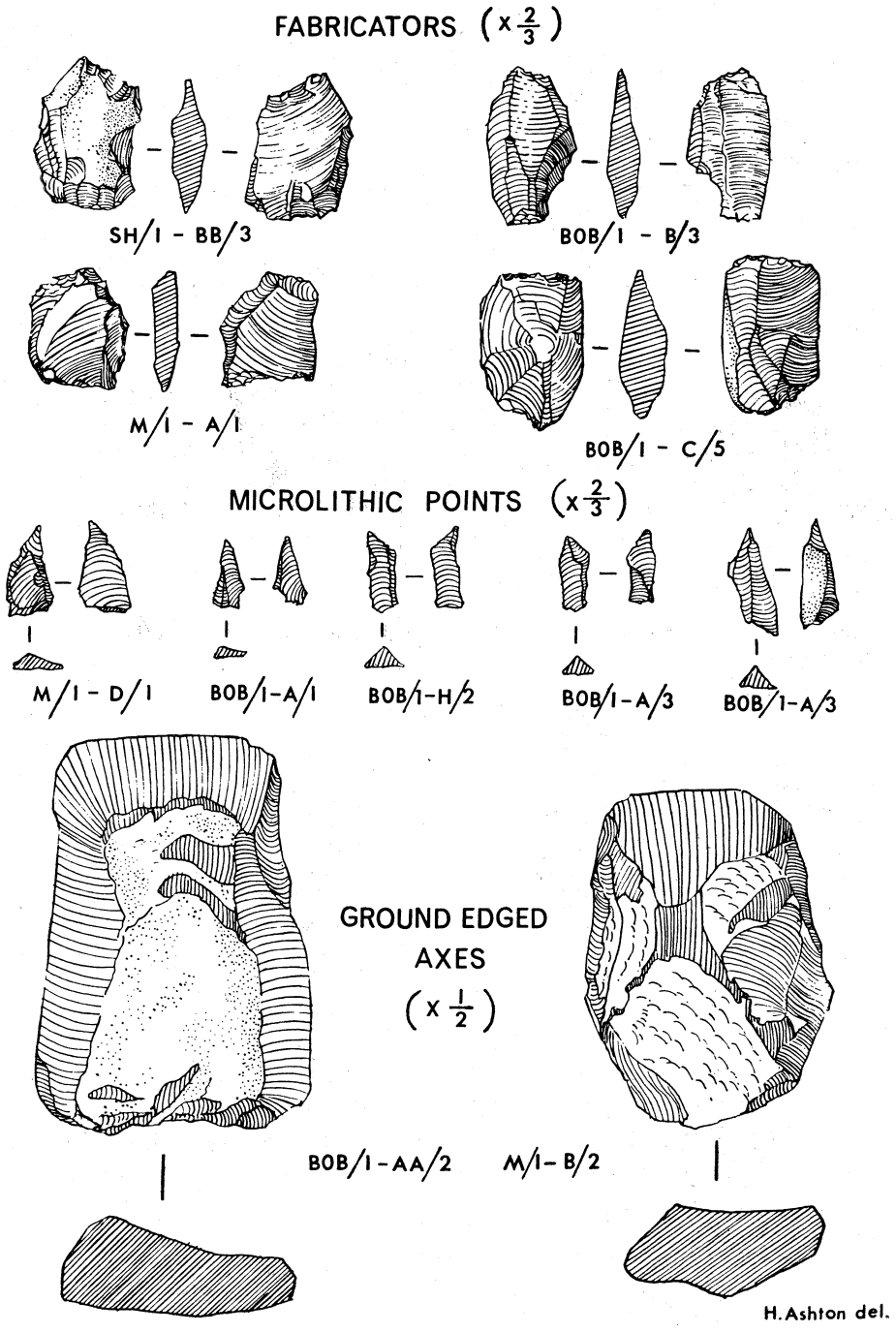


Figure 1: Implement types

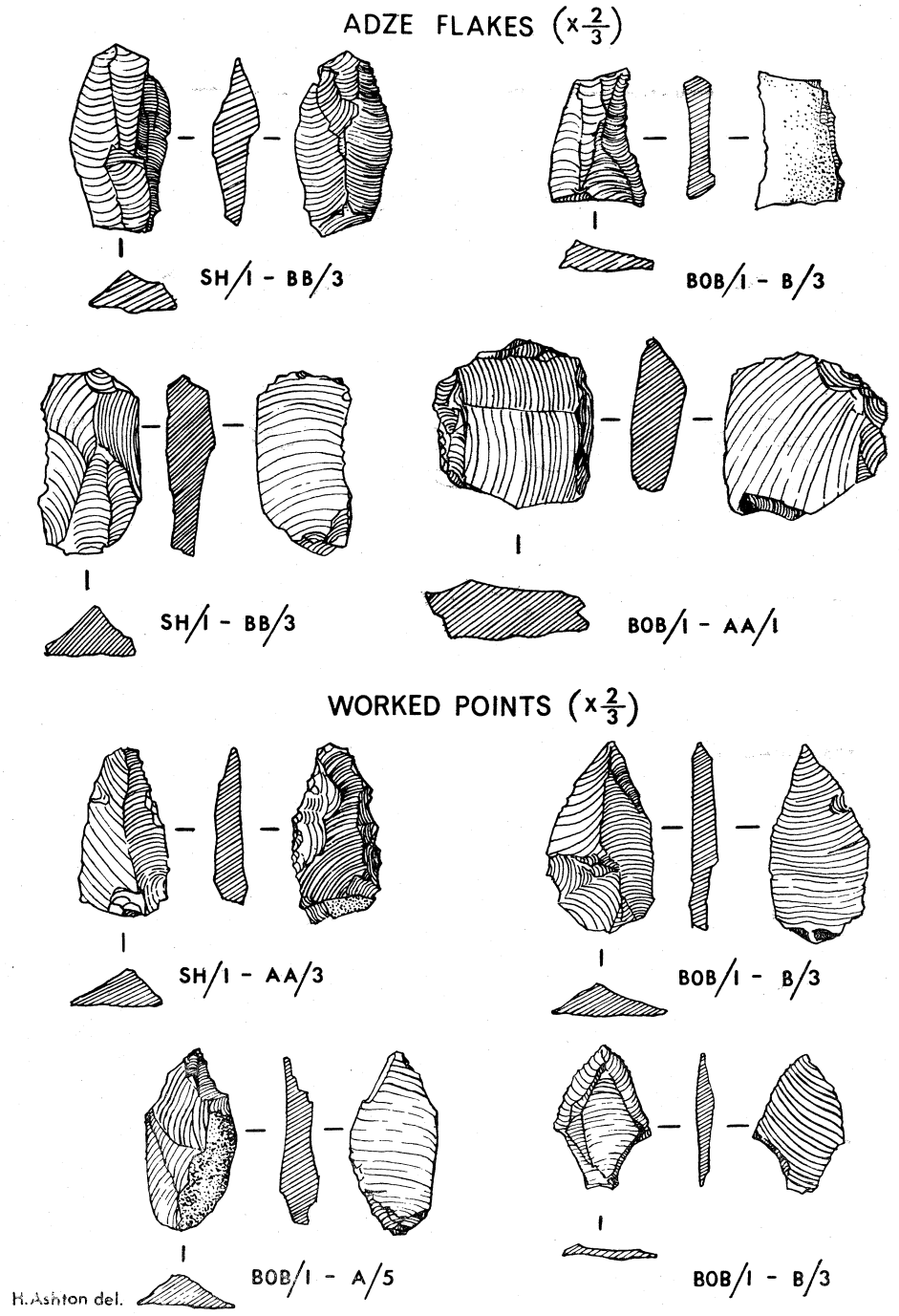


Figure 2: Implement types

THE EXCAVATIONS

Sandy Hollow (Map—Muswellbrook, 1 to 63360). See plates 4 and 5.

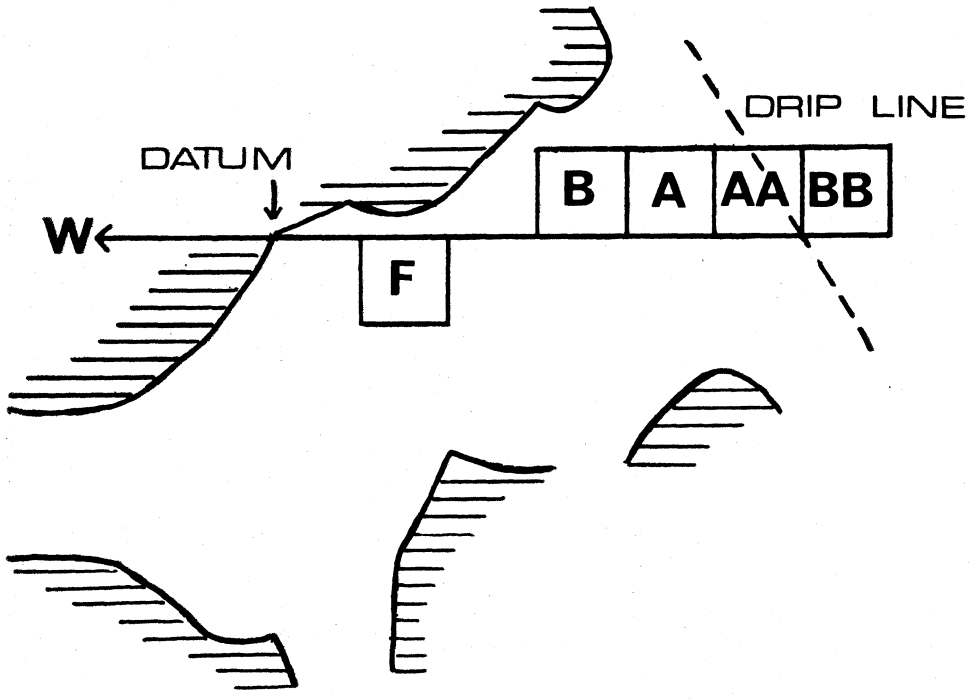
SH/1 rock shelter is situated at 531001, some 300 yards north of the Goulburn River at the foot of a rugged scarp, and consists of a huge hollow conglomerate rock lying in what is now a sloping paddock. Half a mile to the east, Halls Creek flows into the Goulburn, and it is the gorge cut through the scarp by Halls Creek that gives easy access into the valley which leads through the range to Merriwa and Cassilis. There is another cutting through the scarp about a mile to the west, where Worondi Rivulet joins the Goulburn; this also gives access to the Cassilis Gap. SH/1, therefore, is right at the point where the Gamilaroi from the western slopes would have reached the Hunter Valley system when they made their periodic excursions for trade, wives, or warfare with the Wonarua.

The method of excavation of SH/1 is shown in the accompanying ground plan and section (figs 3 and 4). In the absence of any continuous stratification, the excavation was carried out in 6-inch levels throughout. The main entrance to the shelter, which was the only one excavated, faces almost due east. There are subsidiary entrances on the western and southern sides of the rock and, as we dug in very hot weather, we found that these entrances, even though much diminished by the build-up of deposits, always channelled a cool breeze through the shelter. Also, the east entrance was pleasantly sunny and warm in the cool early morning, but shaded from the hot sun later in the day. Inside the cavity is a flat rock shelf, on which the whole rock shelter is resting, but this shelf ends just inside the east entrance, where a sort of natural seat is formed (in Square B).

Squares A and B contained almost exclusively implements and waste flakes, whereas Squares AA and BB, outside the dripline, produced quantities of bone, teeth, and shell, as well as artefacts. In these squares, rock slabs, fallen from an earlier extension of the overhang, were employed as fireplaces, augmented here and there by river boulders. The material in Square F, inside the shelter, was in loose dust and appeared to have been much mixed by the scuffling of animals; it has not been included in the statistical tables.

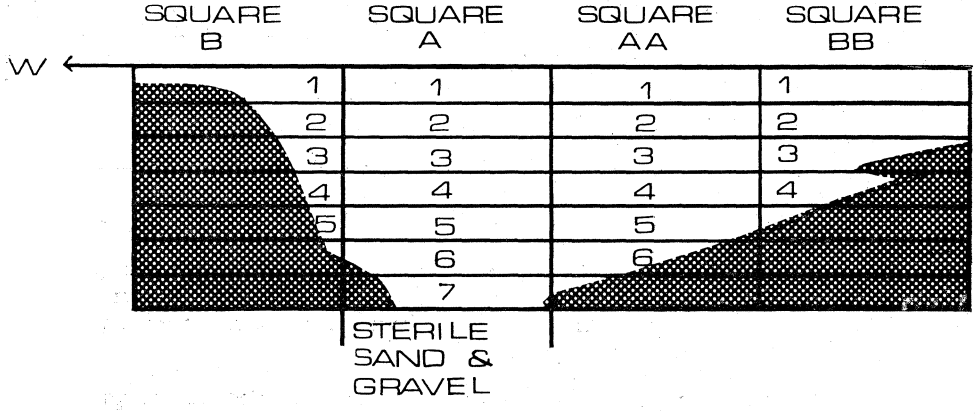
In Squares A and AA the excavation was taken into sterile yellow base sand at 3 feet 6 inches. Elsewhere base rock was encountered at varying depths. My initial interpretation of the site was that the rock shelf inside the shelter had been used as a sleeping place, the east entrance under the overhang as a workshop, and the cooking had been done in the hearths outside the front, so that the shelter was not filled with smoke when the nor'easter was blowing, and as the excavation progressed it seemed that this was correct. At first it seemed that the reason for the occupation of this particular site was that the inhabitants were making implements from the nodules in the conglomerate of which the rock is formed, but subsequently it became apparent that the material flaked had been obtained from the bed of the nearby Goulburn River, which was scattered with chunks of the yellow chert and red jasper that were the main materials used. The other material that appeared occasionally throughout the deposit was white quartz. Although no actual implements of quartz were found, a quantity of obvious waste flakes from quartz-working were present in all levels down to the bottom of Level 5.

The material from Sandy Hollow was subsequently sorted and roughly typed. Bondi points occurred only in the top four levels, the total for the whole excavation amounting to 66, together with a further 33 miscellaneous backed blades and 9 eloueras. Waste flakes continued below Level 4, but the only implements present were a few scrapers and utilized flakes. The total of flakes and cores was 4190.



SANDY HOLLOW SHELTER NO.1 (SH/1)
LAYOUT OF SQUARES.
SCALE: 1/2" TO 3 FT.
DATUM E-W MAG.
MAP REF. MUSWELLBROOK - 531001.

Figure 3



SANDY HOLLOW SHELTER NO.1 (SH/1).
SECTION ALONG DATUM LINE.
SCALE: 1/2" TO 1 FT.

Figure 4

Table 1 shows the disposition of implements in the deposit, the size and location of waste flakes and cores, and the areas of occurrence of quartz. In Table 2 implements and waste are arranged by horizons.

The majority of the identifiable bones and jaws came from Square BB, Level 3, and all species noted still exist in the area. The main types are: Grey Kangaroo (*Macropus major*), several individuals represented; Wallaby (*Wallabia spp.*); and Brush-tailed Possum (*Trichosurus vulpecula*).

The shells present include *Alathyria profuga* (Gould); *Hyridella australia* (Lamarck); and *Cucumerunio novaehollandiae* (Grey). All these species are now classified in the family Hyriidae and are extant in the Hunter region.

Carbon-14 dates supplied by the Australian National University laboratory for charcoal from SH/1 were as follows:

ANU-125 Square BB, Level 1 (4–6 inches)—530±80 BP (A.D. 1420).

ANU-12 Square AA, Level 4 (23–24 inches)—1300±100BP(A.D. 650).

In the course of the Sandy Hollow excavation a reconnaissance was made of the Widdin Valley and a painted rock shelter at 337985 (Singleton—1 to 250,000), previously reported, was examined, photographed, and sketched. This shelter, also in a huge boulder, adjacent to Widdin Brook, had previously contained an extensive occupation deposit, but unfortunately this had been cut through by a realignment of the road some years before and, as a result, much material had fallen down and become intermixed. However, it was encouraging to learn that this shelter, known locally as "Black's Cave", had only been saved from total destruction by the strong representations of residents of the valley.

A number of other shelters with occupation deposits, similar to those at Sandy Hollow, were found higher up the Goulburn Valley, near Baerami, at 337994. The only other site located was on Hall's Creek, near Gungal, where the recent excavation of a dam at 510035 (Muswellbrook—1 to 63,360) showed yellow chert flakes in some quantity in the spoil thrown out by the bulldozer.

Singleton (Map—Singleton, 1–63360). See plates 6 and 7.

After the conclusion of the Sandy Hollow excavation, attention was concentrated on the Singleton area, particularly on the situation reported by McCarthy and Davidson (1943)—that is, the erosion of large quantities of artefacts along the 200-foot contour in the near vicinity of the Hunter southwest of Singleton. Starting from the Wollombi Brook junction and working down the Hunter to Singleton, artefacts were found in erosion points along the 200-foot contour at 046776, near Gouldsville (095734), Mount Thorley (105685), and particularly along a stretch of some hundreds of yards of what McCarthy termed the Gowrie terrace, from 145739 to 140724. Near Wylie's Flat on the high ground at 133722 both yellow chert and pink quartzite were found outcropping and there were signs that blocks had been struck off for making artefacts. On Reservoir Hill (150745) many artefacts were eroding out on and above the 200-foot contour.

In an attempt to clarify this situation, a number of test squares were dug at various points on the 200-foot terrace. The three main series, dug during June 1966, were designated and located as follows: S/1 was on the Gowrie terrace at 144727; S/2 was north of Gouldsville at 095734; and S/3 was on a reverse slope above a small creek at 135755. None of these trial excavations produced any conclusive evidence (nor any datable material), but they did establish that the artefacts eroding out were in fact contained in the sparse topsoil 6–12 inches deep, overlaying the heavy clay

Table 1. Sandy Hollow (SH/1): Distribution of Stone Implements, Waste, and Quartz

SQUARE		B					A							AA							BB					Grand Totals
LEVEL		1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	
Blade .. .. .. Backed	Bondi	3	1	..	..	..	2	4	4	..	..	..	..	..	3	19	10	..	..	..	1	1	18	..	..	66
	Elouera	1	1	..	..	..	..	2	..	..	..	..	..	..	..	2	2	..	..	..	..	..	1	..	..	9
	Microlith	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	1	..	..	..	..	4
	Other	2	..	..	..	..	3	1	1	..	..	..	..	1	1	5	7	..	..	..	..	..	6	2	..	29
Scraper	Side	..	..	..	..	..	..	..	..	..	..	..	..	2	..	3	2	2	..	..	1	1	2	..	..	13
	End	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	1	..	..	..	..	..	..	..	4
Point, Worked ..	Uniface	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	2
	Other	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	..	3
Flake .. .. .. Utilized	Blade	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	3
	Other	..	..	..	..	1	..	..	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	4
	Adze Flake	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	3	..	..	6
	Fabricator	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1
	Core, Utilized ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
	Axe, Ground-edged ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
	Pebble, Utilized ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
	Miscellaneous ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Sub-Totals	Implements	6	2	0	0	1	6	7	6	1	0	1	0	3	5	37	24	3	0	0	4	2	33	3	0	144
CORE..	Large	..	2	1	..	..	1	2	3	..	1	..	..	3	2	27	11	6	..	..	1	3	32	9	4	108
	Small	1	..	1	1	..	3	2	1	..	..	..	..	1	2	15	4	10	..	..	3	2	5	4	1	56
WASTE .. .. FLAKE	Large	43	22	5	18	7	37	77	63	15	11	10	..	24	36	345	162	158	2	1	15	29	211	54	38	1,383
	Small	171	116	37	50	19	147	171	148	43	20	33	1	157	81	331	272	232	3	1	67	61	210	75	53	2,499
Sub-Totals	Cores and Waste ..	215	140	44	69	26	188	252	215	58	32	43	1	185	121	718	449	406	5	2	86	95	458	142	96	4,046
Totals	Implements and Waste	221	142	44	69	26	194	259	221	59	32	44	1	188	126	755	473	409	5	2	90	97	491	145	96	4,190
Quartz	Implements	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
	Waste	19	7	1	5	1	10	3	5	4	1	2	..	11	9	41	11	12	..	..	5	7	1	2	..	157
Sub-Totals	Quartz	19	7	1	5	1	10	3	5	4	1	2	0	11	9	41	11	12	0	0	5	7	1	2	0	157

Table 2. Sandy Hollow (SH/1): Distribution of Implements and Waste by Horizons

Horizon	Blade, Backed				Scraper		Point, Worked		Flake Utilized		Adze Flake	Fabricator	Core, Utilized	Axe, Ground-Edged	Pebble, Utilized	Misc.	Core		Waste Flake		Totals
	Bondi	Elouera	Micro	Other	Side	End	Uniface	Other	Blade	Other							Large	Small	Large	Small	
1	6	1	1	6	3	..	..	..	2	..	..	..	..	..	..	..	5	8	119	542	698
2	9	3	..	2	1	1	..	..	..	..	..	..	..	..	..	..	9	6	164	429	624
3	41	3	1	12	5	2	2	2	..	1	6	1	..	..	..	..	63	22	624	726	1,511
4	10	2	2	9	2	..	..	1	1	1	..	..	..	..	..	..	20	9	249	440	746
5	..	..	..	..	2	1	..	..	..	1	..	..	..	..	..	..	11	11	214	324	564
6	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	12	36	49
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3
Totals	66	9	4	29	13	4	2	3	3	4	6	1	0	0	0	0	108	56	1,383	2,499	4,190

formations of which the body of the terrace was composed. No associated material was found, except that at S/1 glass fragments and a broken clay pipe were encountered in the top 3 inches. However, these were not necessarily associated with the Aboriginal artefacts, which generally did not occur in the top 4 inches of the deposits.

From personal communication with F. A. Davidson, formerly of Singleton, who collected extensively along the terrace in the early 1940's and aided McCarthy in his investigations in 1943, it seems that this topsoil, which is now held together by sparse grass, was formerly dry and dusty, so that in high winds considerable quantities were blown away. At that time the surface of the topsoil was scattered with artefacts, whereas now they are only found sticking in the underlying clay at erosion points. Probably the artefacts now present in the topsoil have accumulated there, owing to the wind and water erosion of the topsoil subsequent to the clearing of the trees by the early settlers. The establishment of grass cover may have caused some subsequent build-up of humus. In any case, it seems that the artefacts cannot be in an original matrix and are likely to be much mixed up.

When water erosion occurs today, artefacts are further accumulated by sticking in the clay at the erosion points. It is not, therefore, necessary to postulate an extraordinarily intensive implement-making industry on the terrace. It may be that the material comes from several periods, but is now inextricably mixed. It should be added that the only implements definitely identifiable in the material excavated on the 200-foot terrace are all geometric microliths, no Bondis or Eloueras being present, nor were any worked implements found during preliminary surface collecting at every erosion point visited. This, of course, may be due to the extensive surface collecting carried out by F. A. Davidson, and no doubt by others, over a number of years.

McCarthy and Davidson (1943) called the terrace industry an Eloueran one, despite the fact that in the material they analysed there were 524 Bondi points and only 89 Eloueras.* Many of the artefacts in this material closely resemble those excavated at Sandy Hollow, but there are a number of types which were not represented at SH/1, for instance uniface pebble implements and a wide range of geometric microliths. Nor were the large flake tools of pink quartzite present at Sandy Hollow.

The 200-foot terrace is now in most places a windy, dusty exposed place and not at all attractive as a camp site, but when it was forested it was probably quite tolerable. However, the reason for the makers of the implements camping 50–100 feet above the river, and in most places up precipitous cliffs, is difficult to fathom. An initial explanation arrived at when surveying the area generally, was that perhaps at the time of this particular industry the Hunter was blocked at the point where it now cuts through the terrace between Mount Thorley and Hambledon Hill (122690) and that the whole of the area west of this point had been a lake up to 50 feet deep. In this case the occupants of the 200-foot terrace would have been camping around the shores of this lake. Alternatively, the Hunter might then have been considerably higher than it is now; there is evidence of considerable down-cutting and alteration of course in this area.

A third alternative was suggested by Dr David Branagan, of the Department of Geology, University of Sydney, who visited the area during the subsequent excavations at Milbrodale. He thought that possibly the geology of the 200-foot terrace had especially favoured the formation of the cherts and quartzites used in the industry and that the implement-making went on only at the level where the desired material was

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* Subsequently McCarthy in 1948 redefined the term Eloueran to apply only to the upper phase at Lapstone Creek and has since used it in this sense only. The Singleton material is now Bondaian in his Eastern Regional Sequence.

available. Certainly, there are outcroppings of both yellow chert and pink quartzite on the highest point of the terrace, directly above the river at 133732. McCarthy and Davidson (1943) stated that the raw material was obtained from the base of the terrace, where it occurred in the form of deposited pebbles.

Lloyd Hamilton, of the University of New South Wales, has drawn attention to a passage in H. G. Raggatt's (1938) unpublished D.Sc. thesis, which reads:

> In 1933, the writer exhibited photos . . . of extensive terrace gravels which occur about 100 feet above the present level of the Hunter River. These gravels have been largely changed to "grey billy" and it was suggested that the only possible explanation of the phenomenon was that they had been overlaid by basalts. These deposits may be seen at Abbey Green, 3 miles south of Singleton; in the village of Jerry's Plains; and on the Denman road, 10 miles from Muswellbrook.

Farther on Raggatt adds: "Confirmation of this has recently been supplied by J. A. Dalhunty (Proc.Roy.Soc. N.S.W. LXXI, 1938: 297–317) who has discovered basalt within the valley of the Goulburn". In this context Dalhunty states that he found basalt in the area where Munmurra Creek joins the Goulburn, i.e. between Kerrabee and Wollar. Raggatt further states: "Following peneplaination, the surface was uplifted and an extensive valley system carved out before the outpouring of the newer basalts. This last event happened in the not long distant past, the valleys having been only slightly modified since the extrusion of the newer basalts". He considers that there has been an uplift of about 100 feet since this laying down of the newer basalts.

This would seem to bear out the suggestion that the 200-foot terrace was a horizon where cherts and quartzites were most likely to form.

During the trial trenching of the 200-foot terrace a more intensive inspection of the Hunter banks above and below Singleton was carried out by the whole excavation party and artefacts were found eroding from the 200-foot contour at one other point (073749). No evidence whatsoever of Aboriginal occupation was found on the river banks and adjacent terraces between the Wollombi Brook junction and Singleton, nor for about 2 miles below Singleton towards Glendon.

Milbrodale (Map—Doyles Creek, 1–50,000). See plates 8 and 9.

Rock-shelter M/1 at Milbrodale, which was the next site to be excavated, during November 1966, stands some 20 feet above the valley floor at the head of a small re-entrant overlooking Bulga Creek at 994566 and is the lower and larger section of a two-level shelter which faces eastwards.

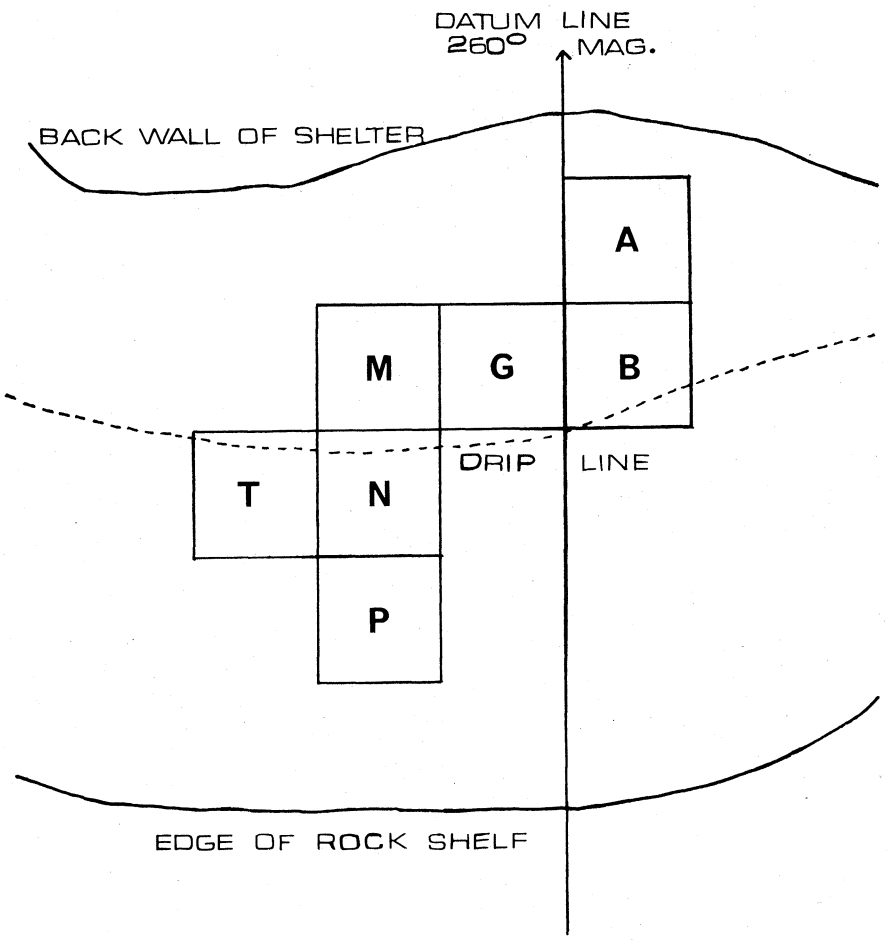
The layout of the Milbrodale excavation may at first sight appear somewhat arbitrary (see fig. 5), but in fact it turned out to be a fairly shallow deposit, with a maximum depth of rather less than 2 feet, and the series of seven squares dug was an attempt to sample the areas likely to be deepest. Two teams excavated and sieved, the first starting with Square A and working forward into Square B, and the second team starting with Square M and working into N, P, and T. The connecting square, G (which included a 6-inch baulk and was therefore 3 feet by 3 feet 6 inches), was completed last by both teams.

The underlying rock shelf was very uneven and was overlain by many irregular slabs fallen from the roof. Some stratification appeared in Square M and was followed. In spite of these difficulties, the excavation was an interesting one and produced, in addition to the expected range of backed blades and utilized flakes, a fine pebble ground-edged axe (see fig. 1) in Level 2 of Square B, one quartz Bondi point and one quartz unbacked point, as well as a delicate microlith segment of chert in Level 1 of Square M. Bondis appeared in most of the top levels, but did not appear

in the lowest levels, except in Squares M and T, which were only 18 inches deep. A total of 40 Bondi points was found in the whole excavation. A considerable amount of bone was encountered, especially along the drip-line, and some pieces seemed as if they might have been worked for points and scrapers.

Table 3 shows the disposition of implements, waste flakes, and quartz, which was most strongly represented in Level 2 in all squares, but extended throughout the excavated area. Table 4 groups implements and waste by horizons.

In the second shelter excavated at Milbrodale (M/2), which is situated near the fine painted shelter at 995569, a square approximately 6 ft x 4 ft was dug into loose white sand in 6-inch levels but produced only some odd flakes of chert and a few human and animal bones. It seems likely from the mandible originally found on the surface that the burial was in fact Aboriginal, but may well have been done in the post-settlement period, when many such burials with little or no ritual seem to



MILBRODALE SHELTER NO. 1. M/1. LAYOUT OF SQUARES.
SCALE: 1" TO 3'. MAP REF. DOYLE'S CREEK 994566.

Figure 5

Table 3. Milbrodale (M/1): Distribution of Stone Implements, Waste, and Quartz

SQUARE		A				B				G			M			N			P	T			Grand Totals
LEVEL		1	2	3	4	1	2	3	4	1	2	3	1	2	3	1	2	3	1	1	2	3	
BLADE, BACKED	Bondi	..	1	..	..	1	3	..	..	2	11	..	2	4	1	..	2	..	..	3	8	2	40
	Elouera	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
	Microlith	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1
	Other	..	..	..	..	..	..	..	..	..	3	..	..	1	1	..	1	..	..	..	2	..	8
SCRAPER ..	Side	..	1	..	..	..	..	..	..	..	2	..	2	2	..	1	..	2	2	2	3	..	17
	End	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	4
POINT, WORKED	Uniface	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
	Other	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2
FLAKE UTILIZED	Blade	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2
	Other	..	..	..	..	..	1	..	..	1	..	..	..	1	1	..	..	..	..	1	..	..	5
	Adze Flake	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
	Fabricator	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	3
	Core, Utilized	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
	Axe, Ground-edged	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
	Pebble, Utilized	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
	Miscellaneous	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Sub-Totals, Implements		2	4	1	0	1	6	0	0	3	17	0	5	9	3	3	4	2	3	8	14	2	87
CORE	Large	..	..	..	..	1	4	..	..	..	1	..	..	5	2	..	5	..	1	5	6	..	30
	Small	9	6	2	1	2	13	8	1	6	10	..	2	8	1	3	7	2	..	20	21	..	122
WASTE FLAKE ..	Large	14	23	1	1	11	24	8	2	26	42	1	24	50	8	14	53	12	9	46	77	..	446
	Small	55	62	9	..	75	86	38	7	84	165	15	70	182	39	37	89	29	31	102	157	6	1,338
Sub-Totals, Cores and Waste		78	91	12	2	89	127	54	10	116	218	16	96	245	50	54	154	43	41	173	261	6	1,936
Totals, Implements and Waste		80	95	13	2	90	133	54	10	119	235	16	101	254	53	57	158	45	44	181	275	8	2,023
QUARTZ ..	Implements	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	2
	Waste	2	4	1	..	6	9	4	..	3	10	..	1	18	2	1	20	1	2	22	17	..	123
Sub-Totals, Quartz		2	4	1	0	6	9	4	0	3	11	0	1	18	2	1	20	1	3	22	17	0	125

Table 4. Milbrodale (M/1): Distribution of Implements and Waste by Horizons

Horizon	Blade, Backed				Scraper		Point, Worked		Flake Utilized		Adze Flake	Fabricator	Core, Utilized	Axe, Ground-Edged	Pebble, Utilized	Misc.	Core		Waste Flake		Totals
	Bondi	Elouera	Micro	Other	Side	End	Uniface	Other	Blade	Other							Large	Small	Large	Small	
1	8	..	1	..	7	2	..	2	..	2	..	2	1	..	..	..	7	42	144	454	672
2	29	1	..	7	8	2	..	..	2	2	1	1	..	1	..	..	21	65	269	741	1,150
3	3	1	..	1	2	..	..	..	..	1	..	..	..	..	..	..	2	13	30	136	189
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	3	7	12
Totals	40	2	1	8	17	4	0	2	2	5	1	3	1	1	0	0	30	122	446	1,338	2,023

have been carried out as the tribal life broke down. The shelter had been well routed through by animals or human beings, and probably the rest of the skeleton and the skull have long ago been dispersed.

Carbon dates from M/1 are as follows:

ANU-121 Square A, Level 1 (4–6 inches)—630 ± 60 BP (A.D. 1320).

ANU-122 Square G, Level 2 (6–12 inches)—1410 ± 90 BP (A.D. 540).

These accord well with the time-span of occupation at SH/1.

Bobadeen (Map—Dubbo, 1–250,000). See plates 10 and 11.

The BOB/1 shelter, which was excavated during May and June 1967, is located at 274022, beside Queens Creek, almost on the watershed of the Great Dividing Range and near the source of the Goulburn River. About a mile away, at 274018, is a magnificent painted rock shelter containing a frieze of red hand-stencils about 300 feet long. The floor of this huge shelter, though containing artefacts, has been much interfered with, both by human agency and by water. BOB/1, although a very small shelter, about 14 feet long and 9 feet deep, produced a remarkable quantity of implements and waste, the total artefacts amounting to 16,609, of which 907 were implements. The material used differed considerably from that of the upper Hunter, since it included a high proportion of milky-white quartz and rock crystal, together with a very fine-grained grey chert. Bondi points were again prominent throughout. In addition, 69 probable bone implements were identified, including 42 of what appears to be a specialized type resembling a burin, whose use can only be a matter for speculation (see plate 13). It is possible that they may have been scribers, used for making the line decorations on marsupial-skin cloaks, one of which from this area is described by Mountford (1963). These presumptive bone implements occurred in all squares in levels 1–3. A bone spatula was found in Square A, Level 2.

The final form of the excavation was a cross (see fig. 6), which gave a good section from back wall to front spill and also followed the dripline to the farthest possible limit. The occupation deposits went down to a maximum depth of 48 inches, when hard grey sterile clay was encountered along the dripline, but within the shelter, in Squares A and AA, a sandstone floor was met with at 30 inches, while in Square AA a shelf was found projecting from the back wall at about 6 inches depth and extending out for about 9 inches (see fig. 7).

Squares E, B, and H, which were bisected by the dripline, and Square C outside, contained two rather puzzling layers of what appeared to be a very hard, brown, compacted clay and grit, at depths of about 12 inches and 18 inches. Between these layers was a dark brown humus, similar to the surface deposit, and below them was a fairly compacted yellow gravel. The two compacted layers and the area between them were most prolific of artefacts (see plate 11).

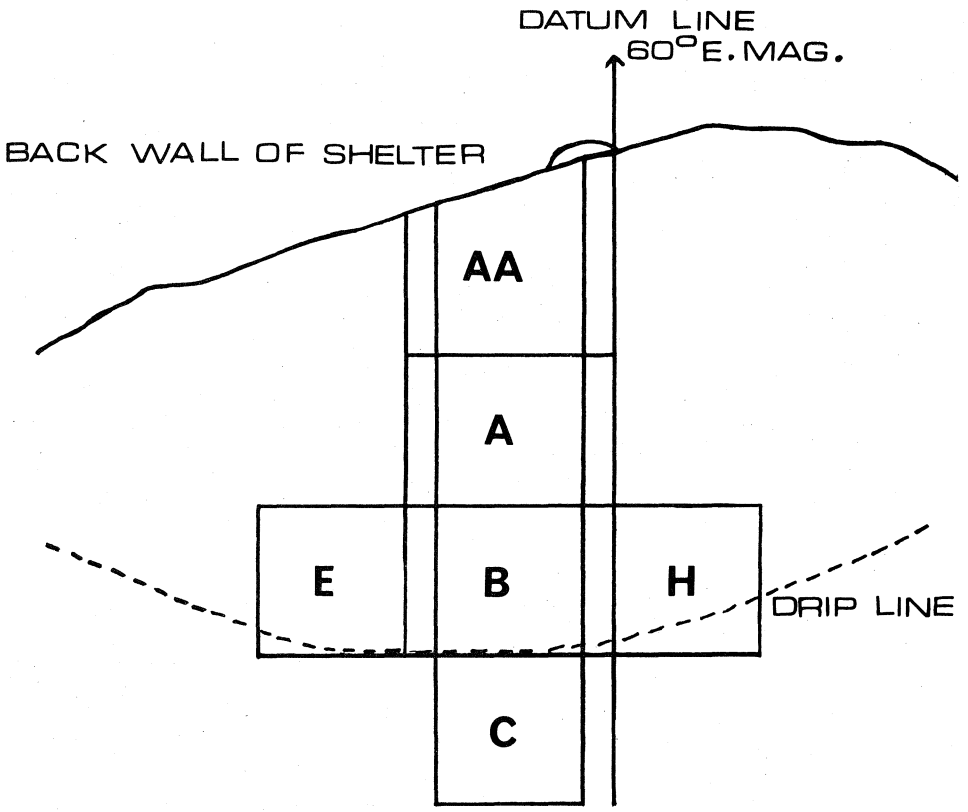
Within the shelter, in Squares A and AA, the only stratification was the change-over from surface brown humus to yellow gravel in Level 3, at about 15 inches depth. In front of the shelter, in Square C, we encountered the usual piled slabs of sandstone, obviously fallen from an earlier overhang, and these extended in places up to the present dripline.

A broken cutting edge of a ground-edged axe was found in Square E, Level 2, and in Square AA, Level 2, were a complete pebble axehead (see fig. 1), a pebble hammerstone, and a small pebble muller.

The extraordinary quality of the quartz-working at this site surprised all those excavating. Quartz Bondis ranged from perfect specimens to rough stubby blades,

but some of the quartz crystal geometric microliths, many less than a centimetre in length, could scarcely be believed to be man-made, until they were placed under a medium-powered microscope, when it could be seen that there was unquestionable secondary working along their backs (see plate 14).

The disposition of implements and waste, and the proportion of quartz in each level, are shown in Table 5. It will be noticed that Bondi points appear consistently,



BOBADEEN SHELTER NO.1. BOB/1.
LAYOUT OF SQUARES.
SCALE: 1" TO 3'. MAP REF. DUBBO
1 TO 250,000 —— 274022.
NOTE: SQ.B INCLUDED BAULKS OF 6" ON EITHER SIDE, MAKING AN ADDITION OF 1'X3'. SQ.AA INCLUDED TRIANGULAR SECTION AGAINST ROCK WALL, 3'X 9".

Figure 6

		LEVEL																													
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	
Blade, Backed ..	Bondi		8	14	..	..	..	6	8	3	1	..	7	11	3	11	9	3	1	..	3	20	12	5	5	14	9	14	2	2	5	21	28	24	..	249
	Elouera		..	1	..	..	..	6	2	..	1	..	1	2	..	4	4	..	..	..	..	5	..	..	4	3	3	..	..	1	3	2	3	2	..	47
	Microlith		2	8	..	1	..	3	3	3	..	..	..	3	1	1	4	2	1	2	2	9	1	1	3	1	5	2	3	..	2	5	15	8	..	91
	Other		..	7	1	1	..	3	8	..	..	..	2	8	2	7	1	1	..	..	1	16	1	3	9	8	3	4	4	..	7	13	15	5	2	132
Scraper ..	Side		2	5	3	..	..	10	..	..	1	..	4	15	1	3	..	..	..	..	8	6	1	..	4	7	1	5	3	..	4	10	2	2	2	99
	End		..	5	..	..	..	..	9	1	1	..	..	4	1	1	1	..	..	..	3	4	4	1	..	8	2	3	1	..	5	6	4		..	67
Point, Worked ..	Uniface		1	2	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	6
	Other		1	3	2	..	1	5	2	..	..	..	1	1	..	3	..	..	1	..	1	5	1	..	..	1	..	2	1	..	4	4	3	..	..	42
Flake, Utilized ..	Blade		..	2	..	..	..	..	3	2	..	..	2	5	1	2	2	..	..	..	1	8	1	..	1	4	2	3	..	4	..	1	5	..	1	50
	Other		..	..	..	2	..	1	1	..	1	..	..	1	1	1	..	..	..	..	..	1	..	..	..	2	..	..	2	1	..	5	1	2	..	22
	Adze Flake		2	2	..	..	..	2	..	1	..	..	1	..	..	..	..	..	..	..	2	..	1	..	2	..	..	..	..	..	1	5	1	2	..	22
	Fabricator		1	..	1	..	..	2	2	..	1	..	..	2	..	1	..	..	..	..	2	1	..	..	2	4	..	..	1	..	..	10	1	2	..	33
	Core, Utilized ..		4	..	..	..	..	..	1	1	..	..	1	2	..	2	..	..	..	..	1	3	..	..	2	..	..	..	4	..	1	..	..	..	..	22
	Axe, Ground-edged		..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
	Pebble, Utilized ..		..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	3
	Miscellaneous ..		3	5	..	..	..	1	2	..	..	..	1	..	..	1	..	..	..	..	..	4	..	1	1	1	..	..	..	..	..	..	..	..	..	20
Sub-Totals, Implements			24	54	7	4	1	39	44	11	7	0	20	55	10	37	21	6	3	2	24	82	22	11	33	53	25	33	21	8	32	83	80	50	5	907
Core	Large		2	2	1	0	0	0	0	3	0	0	1	0	0	2	1	1	1	..	0	5	2	0	2	16	..	15	10	1	0	1	1	8	..	75
	Small		3	6	2	1	1	4	6	5	2	0	3	7	2	6	11	2	2	..	4	8	2	0	4	20	2	7	7	3	3	20	5	21	6	175
Waste Flake ..	Large		45	119	25	5	0	68	73	28	10	1	65	142	43	112	68	25	18	6	37	140	55	19	76	87	50	60	67	18	85	157	119	73	4	1,900
	Small		298	531	214	95	11	686	830	252	138	3	262	948	143	442	537	341	211	62	601	1,000	373	339	558	615	197	318	380	106	766	907	537	813	38	13,552
Sub-Totals, Cores and Waste			348	658	242	101	12	758	909	288	150	4	331	1,097	188	562	617	369	232	68	642	1,153	432	358	640	738	249	400	464	128	854	1,085	662	915	48	15,702
Totals, Implements and Waste			372	712	249	105	13	797	953	299	157	4	351	1,152	198	599	638	375	235	70	666	1,235	454	369	673	791	274	433	485	136	886	1,168	742	965	53	16,609
Quartz	Implements ..		11	17	3	1	..	13	7	4	4	..	4	13	3	10	5	3	1	2	7	22	6	4	4	18	5	11	10	4	9	33	22	23	2	281
	Waste		150	358	164	69	8	511	599	211	116	2	124	536	101	380	416	272	168	36	288	803	291	219	321	395	139	256	246	37	204	443	372	528	26	8,789
Sub-Totals, Quartz			161	375	167	70	8	524	606	215	120	2	128	549	104	390	421	275	169	38	295	825	297	223	325	413	144	267	256	41	213	476	394	551	28	9,070

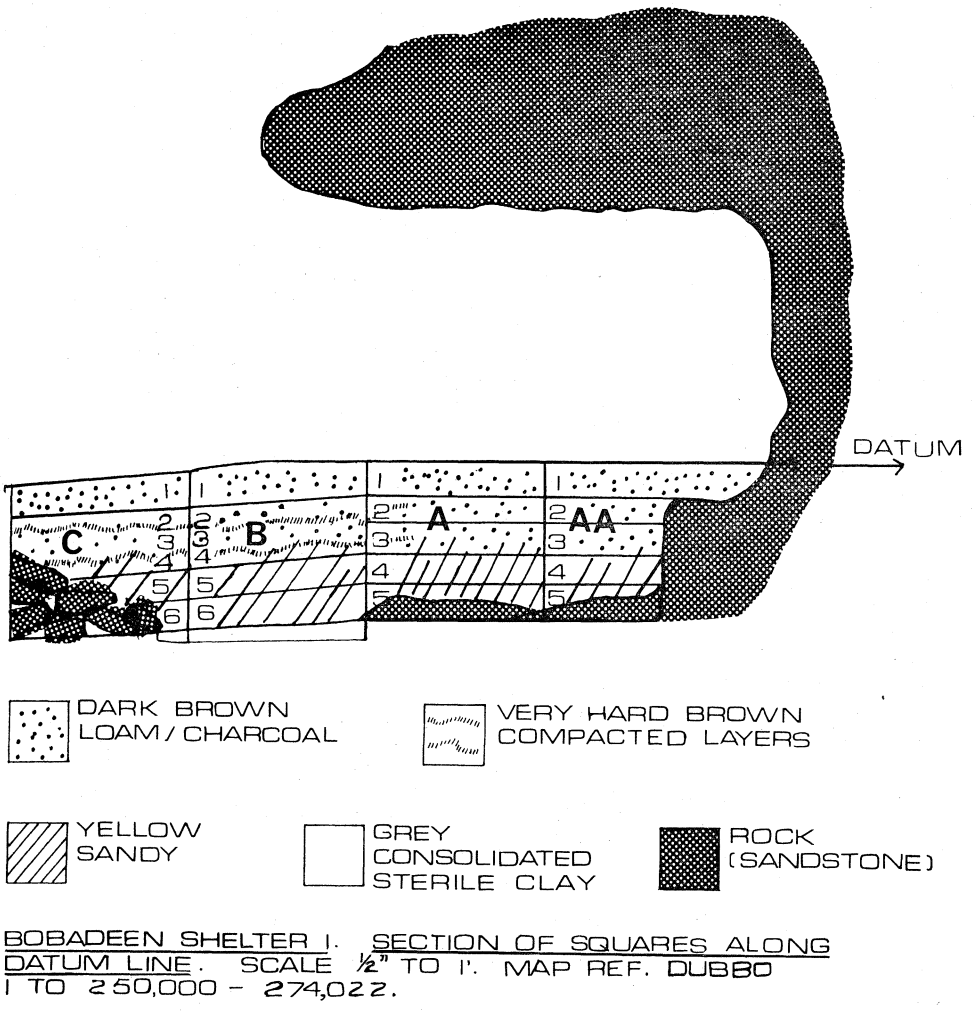


Figure 7

except in Square A, where there were none below Level 2. The spread of microliths also is fairly even. The industry, in fact, is uniform throughout the deposit and is markedly a Bondaian one, showing a very high standard of workmanship. Table 6 shows implements and waste by horizons.

Charcoal was found in most levels, but bone occurred only in Levels 1–3. A somewhat puzzling feature is that rabbit or hare bone was found in Level 2 in Squares A, AA, B, and E, while there was a hare or rabbit jaw in Square A, Level 3. Sheep bones were found in Level 2 of Squares E and H. There was no sign that the deposits had been interfered with in any way, nor was there anything to indicate the previous existence of burrows. There were root systems along the top of the first compacted layer, but these did not extend into Square A. In the light of the carbon dates given below, it can only be assumed that these post-European bones are intrusive, having been trodden into the deposit, or else are the result of burrows now completely disappeared.

Apart from these obviously recent bones the chief animals represented (in the top three levels only) were bandicoot, Ringtail Possum (*Pseudocheirus*), Brushtail Possum (*Trichosurus*), wallaby (*Wallabia*), and rat kangaroo (*Bettongia*). Freshwater shells appeared in the top three levels and there were 132 fragments of emu eggshell.

The problem of the compacted layers requires some discussion. They were very rough and uneven and certainly not consonant with any possible flood deposition. In any case, the area as it is today is extremely unlikely to suffer flooding. Queens Creek rises only a mile to the northwest, near the watershed of the Divide, and is dry for most of the year. Before the tree cover was cleared it may have run more consistently, but it lies about 30 feet below the shelter and has cut down only moderately below the level of the paddock. The country is gently rolling, with sandstone outcrops, and has a general inclination towards the Goulburn.

Analysis of samples taken from the compacted layers was carried out by the Chief Chemist, Department of Agriculture, N.S.W., who identified the material as "Sandy clay loam" with a pH of 6.9. He suggests that "the compacted material represents deposits from times of occupation of the shelter and that its organic layers represent times of non-occupation. The irregular surface could be due to the formation of large roots, but alternatively the roots could have preferentially travelled along existing depressions in the material". The impression given by the compacted layers in situ was that the marked uneveness could not have been caused by roots, but was an intrinsic part of the original deposition. It is possible that these two compacted layers are the result of exceptionally rainy periods during which there was extensive run-off of water and sand from the sandstone plateau above the shelter. It is noteworthy that the compacted layers extended only to the inner edges of Squares E, B, and H and were not found in Squares A and AA. The present conformation of the ground is such that run-off from the plateau tends to pass across the front of the shelter before being diverted down to Queens Creek.

Carbon dates from BOB/1 are as follows:

ANU-123 Square E, Level 1 (4–6 inches)—730 ± 70 BP (A.D. 1220).

ANU-124 Square E, Level 7 (25–30 inches)—7750 ± 120 BP (5800 B.C.).

If these dates are compared with the artefact yields shown in Table 3, it will be seen that ANU-124 is apparently associated with the lowest Bondi point obtained from Square E. If this is the case, the date (5800 B.C.) would be an exceptionally early one for the start of the Bondaian industry. However, Level 7 was 6 inches in depth and it is possible that the solitary Bondi came from the top of the level, whereas the majority of the scattered charcoal flakes constituting the sample for dating may have been obtained from the lower part of the level.

In an effort to clarify this situation, during July 1968 a further sampling was made by extending Square E for a distance of one foot on its eastern and western sides. The levels in these areas correlating with Levels 7 and 8 in Square E were excavated in 2-inch sub-levels and sufficient charcoal for dating was obtained from each 2-inch sub-level. At the time of going to press only one of these had been processed:

ANU-287 Square E, Level 7 (25–26 inches)—5150 ± 170 BP (3200 B.C.).

Artefacts obtained from these extensions included one Bondi point from the top 2 inches of Level 7 and microliths and unbacked points down to the top 2 inches of Level 8. Below this, sterile clay and gravel were encountered, as in Square E itself.

Table 6. Bobadeen (BOB/1): Distribution of Implements and Waste by Horizons

Horizon	Blade, Backed				Scraper		Point, Worked		Flake Utilized		Adze Flake	Fabricator	Core, Utilized	Axe, Ground-Edged	Pebble, Utilized	Misc.	Core		Waste Flake		Totals
	Bondi	Elouera	Micro	Other	Side	End	Uniface	Other	Blade	Other							Large	Small	Large	Small	
1	34	14	12	22	32	8	1	12	4	1	10	7	9	..	..	6	5	21	376	3,171	3,745
2	88	15	29	60	43	36	2	16	23	10	7	19	6	2	3	12	24	67	718	4,831	6,011
3	55	6	25	22	8	12	2	6	11	2	3	2	1	..	..	..	7	18	320	1,716	2,216
4	55	7	13	20	11	9	1	5	5	6	2	4	2	..	..	2	25	37	279	2,145	2,628
5	11	4	7	7	5	2	..	2	3	2	..	1	4	..	..	..	11	25	140	969	1,193
6	5	1	2	1	..	..	..	..	4	1	..	..	..	..	..	..	2	5	43	447	511
7	1	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	1	2	18	211	235
8	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	62	70
Totals	249	47	91	132	99	67	6	42	50	22	22	33	22	2	3	20	75	175	1,900	13,552	16,609

COMPARISON OF SITES

General Implements and Waste

The accompanying histograms (Fig. 8) show visually the occurrence of the chief implement types and waste at the three main sites excavated—Sandy Hollow (SH/1), Milbrodale (M/1), and Bobadeen (BOB/1). The histograms of implement types represent percentages of total implement yields. Cores and waste flakes are percentages of total waste material. Each vertical division in each column on the chart represents 5 per cent. Cores are graded into small (less than 3 cms maximum measurement) and large (> 3 cms), waste flakes into small (less than 2 cms maximum length) and large (> 2 cms).

The first point that emerges from this visual comparison is that the backed blade industry at Bobadeen was a more generalized one than that of the upper Hunter, since the Bondi points form a considerably smaller component in it than at either Sandy Hollow or Milbrodale. The second obvious difference is that micro flakes predominate in the waste material at Bobadeen to a far greater degree than at the upper Hunter sites. This is most likely a reflection of the fact that the Bobadeen industry is more markedly microlithic than the others, but probably also reflects the much higher percentage of quartz implements and waste at Bobadeen. Table 7 shows this clearly.

Table 7. Comparison of Implements to Waste

	Sandy Hollow SH/1	Milbrodale M/1	Bobadeen BOB/1
Implements (Total)	144	78	907
Cores (Total)	164	152	250
Waste flakes (Total)	3,882	1,784	16,143
Impls/Waste (%)	3·5	4.0	5·5
Quartz impls (Total)	..	2	281
Quartz waste (Total)	157	123	8,889
Quartz impls/Total impls (%)	..	2.6	31
Quartz waste/Total waste (%)	3·7	6.8	55
Quartz impls/Quartz waste (%)	..	1.5	3·1
Non-quartz impls/Non-quartz waste (%)	3·7	4.6	9.2

The difference between the ratio of quartz implements to quartz waste and that between non-quartz implements and non-quartz waste at Bobadeen shows clearly the greater difficulty in fashioning quartz. Comparison between the ratios for Bobadeen and Milbrodale would probably not be valid, since the sample of quartz implements from Milbrodale was so small. However, when one compares the ratios of total implements to total waste for the three sites, the greater overall efficiency of the Bobadeen industry is apparent, particularly in view of the high percentage of quartz at Bobadeen. The difference is even more marked when the ratios for non-quartz implements are compared.

The greater intensity of material in the Bobadeen shelter is immediately apparent from the figures given in Table 8.

Fig.8. COMPARATIVE OCCURRENCE OF ARTEFACTS (%)

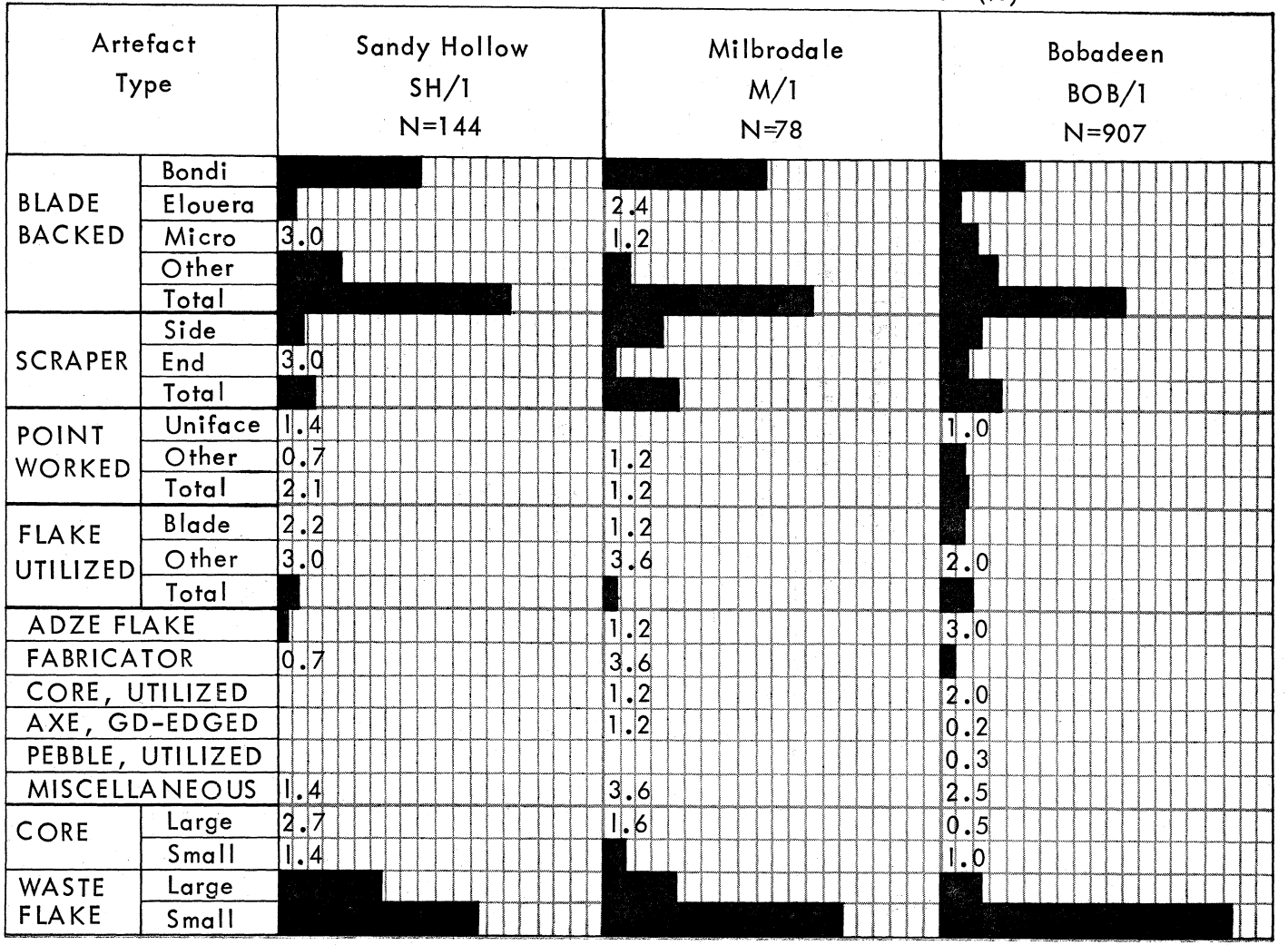


Table 8. Yield of Implements and Waste

	Sandy Hollow	Milbrodale	Bobadeen
	SH/1	M/1	BOB/1
Approx. vol. excavated (cu. ft)	90	60	140
Yield per cu. ft (impls and waste) ..	47.2	33.6	120.6
Yield per cu. ft (impls only)	1.6	1.3	6.5

Bondi Points

Turning now to a more intensive examination of the type tool of each of the three sites—the Bondi point—some general comparative statistics will give a picture of the relation of the Bondis to the remainder of the implements and to waste at each site; some figures relating to quartz Bondis are also included.

Table 9. Comparison of Yield of Bondi Points

	Sandy Hollow SH/1	Milbrodale M/1	Bobadeen BOB/1
Bondi points (Total)	66	40	221
Bondi/total impls (%)	42	49	23
Bondi/waste (%)	1.6	2.0	1.4
Quartz Bondi (Total)	..	1	95
Quartz Bondi/Bondi (%)	..	2.5	43
Quartz Bondi/Quartz waste (%)	..	0.8	1.7
Non-quartz Bondi/non-quartz waste (%)	1.7	2.1	1.5

It will be noticed that, in the figures for Bobadeen, unlike the ratios for implements in general, the percentages for Bondis might be taken to imply that production of Bondis from quartz was more efficient than that from other materials. However, this may be merely a reflection of the fact that the proportion of Bondis to backed blades as a general class was considerably lower at Bobadeen than at the other two sites, whereas the proportion of quartz Bondis to non-quartz Bondis was high.

Measurements on whole Bondis were carried out as follows:

Maximum length—from tip to butt

Maximum breadth—wherever on the blade this occurred

Thickness—at mid point between tip and butt

Cutting angle—at mid point

Measurements were made by caliper, with vernier, to the nearest millimetre and by steel adjustable protractor to the nearest degree. The following table gives a comparison of the means of the measurements for Bondis from each site.

The only marked variation in these figures is that at Bobadeen the mean length of Bondis is considerably lower than that for the other sites. This again may be merely a reflection of the high proportion of chunky quartz blades made. This factor is reflected also in the means for weight and for breadth/length ratio.

Table 10. Comparative Mean Measurements of Bondi Points

	Sandy Hollow SH/1 N = 58	Milbrodale M/1 N = 28	Bobadeen BOB/1 N = 197
Length (cm)	2.5	2.27	1.9
Breadth (cm)	0.7	0.74	0.72
Thickness (cm)	0.4	0.39	0.37
Cutting angle (° at mid-point)	36	40	33
Weight (gm)	0.7	0.7	0.6
Breadth/length ratio (L = 100)	31	34	40

The mean cutting angle for the Milbrodale Bondis seems to imply some technological differentiation. In case it might be thought that this figure was affected by a few aberrant specimens, it should be added that the median for cutting angle for Milbrodale was even higher, 40.75°, while that for Sandy Hollow was 36.50°. The single quartz Bondi from Milbrodale had a cutting angle of 50°, but 15 chert specimens also had cutting angles in excess of 40°, while two of the chert specimens had a cutting angle the same as the quartz one. In general, it seems that the Milbrodale people preferred a more obtuse-angled backed blade than did the craftsmen at the other two sites.

The next table refers to the work use and retouch found on the chords of Bondis from all three sites.

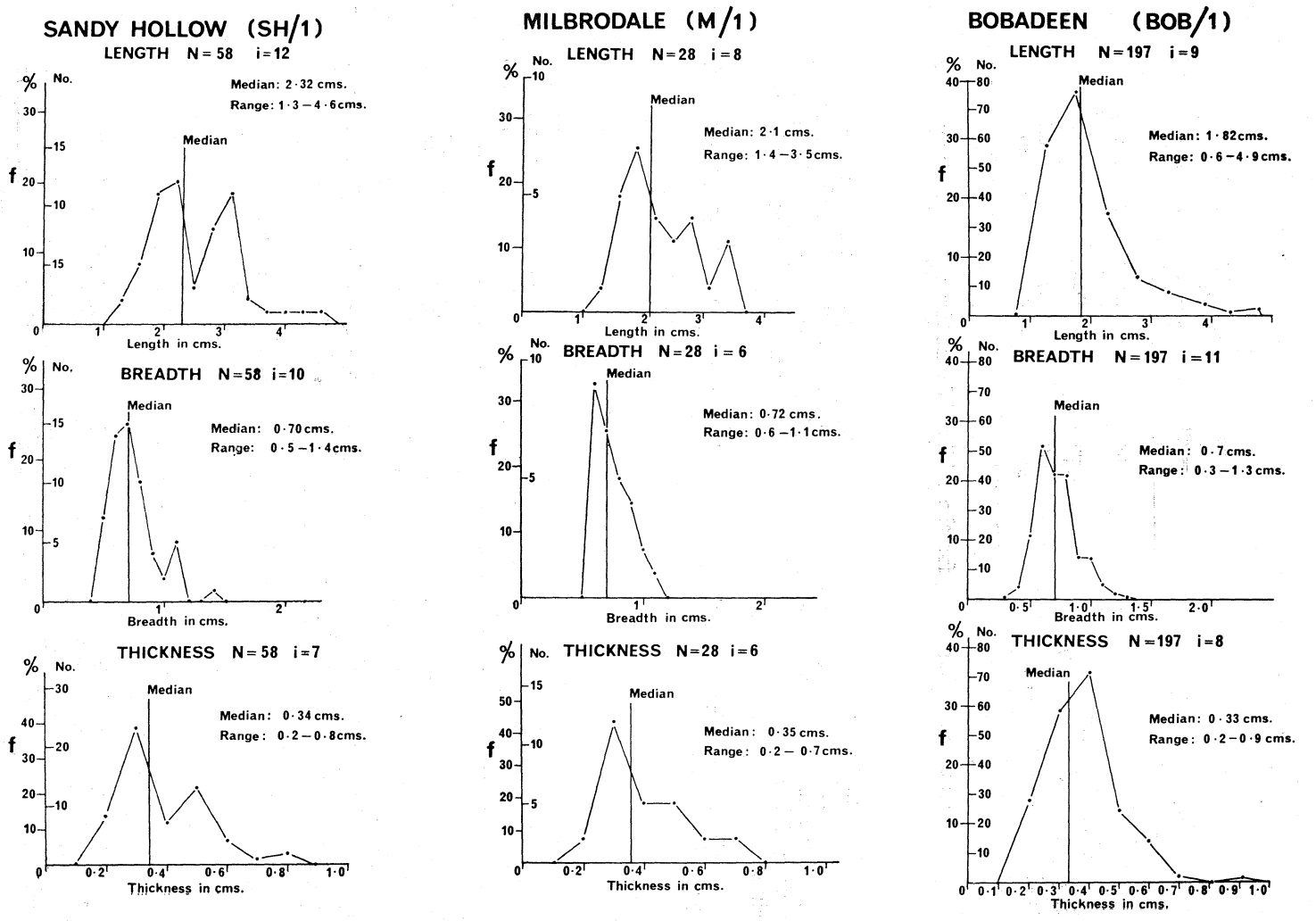
Table 11. Comparison of Bondis with Work-Use

	Sandy Hollow SH/1	Milbrodale M/1	Bobadeen BOB/1
Bondi with work use/retouch	9	6	40
Used Bondi/Total Bondi (%)	13.7	15	18

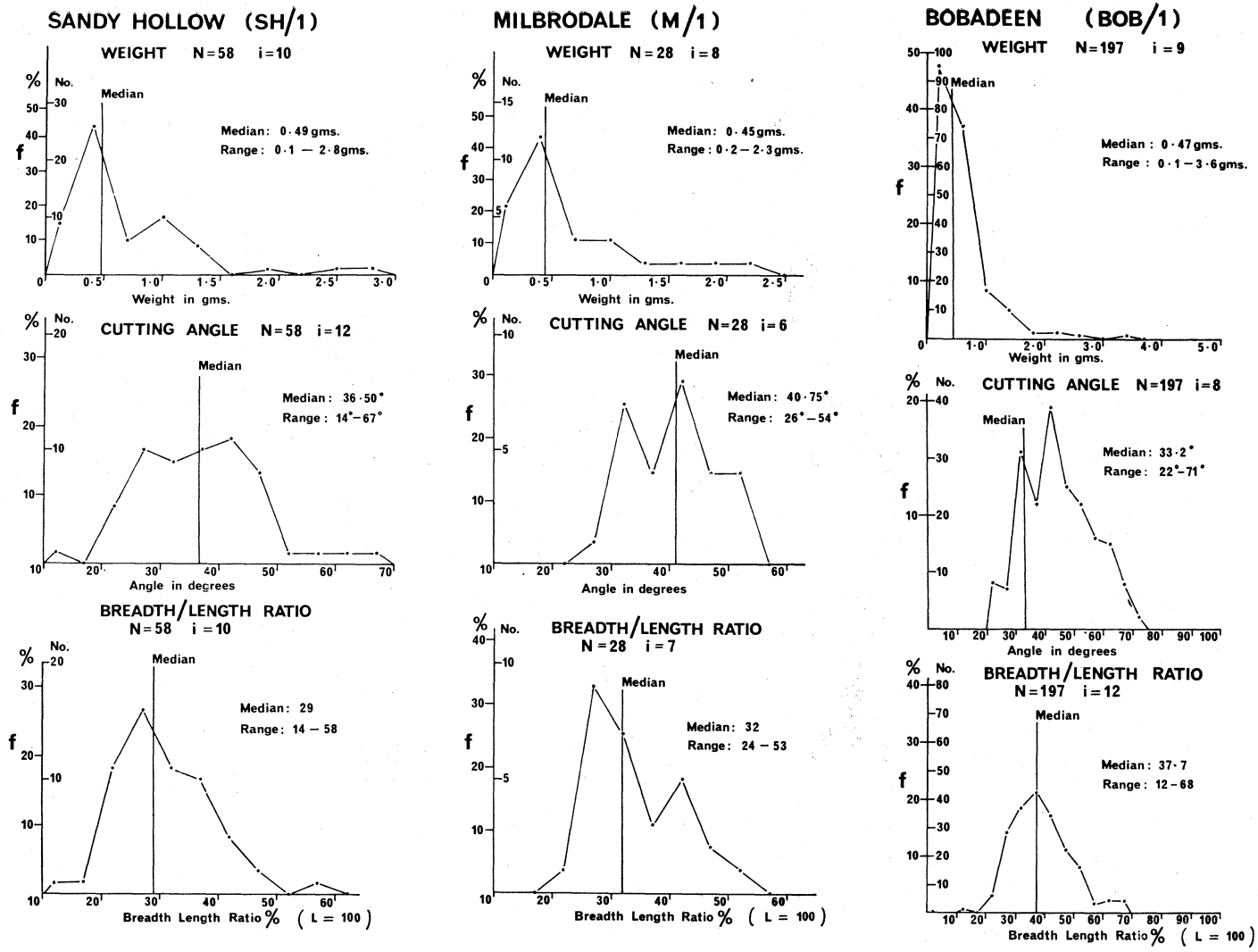
The percentages of Bondis with work-use are reasonably consistent for the three sites and would seem to imply that, for this area at least, the Bondi was employed as a cutting instrument with some regularity.

The frequency distributions of the various characteristics measured on the total whole Bondi points from each excavation site are shown graphically in the following series of comparative frequency polygons (figs 9–26). It should be noted that the marked difference in the sizes of the samples from the three sites encourages some exaggeration of the tendencies illustrated. Nevertheless, a number of obvious variations call for comment.

Firstly, the variation in average length already shown in the table of means (Table 10) is endorsed by the first three polygons (figs 9–11), but the bimodalism of the SH/1 polygon is surprising. This tendency may also be reflected in the M/1 curve, which has a small second peak at 3 cms. It is certainly absent in the BOB/1 polygon, which shows only one peak in what is nearly a perfect bell-curve



Figures 9–17. Comparative Frequency Polygons: Bondi Points



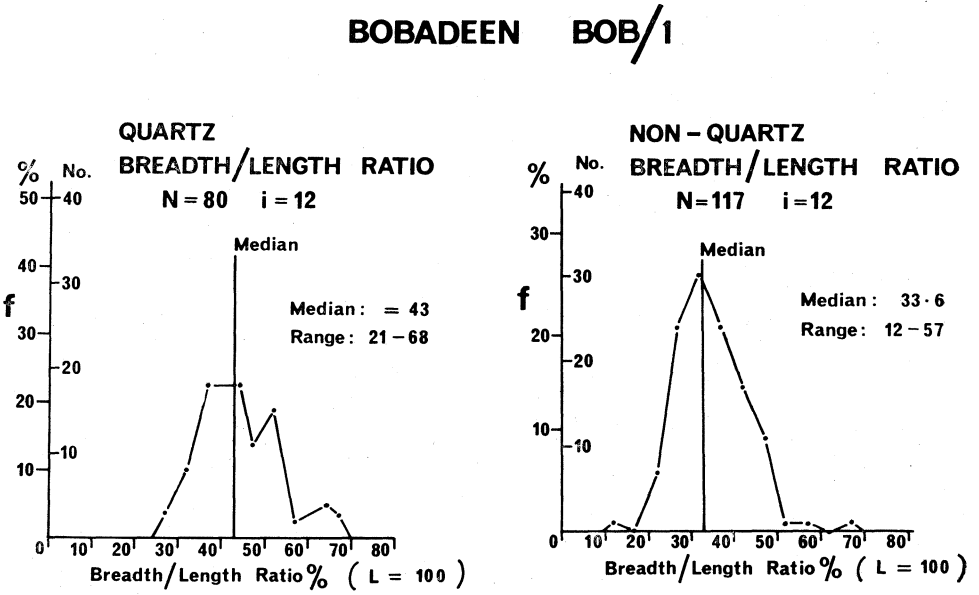
Figures 18–26. Comparative Frequency Polygons: Bondi Points

The bimodalism of the SH/1 length curve may be echoed also in the SH/1 curves for breadth and thickness (figs 12 and 15), which would seem to argue that two particular sizes of Bondi were particularly favoured. For BOB/1 all three curves are consistently close to normal, and this endorses the subjective view gained during excavation that the craftsmanship of the Bobadeen toolmakers was of a higher and more consistent order than that at the two Hunter sites, particularly in view of the more varied materials used at Bobadeen.

No significant difference in weight is shown by figs 18–20, but the polygons for cutting angle (figs 21–23) show marked variations, though bimodalism is present in each case. The more obtuse angle apparently favoured at M/1 has already been shown in the table of means (Table 10), but it appears in addition that cutting angles of approximately 30° and 40° predominated at each of the three sites. Possibly this is some mechanical limitation imposed by the natural fracture lines of the material used. If this is so, then the tendency in question would be that of chert, which predominates in the material used at each site. It would probably not apply to quartz, but this is only significant in the case of BOB/1; most likely the curve for cutting angle for specimens from that site is dominated by the slightly greater occurrence of chert Bondis (see Table 9).

The breadth/length polygons again reflect the preponderance of short stubby blades at BOB/1 and the near perfect bell-curve endorses the consistency of the working at this site. The bimodalism of the M/1 curve may be an exaggeration imposed by the smallness of the sample.

The two final polygons (figs 27–28) compare the breadth/length ratios for quartz and non-quartz Bondis from BOB/1. The latter is close to a normal distribution, whereas the quartz polygon clearly reflects the short chunky form imposed by the material. If these curves are compared with the breadth/length curve for all Bondis from BOB/1 (fig. 26) it will be seen that the non-quartz curve approximates quite closely, whereas the quartz curve shows a marked preponderance of blades in the



Figures 27, 28. Comparative Frequency Polygons: Bondi Points

35–55 range. It is undoubtedly far more difficult, if not impossible, to make a long fine blade from quartz than it is from chert or even quartzite. The possible reasons for the use of such a recalcitrant material as quartz, in preference to excellent cherts, are discussed in the next section.

Finally, it is possible to work out from the Carbon-14 dates obtained for each of the three sites the approximate rate of deposition of material and to provide a comparative table. Naturally these figures do not allow for possible erosion, nor for variations in the compaction of the deposits, but they may serve as a rough guide to the probable time-span of the various levels and horizons.

Table 12. Estimated Rates of Deposition

Sandy Hollow (SH/1).—18 inches in 770 years. Average: 1 inch in 42 years.
Milbrodale (M/1).—6 inches in 780 years. Average: 1 inch in 130 years.
Bobadeen (BOB/1).—24 inches in 7,020 years. Average: 1 inch in 292 years.

In general these figures reflect fairly closely the differential degree of compaction of the deposits at the three sites. S H/1, in the horizons bracketed by its carbon dates, contained a light humus, merging into fairly loose yellow sand at about 30 inches depth. M/1, apart from the first few inches of humus, contained a fairly compacted yellow grit, probably derived mainly from the sandstone of the shelter itself. BOB/1 was stratified into alternating horizons of humus and very hard compacted grit in its top 18 inches, and below that merged into very compacted yellow grit.

SUMMARY AND COMMENT

If the approximate rates of build-up of deposits, as given in Table 12 at the end of the previous section, are extrapolated to include the levels not carbon dated, we can arrive at a tentative time-sequence for each of the three main excavation sites. For example, at SH/1 the earliest cultural material occurred in the top of Level 7 in both Square A and Square AA. This is 14 inches lower than the charcoal sample dated to A.D. 650. With an average build-up of 1 inch in 42 years, this would give a starting date of approximately A.D. 70. However, any attempt to apply a similar method to the end of occupation would be unlikely to have any validity, because of the mixing and movement of the top few inches of deposit during the 150 or so years since the start of European settlement and also because the removal of tree cover would materially alter the rates of deposition and erosion. The following table compares the carbon dating from the three sites and gives a tentative estimation of the time sequence for levels not so dated.

Table 13. Comparison of Carbon Dates and Estimated Dates

Depth (inches)	Sandy Hollow SH/1	Milbrodale M/1	Bobadeen BOB/1
4–6	**A.D. 1420 (ANU-125)**	**A.D. 1320 (ANU-121)**	**A.D. 1220 (ANU-123)**
12	A.D. 1150	**A.D. 540 (ANU-122)**	530 B.C.
18	A.D. 900	240 B.C.	2280 B.C.
24	**A.D. 650 (ANU-12)**		4030 B.C.
30	A.D. 400		**5800 B.C. (ANU-124)**
36	A.D. 150		7550 B.C.
38	A.D. 70		

Note: Carbon-14 dates are in bold type.

It will be noticed that the tentative time sequences for the two upper Hunter sites (SH/1 and M/1) are quite consistent, whereas at BOB/1, only 50 miles away at the source of the Goulburn River, occupation appears to have begun some 7,000 years earlier. On the other hand, the Bobadeen date is quite plausible in relation to the carbon dates for the sites in the Capertee Valley obtained by McCarthy and Tindale. McCarthy dated his Capertee Site 3 to 5400 B.C., while Tindale obtained a date of about 9500 B.C. from Noola Cave in the same valley. However, the Capertee results pose another problem. McCarthy's Bondaian at Capertee had a time span from

approximately 1700 B.C. to 900 B.C. and his earlier date marks the start of the Capertian, while Tindale's date is apparently associated with uniface pebble material. Nothing resembling a Capertian assemblage was found at Bobadeen and, assuming ANU-124 and 287 are correct, we certainly have Bondi points dated to 3200 B.C. and possibly to 5800 B.C. at a site only some 50 miles from the Capertee Valley. Pending receipt of further C14 estimations from BOB/1, there is no point in speculating on these anomalies.

Turning to the upper Hunter situation, on present evidence it would seem that occupation began there comparatively late, at about the start of the Christian era. It is interesting to compare McBryde's results from the North Coast region. Her earliest date from east of the Dividing Range was obtained from Seelands shelter, on the Clarence River, and is of the order of 5000 B.C., representing a large flake and uniface pebble industry, while the Bondaian from Seelands was dated from approximately 2000 B.C. to A.D. 1500. Until recently the earliest date from the coastal side of the Dividing Range was Megaw's 5500 B.C. from Curracurang, a rock shelter site just south of Sydney. This is associated with an industry possibly equating with McCarthy's Capertian. The Bondaian time sequence at Curracurang appears to be approximately 400 B.C. to A.D. 1100. Late in 1968, however, a date of the order of 20,000 B.P. was obtained by R. Lampert from a rock shelter at Lake Burrill on the south coast of New South Wales. This date also appears to be associated with a Capertian type of material.

Regarding the termination of occupation in the upper Hunter sites, on present evidence there is no reason to suppose that they were not in use up to the beginning of European settlement in the valley. If this is so, then it would appear that the Bondi point also was still in use, since both SH/1 and M/1 contained numbers of Bondi points in the top levels. SH/1, in fact, had several actually lying on the surface inside the shelter. The situation at BOB/1 would seem to be similar, since Bondi points were prolific in the top levels. Ground-edged axes and eloueras were also found in the top levels at M/1 and BOB/1, but neither the material nor the dating can be said to indicate any evidence of a change to Eloueran in the sequence.

Turning to problems specifically relating to the Bondi point as a tool, the presence of work-use and/or retouch on the chords of a significant proportion of Bondis from all three sites (see Table 8) supports the view that the Bondi may have been a general-purpose hafted cutting and boring implement, rather than exclusively a spear barb and point, as maintained by McCarthy and others. In this connection, it should be mentioned that McCarthy and Davidson (1943) found work-use on 72 out of 524 Bondi points collected from the Singleton terraces, while McCarthy recorded work-use on 13 out of 33 from Bathurst, 16 out of 186 at Lapstone Creek, and 275 out of 2,340 from the South Coast of New South Wales. There were also definite traces of gum along the backs of four Bondis and possibly also on two others (see plate 12). Another reason for doubting that the Bondi was intended specifically as a spear barb or point is that the bone point which supposedly replaced it in no way resembles a Bondi. The most common form, the double point sometimes called a "muduk", is usually ground with flattened sides, so that in cross-section it is oval. There is no attempt to make one margin sharp and the other blunt. The muduk was usually bound into the spear head with sinew and firmly fixed with gum. In the case of the Bondi, if used in this way the sharp chord would have pressed against the sinews and would have tended to cut them. The oval form of the muduk, on the other hand, fits snugly into the slot in the spear head and does not abrade the binding.

A further problem was that nearly half of the Bondis from Bobadeen were made of quartz, a comparatively intractable material, although excellent cherts are available; most of these quartz Bondis are stubby little blades, less than 2 centimetres long. One

can only assume that quartz, in spite of the difficulty of flaking it satisfactorily, was favoured for its acute cutting properties. If used as cutting implements, such microlithic quartz blades must have been hafted. Although quartz waste was encountered at both SH/1 and M/1, no quartz implements were found at Sandy Hollow and only two at Milbrodale—a Bondi point and an unbacked point; this is not a sufficient sample to draw any conclusions.

Evidence of trade or contact between the upper Hunter people and the tribes inland is not specifically present in any of the excavated material, unless the presence of quartz-working in the upper Hunter sites may be taken as evidence of trade; certainly no signs of outcrops of quartz were found in the area of either of the excavations. The general similarity of the industries at the three sites would seem to argue either that there was considerable contact or that the upper Hunter people were originally a sub-group of the inland people. However, the apparent late occupation of the upper Hunter region and the hostile relationship between the Geawegal and Wonarua, on the one hand, and the inland Gamilaroi people on the other, would seem to argue against the latter hypothesis. It is possible that the Hunter system may have been occupied from the coast. This could be quite consistent with the geography of the region, since the Great Dividing Range would have constituted a formidable barrier in most places, whereas to a people skilled in navigating sheltered inland waters, movement up and down the coastal plain and up the river valleys would have presented no problem.

The questions posed by the situation along the 200-foot terrace at Singleton are not yet satisfactorily answered. However, there can be no doubt that the material collected by McCarthy and Davidson and that excavated and collected by Australian Museum parties in 1966 contains the same microlithic and backed blade complex as that excavated at SH/1 and M/1. One can, therefore, presume that the terrace was occupied during approximately the same period as the rock shelter sites, i.e., from about the beginning of the Christian era until European settlement. However, if the assumption that the material in the terrace is condensed and mixed is correct, then the other component—the somewhat crude flake implements of pink quartzite—may represent the remains of an earlier occupation.

No valid conclusions regarding the Hunter Valley industries can be reached until the survey has been extended into the estuaries and lagoons of the Newcastle-Port Stephens area. It may be that occupation sites of greater antiquity will be found there, in which case, granted that the industries are similar, it would be reasonable to assume that the people spread up the valleys from the sea coast.

In any case, the various hypotheses put forward here are purely tentative at this mid-point in the survey.

APPENDIX

Skeleton Discovered by Schoolboys at the SH/1 Site

Following publication in the *Newcastle Herald* in July 1966 of an article describing the Australian Museum's work in the upper Hunter Valley, the text was reproduced verbatim by most of the local newspapers in the valley. As a result, there was great excitement, particularly at Sandy Hollow, where school children ranged the countryside, searching for caves and Aboriginal tools. One of these parties apparently located the SH/1 shelter and, while scratching around in the loose surface dust within the east entrance, uncovered a skeleton, only a few inches down.

The Postmaster at Sandy Hollow, Mr Horner, whose nephew was a member of this party, immediately phoned the Museum and subsequently sent a fairly detailed account. As it was impossible to investigate at the time, he was asked to keep the skeleton until it could be picked up; he was also requested to plot the position of the find on a sketch plan and record as much information as possible while it was still fresh in the boys' minds.

As it turned out, it was not possible to follow this up until May 1967, by which time Mr Horner had been transferred elsewhere. However, he had deposited the bones and a sketch plan with relatives and these were handed over, with the additional information that the skull had been jammed beneath a rock ledge so that the boys could not extricate it. A small party returned to the SH/1 shelter and excavated a trench at right angles to the original excavation, at the point indicated on Mr Horner's plan. At a depth of about 6 inches we found some fragments of what appeared to be a human humerus, but there were no further traces down to a depth of 2 feet, nor was there any sign of a skull. The area appeared remarkably undisturbed and contained stone artefacts similar to those previously excavated, but nearly a year had elapsed since the boys had interfered with the site. We could only assume that someone had come subsequently and removed the skull as a souvenir.

The skeletal remains handed over were in very good condition and carefully wrapped in cotton wool. They included a mandible, with some teeth intact. The stratigraphic position of the burial seemed to indicate that it was comparatively recent and probably unrelated to the artefactal deposits; this inference was reinforced by Alan Thorne, of the Department of Anatomy, University of Sydney, who, on inspection of the remains, estimated that they were those of an Aboriginal woman of about 60, and of recent date. Professor N. W. G. Macintosh later confirmed this opinion.

This may well be a post-European burial, intruding into an older deposit and similar in age to the fragmentary skeleton excavated at Milbrodale.

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Without the support of Dr J. W. Evans, Director of the Australian Museum in 1966, this project could not even have started, and this support was continued enthusiastically by his successor, Dr F. H. Talbot. After the completion of the SH/1 excavations, a series of small research grants from the Australian Institute of Aboriginal Studies enabled the work to continue without interruption and my grateful thanks are due to the Institute and its Principal, Mr F. D. McCarthy, who has taken a personal interest in the project from its inception.

Particular thanks are due to members of the various field parties, both from within the Museum and from outside, who have worked so willingly and helped to make the somewhat slow and often wearisome business of excavation both entertaining and enjoyable. Chief among these helpers have been F. J. Beeman, who was then the Museum's Exhibitions Officer, and members of his department, David Rae, Brian Bertram, Helen Ashton, Lori Zirkzee, Kingsley Gregg, and Peter Fluke. Others who have assisted at various times include Dr John Yaldwyn, Beverley Ingram, and Vaughan Edwards. Dr S. M. Bard, of Hong Kong, devoted the best part of his sabbatical leave in 1967 to excavating and sorting material as a more than willing volunteer. Charles Turner, of the Museum's Photographic Department, and Elvie Brown, Helen Ashton, and Beverley Crewe, of the Art Department, gave expert assistance with the illustrations.

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Finally, my special gratitude must go to my assistant, Kathleen Pope, who helped with every stage of the survey and never failed to do everything possible to free me from routine chores so that I could give all my attention to planning and interpretation, and to my wife, who worked on several of the "digs" and cheerfully tolerated all the often inconvenient comings and goings.

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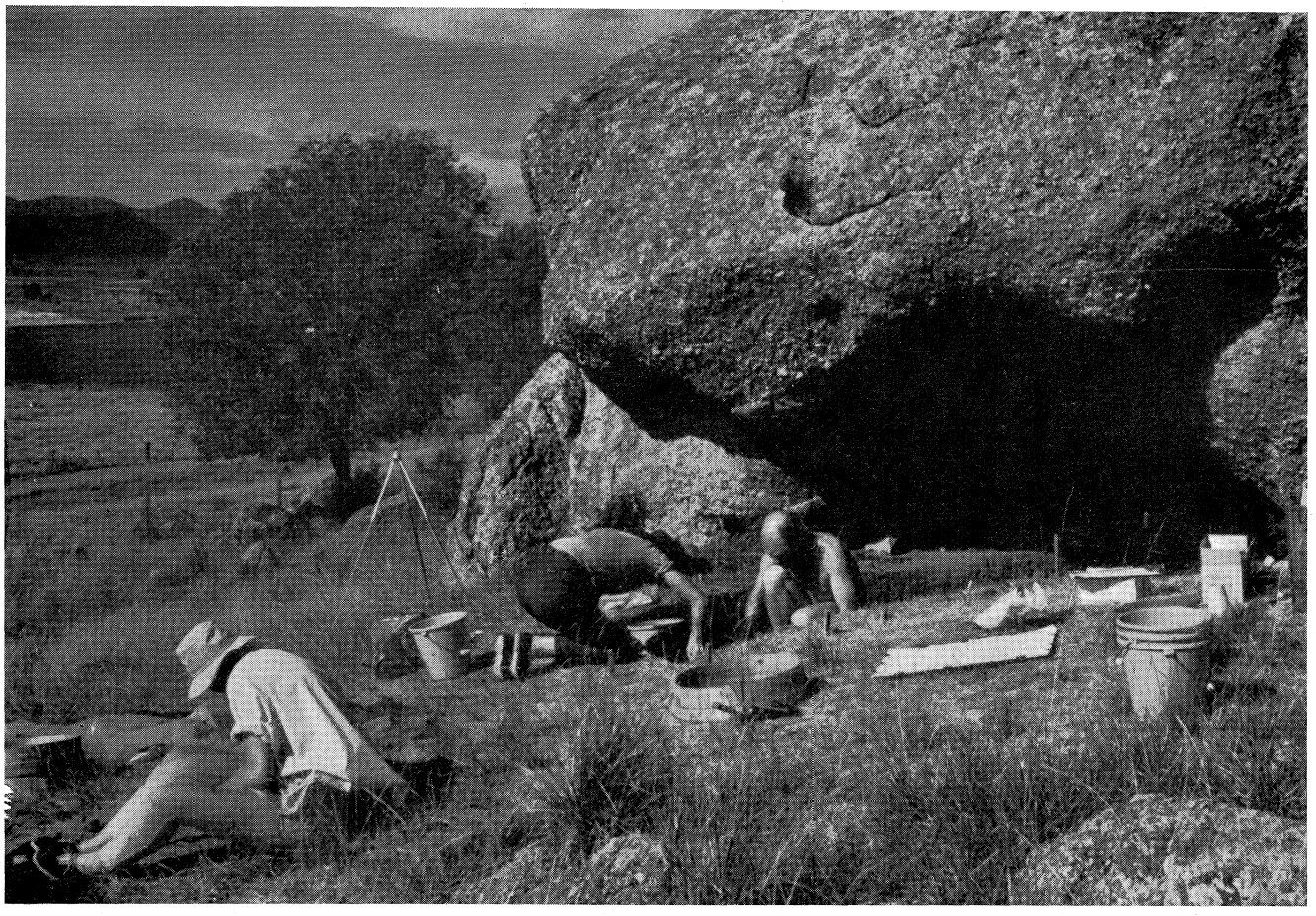
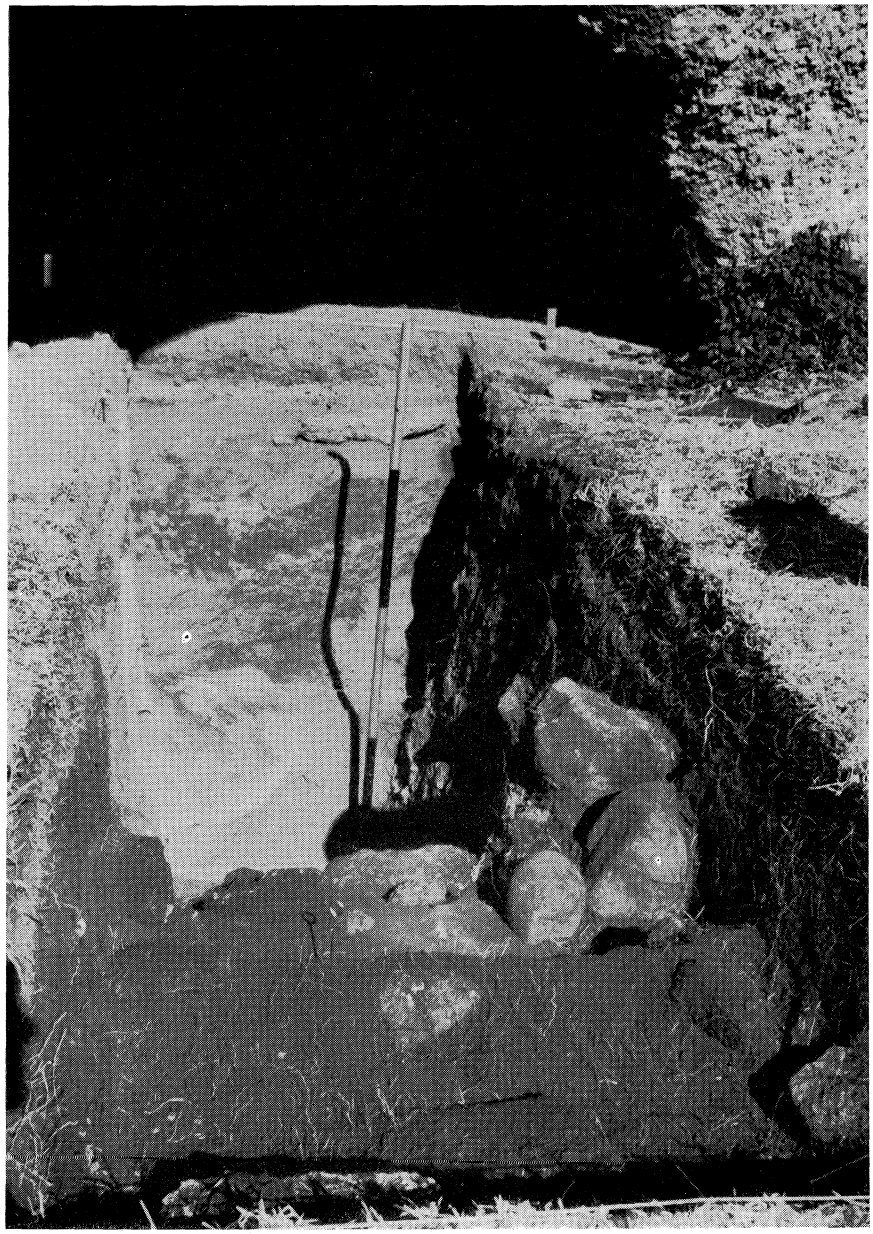


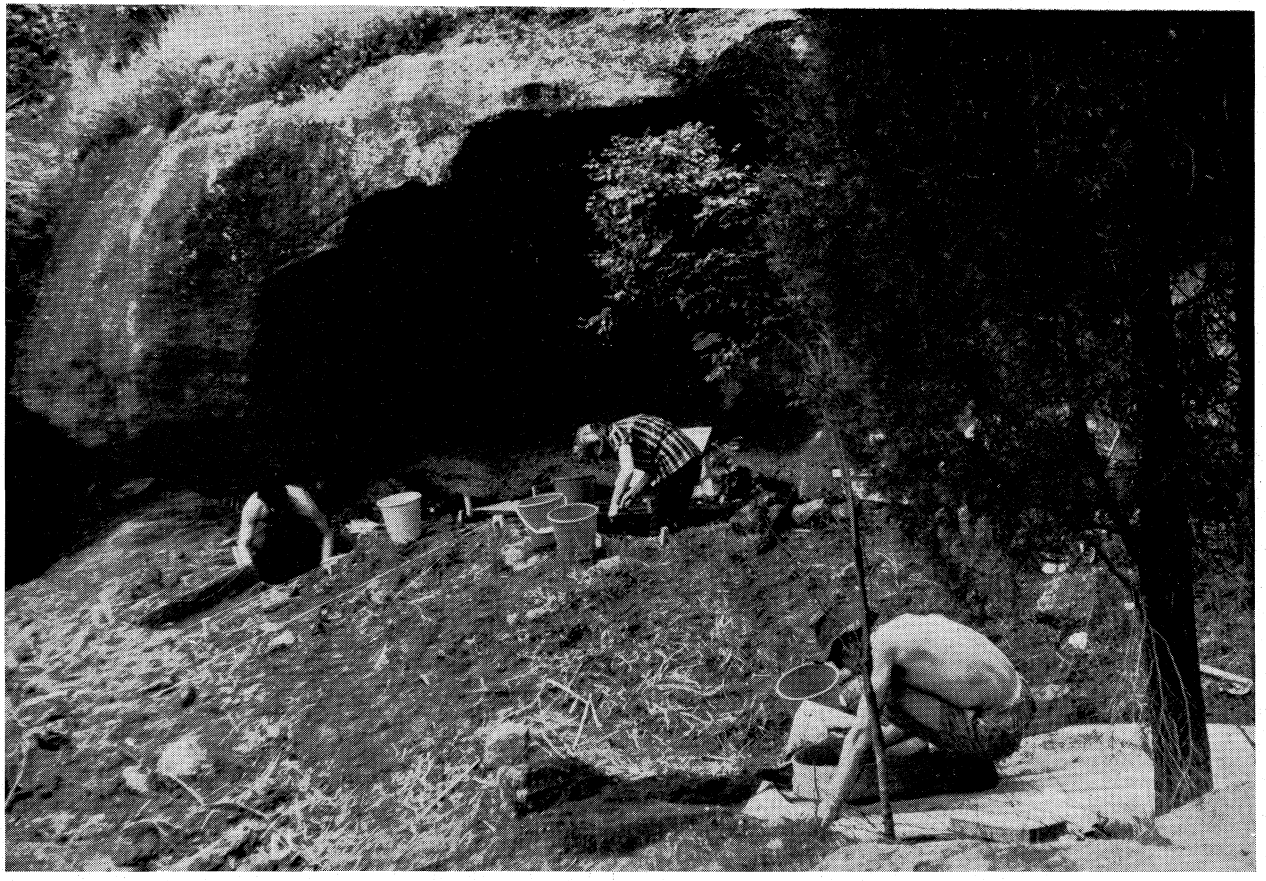
Site SH/1. The east entrance of the Sandy Hollow shelter, showing the alignment of the squares, in a continuous trench along an east-west datum line. The banks of the Goulburn River can be seen (far left), about 300 yards distant. [Photo: G. Moore.]



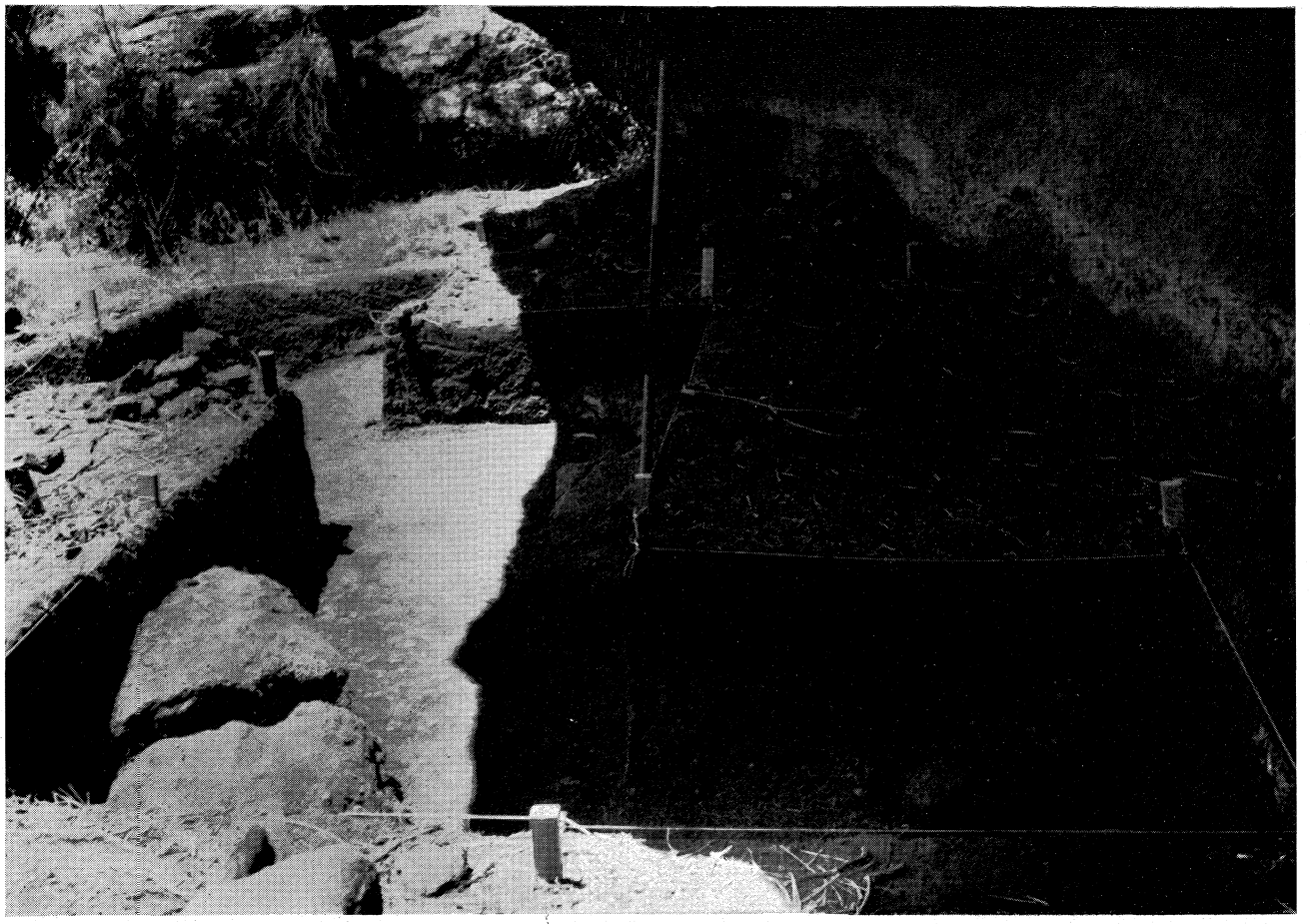
Site SH/1. Boulders arranged to form hearths in Squares AA and BB, where most of the bones were found. The ranging pole is placed at the deepest point, in Square A, where sterile gravel was reached at 3 feet 6 inches. The burial, discovered subsequently to the excavation (see Appendix A), was beneath the overhang on the left side of Square A. [Photo: Author.]

Site S/1. The Gowrie terrace, northwest of Singleton, with the Hunter River 60 feet to 100 feet below. The trial trenches at S/1 were dug across the terrace at the erosion point at top left. [Photo: Author.]

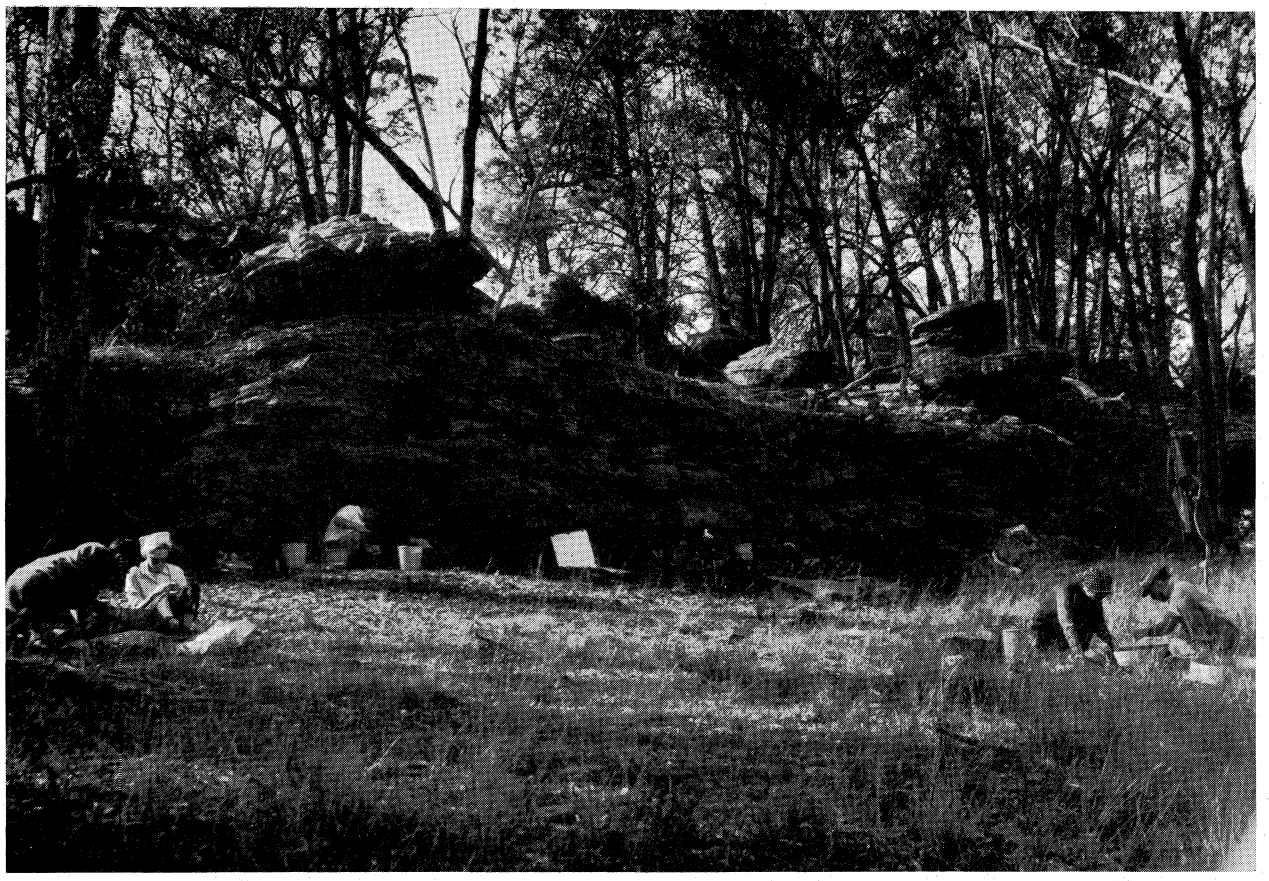
Site S/1. The commencement of the trial trenches. In the foreground artefacts can be seen sticking in the underlying clay. The dark longitudinal crack represents the base of the overlying topsoil from which the artefacts erode. [Photo: Author.]



Site M/1. A general view of the main shelter at Milbrodale with the excavation in progress. This shelter stands about 50 feet above the valley floor, up a steep slope. Immediately above it is a second shelter. [Photo: Author.]

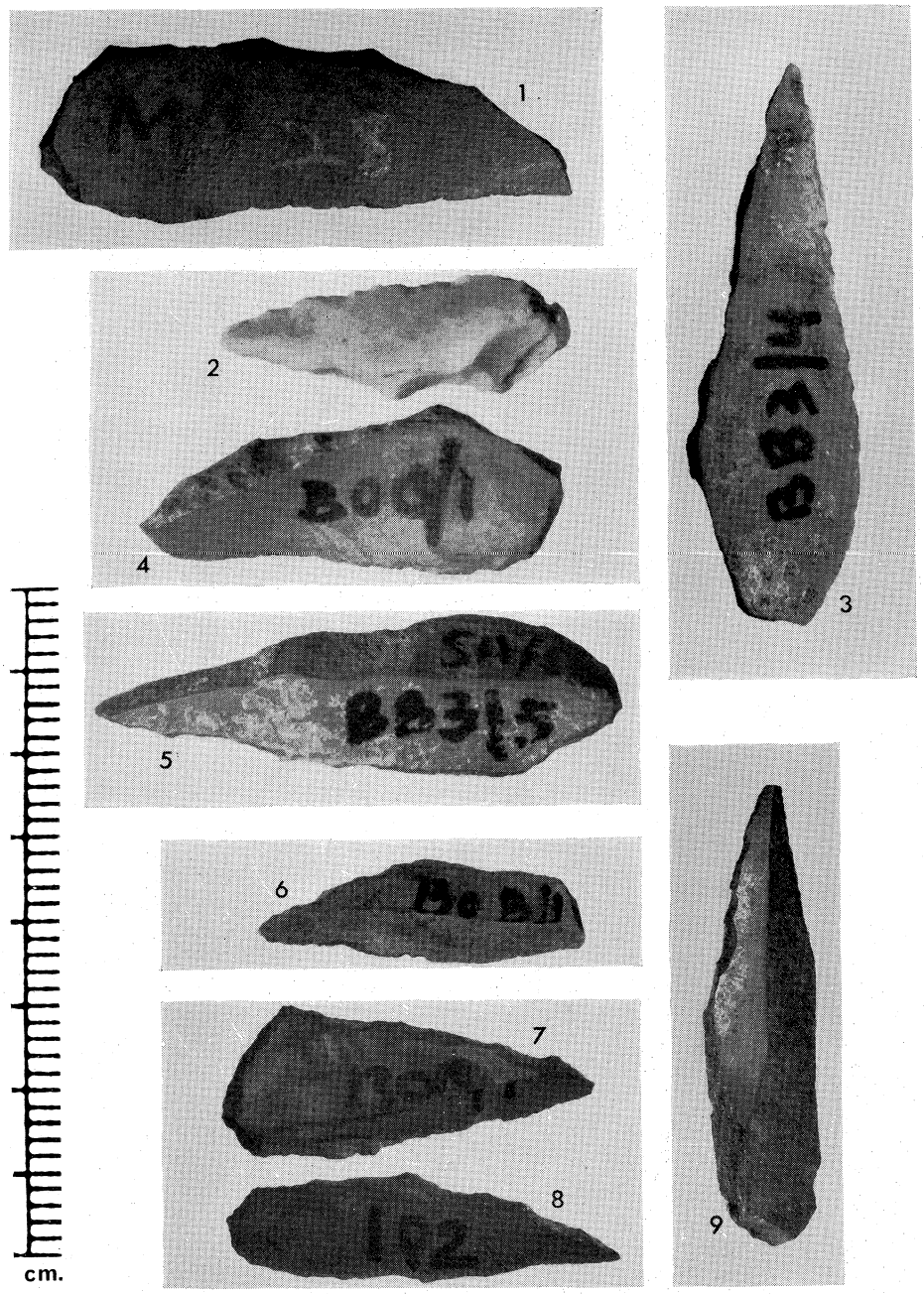


Site M/1. The completed excavation. This was a shallow deposit and called for extensive trenching in order to obtain a satisfactory sample. [Photo: Author.]

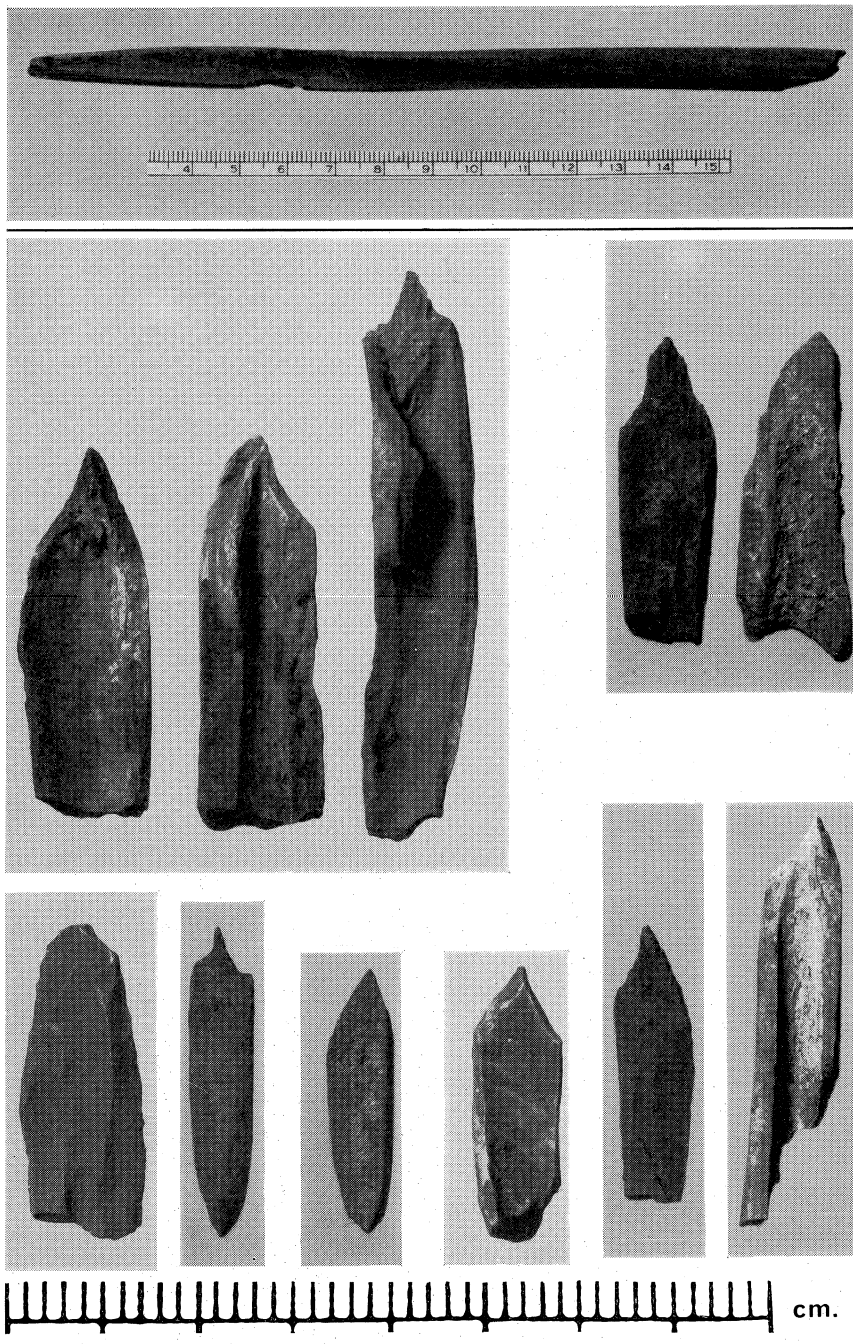


Site BOB/1. The small but prolific shelter at Bobadeen, with two digging and two sieving teams at work. (One of the teams is obscured from sight in the background.) The conglomerate sandstone slabs above the shelter contain quartz nodules. [Photo: Author.]

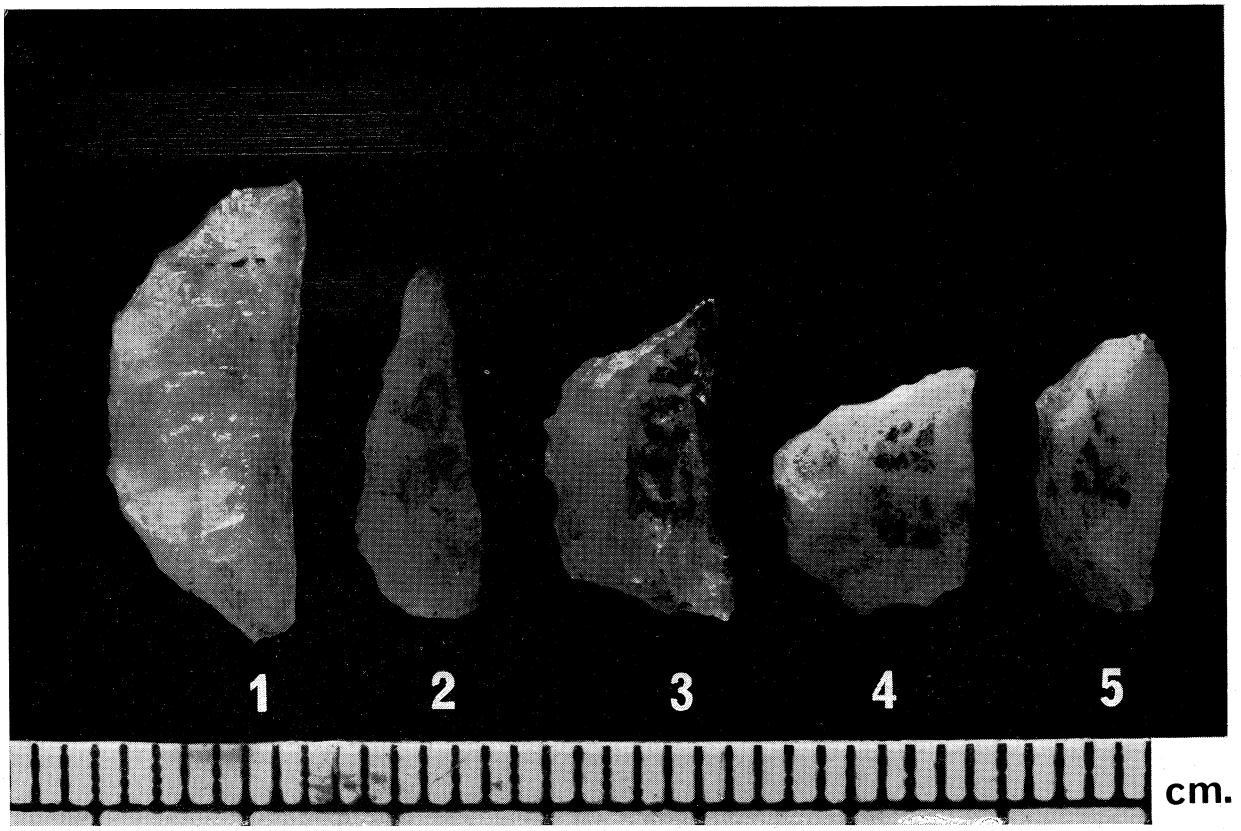
Site BOB/1. The first compacted layer in Square H. The breaks in the surface were caused by tree roots, which had travelled preferentially along the hard surface. These layers, and the humus between them, were especially prolific in artefacts. [Photo: Author.]



Bondi points. (x2½) (1) From M/1, showing work-use. (2) The solitary quartz Bondi from M/1, with marked retouch on the chord. (3, 5) From SH/1 and (4, 6, 7, 8) from BOB/1, all showing work-use and/or retouch. (9) From SH/1, with gum on back and butt. [Photo: C. V. Turner.]



Bone Implements. Burin-like bone points (x2½) from BOB/1. Some of the specimens appear to show work-use. The long implement (x⅔) is a bone spatula, showing both grinding and work-use at the tip and cuts on the left margin. The purpose for which these implements were employed remains a matter for speculation. [Photo: C. V. Turner.]



Quartz Microliths (X4). These are all from BOB/1 and demonstrate the remarkable precision of the quartz-working there. The larger segment (1) is less than 1.5 cm long and has a razor-like cutting edge. The smallest Bondi point (2) is 1.2 cm long. The trapezoids (3, 4) and the small segment (5) are less than one cm long. [Photo: C. V. Turner.]