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THE

MOTH - HUNTERS

Investigations towards a prehistory of the south-eastern highlands of Australia.

by

J. M. Flood

Submitted for the degree of Doctor of Philosophy Australian National University, Canberra.

THE MOTH HUNTERS by J.M. FLOOD

CORRIGENDA

Page

92A  The number of arboreal mammals in the column of Direct Observations should be 8, not 9.

106  Lines 21-3. Delete 'Amongst........ table 7:2

214A  Table 14:1C. After Total insert 'of quartz scaled pieces'.

257  Last line. Read fig.44 for 43.

257A  After 'Pseudomys' insert 'higginsi and fumeus'

263  Line 11. After 'native cats' insert (Dasyurus viverrinus), swamp wallabies (Wallabia bicolor).

264  Lines 19-21. Delete sentence 'This is....Cloggs Cave'.

Passim Millennium for millenium.

Bibliography. Insert reference to Cooper H.M. 1959 'Large archaeological stone implements from Hallett Cove, South Australia.


ADDENDA

Radiocarbon dates on Cloggs Cave, Buchan

* ANU-1181 Pit G spit 6A 1010+65B.P.
* ANU-1183 Pit W spit 5 1130+70B.P.
+ ANU-1182 Pit SS spit 12A 13,690+350B.P.
+ ANU-1220 Pit S spits 18-25 22,980+2000B.P.

* Final laboratory-corrected age estimations of earlier dates quoted in this thesis.

+ Additional dates, still subject to slight laboratory correction.
PREFACE

Except where otherwise stated in the acknowledgements and in the text, this thesis is based solely on my own fieldwork and research.

Josephine Flood


(Josephine Flood)
Department of Prehistory
Australian National University
Canberra.
Wonders are many on earth, and the greatest of these is Man...

He is lord of all things living, birds of the air, Beasts of the wilds, all creatures of sea and land He taketh, cunning to capture and ensnare With art of hand;

The use of language, the wind-swift notion of brain He learnt; found out the laws of living together In groups, escaping the shafts of lashing rain And wintry weather.

Sophocles Antigone 332-60
(Translation based on that of E.F. Watling)
This work is dedicated to the vanished moth-hunters of the Australian highlands.
ACKNOWLEDGEMENTS

To begin well before the thesis began, I would like to acknowledge my gratitude both to teachers and family who helped me on the path to Cambridge, and to those who inspired me on a circuitous route through Classics and Classical Archaeology to Australian Prehistory. Foremost among the latter are Jack Golson, John Mulvaney, and Rhys Jones, who opened my eyes to the absorbing interest and challenge of Australian archaeology.

For the opportunity to carry out the research which forms the subject of this thesis I am indebted to the Australian Institute of Aboriginal Studies, who financed the project, and to the Prehistory Department of the Research School of Pacific Studies, Australian National University, for the provision of technical facilities. To be a member of this department has been an enjoyable and rewarding experience, and I would like to acknowledge the pleasant ambiance created by Lois White, Beverley Fox, Stella Wilkie and the other staff.

In the production of this thesis I owe a particular debt to Win Mumford, for drawing the maps and imparting her artistic skill to my rough plans and section-drawings; to Beverly Fox and Anne Bayles for their excellent typing of the complex tables, to Robin Isaacs for deciphering my hand-writing so competently, to Jean Adams for her careful typing of the masters, and to Dragi Markovic who made such a splendid job of the plates.

The help of those who assisted in site reconnaissance and excavation is recorded in the relevant sections, but I would particularly like to thank Bill Adams, Peter Bindon, Carol Kiss and other members of Canberra Archaeological Society who enthusiastically participated in the work, often under difficult conditions. Others who provided considerable, continuing assistance were Jean Edwards, Jacqueline Kuiters, and Darrell Lewis. I would also like to mention the helpful co-operation of the rangers of the Kosciusko National Park and the Tidbinbilla Nature Reserve, the


In particular, within the Prehistory Department, I would like to thank Professor Golson for his helpful comments on the manuscript, and Rhys Jones, my supervisor, for his wise advice and enthusiastic support throughout the project.

Finally I would like to thank Philip for his constant encouragement and for making available that most precious of all commodities, 'time', on numerous occasions, and my children, Nadine, Michael and Adrian, for providing inspiration to gain a deeper understanding of the prehistory of their land.
SUMMARY

This thesis examines the prehistory of the Southern Uplands of Australia, a region of tablelands and highlands in the extreme south-east of the continent. From ethnographic and archaeological evidence the unique exploitation of the Bogong moth is reconstructed, and the pattern of seasonal transhumance which it engendered. The importance of moths is assessed in the subsistence economy of the region, and an analysis made of prehistoric food resources. Ethnographic evidence on prehistoric population, material culture, trade, inter-tribal relations, customs and language is also examined, and a series of hypotheses set up to be tested by archaeological fieldwork.

Settlement patterns are investigated by a locational analysis of camp-sites, and artifactual variation is explained in terms of the function, location, culture and chronology of sites. Then the question of time-depth is examined, and a prehistoric cultural sequence set up for the Canberra-Monaro region from the evidence of excavations in nine small rock-shelters. This sequence spans the last four millennia, but a lower dimension is added to it from Cloggs Cave, a limestone cave at Buchan on the periphery of the mountains. There, human occupation was found extending back into the Glacial Period, and the deposit also contained a rich faunal assemblage, with important environmental implications.

Finally, the ethnographic, archaeological and environmental evidence is integrated in an attempt to reconstruct the prehistory and life-style of hunter-gatherers in the Uplands from the Pleistocene to Protohistoric Period.
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GLOSSARY

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INTRODUCTION

Measurements

Since Australia is in the throes of adopting the metric system, I have given both metric measurements and British equivalents for distance, elevation, area etc. However, two exceptions have been made. In accordance with present Australian usage, only metric measurements of excavation data and tools are given, and only British measurements of rainfall. Elevations have been rounded to the nearest 5 metres, and distances to the nearest kilometre, when only an approximate indication is being given.

Abbreviations used

A.C.T.    Australian Capital Territory.
A.I.A.S.  Australian Institute of Aboriginal Studies.
A.N.U.    Australian National University.
A.S.L.    Above sea level.
B.P.      Before the Present (1950).
c.        Circa.
cf.       Compare.
H.R.A.    Historical Records of Australia.
H.R.N.S.W. Historical Records of New South Wales.
ms.       Manuscript.
n.d.      No date.
S.M.A.    Snowy Mountains Authority.
S.M.H.    Sydney Morning Herald.
Four recent discoveries, which have revised thinking about the date of man's presence in Australia, have also thrown a spotlight on south-eastern Australia. One was the discovery of 20,000 year old occupation at Burrill Lake on the south coast of New South Wales (Lampert, 1971b), the second a 26,000 year old human cremation site at Mungo in the far south-west of New South Wales (Bowler et al., 1972), the third, hearths in the same region, dated to 32,000 BP (Barbetti and Allen, 1972), and the fourth, human remains from Kow Swamp in Victoria, which display archaic Homo erectus features (Thorne and Macumber, 1972).

Until these discoveries the earliest sure indications of man's presence in Australia had been the 16,130 ± 140 BP date for the basal level of occupation at Kenniff Cave on the Western Slopes of the Great Dividing Range in southern Queensland, the 20,000 year old Koonalda flint quarry on the Nullabor Plain in South Australia, and the series of dates ranging up to 22,900 ± 1,000 BP for two occupation sites near Oenpelli in the north of the continent (Mulvaney & Joyce, 1965; Wright, 1971; C. White, 1967 a & b).

Despite numerous excavations, prior to the Burrill Lake site no human occupation on the east coast of the continent had been found to exceed the antiquity of 12,550 ± 185 BP at Noola in the Sydney region (Tindale, 1961; Bermingham, 1966:514). It had thus seemed likely that at least the southern sector of the eastern coast had not been settled very early, but had been by-passed by the wave or waves of migration which came somewhere west of the Great Dividing Range down into Tasmania during the Pleistocene era (cf. Jones, 1968:189-91). Jones noted a west to east gradient in the antiquity of sites, and from this evidence suggested that Palaeolithic migrants might
FIGURE 1: Location of Archaeological Sites in Australia.
have made landfalls in the west, rather than in the north of the continent.

Evidence of man's presence in the Burrill Lake rock-shelter twenty thousand years ago therefore dramatically changed current thinking on east coast archaeology. One of several questions unanswered was how people had reached Burrill Lake in late-glacial times? Was it by a route down the coastal strip from Cape York, or across the Great Dividing Range from the inland plains?

In western New South Wales sites on the Lake Mungo lunette demonstrated an antiquity for human occupation of 25,000 - 30,000 years (Allen, 1972:279-80), showing that colonization of the continent could have been well-advanced early in the Upper Pleistocene. In the same region to the north at Lake Menindee the apparent, though not proven, association of stone tools, extinct marsupial bones, and charcoal dated to 26,300 ± 1,500 BP lent support to this hypothesis (Tindale, 1955; 1957; 1964). The region between Mungo and Burrill Lake thus acquired additional interest, the particular problem being - was the Great Dividing Range a real barrier, or did man find its weak points and brave the periglacial conditions to reach the east coast?

One part of the Great Dividing Range has features of particular interest to the prehistorian. This is the Snowy Mountains region, which is the one area in the whole of Australia where occupation is completely impossible all the year round, being snow-covered for three to four months each winter. Yet at least seasonal Aboriginal visits to these alpine summits are attested by the find of several stone axes above the orographic snow-line.

How then did the Aborigines adapt to the montane environment? What were their food resources? What was their incentive to ascend these windswept alpine summits?

Ethnographic records from the first half of the nineteenth century provide one explanation. The magnet which drew Aborigines to travel hundreds of kilometres and
climb 2000 metres up to the granite tors was a small brown moth, called 'Bogong' by the Aborigines. These Bogong moths (*Agrotis infusa*) aestivated in their millions on the alpine peaks, providing a unique seasonal food, easily caught, abundant, and full of protein, which each summer engendered a major transhumance of tribes from valleys and tablelands surrounding the high ranges.

Unfortunately the Bogong moth population appears to be rapidly decreasing, probably as a result of the use of insecticides in the breeding grounds, and the moth migrations may soon become a phenomenon of the past. Since any study of the moth-hunters must also devote attention to the ecology of the moths, their possible extinction lent some urgency to the project.

My region of study thus became the Southern Tablelands and Highlands of south-eastern Australia, for which I have adopted the name 'Southern Uplands'. This is a very large geographical area of approximately 100,000km² (60,000 square miles), comprising the moth aestivation sites and the surrounding valleys and tablelands. The title of this thesis, *The Moth Hunters*, should not be taken too literally; it is intended to imply that the majority, but not necessarily all, of the region's prehistoric inhabitants were moth-hunters, and that moths were of supreme importance in the subsistence of the highlanders.

The very large area covered in this regional study was necessary for two reasons. Firstly, it was clearly desirable to study the ethnography of the whole highlands region as a geographical entity, ignoring artificial state boundaries. Secondly, compared with the abundance in coastal or western New South Wales, this region is relatively scarce in prehistoric sites. One reason for the few sites is the lack of sandstone rock shelters, with their frequent occupation deposits. The rock in most of the Uplands is granite which is never engraved, very seldom painted and which only occasionally provides usable rock shelters. Some groups of limestone caves occur, but most
of these are too wet or shaft-like to be used for human habitation. A second factor is the grass which covers the tablelands, and probably covers a great many prehistoric campsites. A few have emerged through erosion or ploughing but the number is very small compared with the plethora found in the arid country of western New South Wales, or on the sand dunes of the coast. This paucity of material remains is accompanied by a scarcity of ethnographic records, but one advantage of this is that I have been able to study both the whole ethnography and virtually all known Aboriginal material from the highland region, a task that would have been too great had there been a much larger body of material. It follows that I have undertaken a regional survey rather than concentrated on a single site, although one site in particular has proved worthy of special intensive examination.

Since the archaeological potential of the region was unknown, the project was framed on a broader basis extending to every aspect of local Aboriginal life. Field reconnaissance was therefore not limited to a search for caves with stratified occupation deposits, but a locational analysis of open sites was also carried out, together with distribution studies of implement types. For this purpose it was necessary to focus on particular areas within the Southern Uplands, and those chosen were the Canberra region, the Tumut Valley and Bogong Range, and the Mt. Kosciusko area, since each of these regions includes a wide range of ecological zones.

My aim in this study of settlement patterns was to achieve some understanding of human adaptation to the montane environment, seasonal movement as reflected in site location and variation, trade routes and cultural areas, and economic activities as reflected in tool-use. Such a study inevitably involved an attempt at reconstruction of the prehistoric environment, and this has been done in some detail in the Canberra region.

From the beginning of the investigation it was apparent that the majority, if not all of the archaeological sites on
The Southern Uplands belong to the Recent Period, i.e. the last 10,000 years. During this period the local climate and vegetation was not markedly different from what it was at the time of European settlement, as shown in Chapter 2, and hence I have felt it was reasonable to reconstruct the prehistoric environment on evidence from the time of first European contact. The recent nature of most of the archaeological evidence has also made a study of the ethnography not only relevant, but essential. From the ethnographic records a broadly-based picture of traditional local Aboriginal subsistence patterns and material culture can be built up, with which to compare and illuminate the scanty archaeological evidence. The use of ethnographic evidence is discussed further in Chapter 3; suffice it to say here that, without this evidence, very little would be known about the moth-hunters.

In south-eastern Australia an important contribution to regional surveys was made by McBryde in the New England region of northern New South Wales, where through a whole variety of Aboriginal sites, a soundly based local prehistoric culture sequence has been established. In the Sydney area, on the basis of his excavations at Lapstone Creek and Capertee, McCarthy (1948 and 1964) proposed a tri-partite Eastern Regional Sequence, which has been revised by Lampert (1971A) in the light of the Burrill Lake data and other recent work on the south coast of New South Wales.

This previous archaeological research had left untouched the south-east of New South Wales, the inland regions of eastern Victoria, and several hundred kilometres of coast between Durras and Wilson's Promontory. By 1970 on the Southern Tablelands traces of some Aboriginal occupation had been found in surface campsites but no archaeological work had been done, except for Hume's work at Sassafras on top of the Coastal Ranges (Hume, 1965). The antiquity of occupation was thus a matter only for conjecture, and guesses ranged from a mere 130 years to 15,000 years! (Slater S.M.H., 4 June, 1927; Hancock, 1972:18).
By way of summary at this stage of the approach to the Southern Uplands, my basic objectives were to:-

(1) reconstruct the prehistoric way of life in the Southern Tablelands and Highlands at the time of European settlement from ethnographic sources;

(2) analyse the location of prehistoric campsites in order to establish settlement patterns and their relation to resources and other factors;

(3) study the seasonal exploitation of the Bogong moth and reconstruct as far as possible the prehistoric economy of the region, from ethnographic and archaeological evidence, and from a survey of food resources;

(4) carry out distribution studies of implement types and other material culture traits, such as art styles, and examine the coincidence of cultural and natural areas;

(5) compare the culture and economy of the region with the inland plains, the eastern coastal strip and the Northern Tablelands of New South Wales and try to distinguish any cultural zones or influences; and

(6) put a time-scale on the occupation of the Uplands and the local prehistoric cultural sequence, and in particular to look for any trace of Pleistocene industries.

Structure of the research project

It is more satisfying but also more complex to try to obtain a total view of Aboriginal culture of a region, rather than to concentrate on a single aspect. My inquiry necessarily had to proceed on four or five fronts at once - research into local ethnography, museum collections, field reconnaissance, recording and excavation.

Strategy: My aim was firstly to set up a model from the ethnographic data, with which the
archaeological findings could be compared. Accordingly the ethnographic material was examined first, and a series of hypotheses set up, which could be tested by archaeological fieldwork. The latter comprised analysis of the location and stone assemblages of campsites, and excavation of a number of stratified occupation deposits in order to establish a prehistoric chronological framework. Since it was clearly impossible for me to cover 100,000km² of country in person, I contacted as many people and clubs in each area as possible, in the hope that their local knowledge would lead me to Aboriginal sites. I therefore approached Historical Societies and Bush-Walking Clubs and talked to both those who lived on the land and those whose interests in natural history, field geology, forestry, gem collects etc., took them around the region. I supplemented these enquiries by publicity in the newspapers and on the radio, and this brought in a number of useful leads.

Such enquiries take some time to bear fruit, so I began them as soon as I had decided on the project late in 1969. I also began fieldwork immediately, to profit from the summer vacation and availability of university students as labour. I had already taken part in several Australian excavations, and had become conversant with both the type of material likely to be encountered and the techniques generally employed.

Fieldwork: My springboard, I decided, should be the coastal ranges, applying the principle of working from the known to the unknown. It was on the top of the coastal ranges at Sassafras, 50 kilometres from the sea, that the only excavation in inland southern New South Wales had been carried out. This was a rock-shelter, excavated by Stewart Hume of Goulburn and written up as a B.A. (Honours) thesis for Sydney University, entitled 'The analysis of a stone assemblage to determine change' (1965). Hume had analysed the material from only one pit, and had since gone overseas, so gave me permission to complete his work on the site. This I did in January 1970, and also test-excavated another rock-shelter nearby, in
order to obtain a firmly based local sequence for the coastal ranges of southern New South Wales.

During 1970, whilst working on the Sassafras material and on the ethnography, reports came in of a variety of sites, mainly surface campsites, but including three art sites. These were large granite boulders bearing paintings and in each case the boulders formed a small rock-shelter where surface finds of chert flakes suggested some occupation. Accordingly these three sites were excavated in the summer of 1970. Bigga proved almost sterile, but the Gudgenby sites, although rather shallow, provided the beginnings of a local cultural sequence in the Canberra region.

Two other sites were excavated in 1971, both small but of particular interest. The first was a small shale cave at Caddigat on the Monaro, which was and still is the only habitable cave known on these high windswept tablelands. Its earth floor was only 30cm. deep, but yielded both classic tool types and the only indication so far of the antiquity of occupation on the Monaro. The other site was high on the Tidbinbilla Range where Jim Webb of the Botany Department, A.N.U. kindly showed me a granite cave containing the debris of Bogong moths. Here I was able to obtain the first archaeological evidence of Aborigines' exploitation of this food source.

1971 was spent processing the material from these various excavations, and carrying out further fieldwork. There was a plethora of surface campsites to record, but much time was also devoted to field reconnaissance to try to find deeper occupation deposits and sites containing food debris remains. This involved looking at limestone caves in particular, of which there were some 40 groups in my study region, some of the groups containing more than a hundred caves.

I was aided in this mammoth task by Dr. Joe Jennings, the Canberra Caving Club, the Victorian Speleological Association, and Dr. Jeanette Hope, who was herself looking for bone deposits in caves in the same area.
Meanwhile another granite rock-shelter, a capacious and well-situated one in the Tidbinbilla valley south of Canberra, was excavated in December 1971, as a check on the local sequence provisionally set up from the Gudgenby excavations.

My search of the Snowy Mountains region for stratified occupation deposits proved unsuccessful, but by reconnoitring all caves in ever-widening concentric circles from Mt. Kosciusko, I found myself examining the lower montane valleys in the foothills of the alps. One of these was the Buchan valley in north-east Victoria, and there, among 200 limestone caves, was one bearing clear signs of prehistoric utilization. Preliminary excavation was commenced in December 1971, and continued in April and May 1972. By this time it was apparent that Cloggs Cave was a major site, with occupation extending back into the Pleistocene period. My excavation was necessarily limited in scale, and the account in this thesis is a preliminary report only, since it is clear that the site merits considerably more work in the future.
Chapter 2

The Geographical Setting

The area chosen includes, of course, part of what is now known as the Great Dividing Range. The Great Dividing Range is rather a misnomer, for it is in no sense a continuous ridge but a "peneplain which has been differentially elevated (as a series of warps and horsts along the coast) to heights varying from 2000 to 7000 feet" [610m.- 2135m.] (Taylor, 1988:47). It is thus a Divide in the sense of being a watershed, but it is only a continuous mountain range in the extreme south-east of the continent and the term Eastern Highlands is now generally preferred. Along its eastern side is a generally steep scarp, dissected by deep gorges, dropping to a narrow coastal plain, but on the western side the slopes to the inland plains are much gentler and less well-defined.

In the southern half of this eastern warp are three main mountain regions, the New England Plateau, the Blue Mountains and the Snowy Mountains. These are separated by two 'gaps' - the Cassilis Gate and the Lake George Gate - which seemed the best places to look for any traces of migration, trade or culture contact between the inland plains and the coast. Of these, I chose the Lake George area or Southern Tablelands as it is generally known, since this is on the natural route between Burrill Lake and the Mungo-Menindee region of the inland plains (see figs. 2 and 3). It was also archaeologically untouched, whereas an archaeological reconnaissance of the Cassilis Gate and Hunter Valley region had been carried out by Moore of the Australian Museum in Sydney (1970) and a survey of the New England region by McBryde (1966a & b, 1968). In both regions the earliest occupation so far found is of the order of 7,000 years old.

To the south of the Southern Tablelands the rugged Snowy Mountains provide a real barrier, rising to 2230m. (7314 ft.) and snow-covered for nearly half the year.
To the north lie the Blue Mountains, a deeply dissected ancient peneplain, elevated to between 915 and 1220 metres (3,000-4,000 ft.) but with such complex topography that it was 25 years before the first Europeans in Sydney could find a way across. This is not to say that the ridges of the Blue Mountains could not have provided a west-east route in early times, but it would be a less obvious and natural route than the open tablelands to the south.

The eastern boundary of my study region is the edge of the coastal scarp, which in general runs parallel to the Pacific sea coast about 30 kilometres (19 miles) inland. The western limit of the region is likewise a topographic boundary, in this case the Western Slopes of New South Wales, which rise from the geosyncline of the Interior to the Uplands of the Eastern warp (see fig. 3). Over much of its length this corresponds approximately to the 20 inch isohyet, which in turn forms the eastern boundary of the modern wheat belt. In its western limit, my study region corresponds broadly to one of the seven natural regions of the Eastern warp - the Canberra region - as defined by Taylor (1958:131).

For purposes of this study Taylor's region has been narrowed down, omitting to the north the portion which includes Sydney, Newcastle and the Blue Mountains, for reasons already given, and to the east the coastal strip, since this forms a different ecological zone from the Uplands. To the south I have extended Taylor's natural region to include the Eastern Highlands of Victoria, which fall into his natural region 3 but are described as "structurally associated with those of the south-east of New South Wales" (1958:148). Ecologically the Highlands of New South Wales and Victoria form an entity, and both are a summer refuge for Bogong moths and hence an attraction to Aboriginal seasonal migration.

I have named my region the Southern Uplands because (a) the term 'Uplands' gives a better connotation than 'Highlands' of the rolling tablelands which characterise much of the area, (b) the term 'Southern Highlands' has
FIGURE 3: The Southern Uplands.
been used previously (by King, 1956; Coventry, 1972 etc.) to denote the Highlands of Southern New South Wales only, whereas my region includes the upland zone of eastern Victoria.

A brief general description of the region is given here, more detailed data being included later for those localities where archaeological work has been carried out.

**Southern Tablelands:** Let us begin from the north, with the lowest and least rugged area. Between the plateau of the Blue Mountains and the highlands of the Snowy Mountains there lies an area of undulating, faulted country, which has long been known as the Southern Tablelands. It covers an area of some 13,000km² (8000 square miles), and has a general elevation of between some 550m and 730m (1800-2400 ft.), with some hills rising to over 915m (3000 ft.). The topography is generally fairly uniform. Low rounded ridges with occasional hills and open savannah woodland are characteristic, with some flat and almost treeless plains. These are not merely the result of European clearing, for the first European explorers commented on the treeless aspect of these plains, which derive mainly from cold air drainage and frost action (cf. Gunn and Story, 1969:19 in *Lands of the Queanbeyan-Shoalhaven Area, A.C.T. and N.S.W.*, and *The Southern Tablelands Region*, a resources survey published by the Government of New South Wales in 1949). Aborigines also may have played a part in their formation, a possibility that is explored at the end of this chapter.

In the centre of the region lie the large internal drainage basins of Lake George and Lake Bathurst. The latter is triangular in shape, each side being about 5.6km (3.5 miles) long, and Lake George is 56km long by 3-9km wide (35 x 2-5 miles). Both lakes sometimes dry up, and did so in pre-European times also according to the evidence of local Aborigines (Cunningham, 1824:April 7).

The region containing the lakes has been named 'Lake George Gate' for here there is a complete break in the
Great Dividing Range. This forms a natural route across these Southern Tablelands, in the south-west corner of which the river Murrumbidgee can be followed up from the western plains. Further north there is another natural gap where undulating country extends westwards along the valleys of the Lachlan River and its tributaries.

The tablelands drain both to the west and to the east, the most important rivers being the Murrumbidgee River flowing west and the Shoalhaven River which flows north and then east down to the coast through a gorge cut more than 300 metres deep (c.1000 ft.) in sedimentary rocks.

The grain of the country has a general north-south trend which reflects the underlying geology. In the ranges and valleys to the south of the tablelands these meridional belts are even more pronounced, with the rivers generally flowing northwards until they leave the ranges. The largest of these rivers is the Murrumbidgee, which rises in the Snowy Mountains region, flows across the north of the high tablelands of the Monaro, then follows a fault valley till it clears the ranges and curves westward again to flow down to join the Murray, and eventually the sea more than 1000 kilometres (c.600 miles) away in South Australia. The junction of this main valley leading north from the Monaro with the Southern Tablelands and 'Lake George Gate' is now the site of the national capital. With prophetic insight John Lhotsky had predicted as much when Canberra consisted of only a handful of farms on the Limestone Plains.

'Limestone Plains form a point where three principal roads, the great road from Sydney, that to Yass Plains, and that to Menero Downs will eventually converge. At Limestone therefore at no distant period, a fine town will exist, uniting Spencer's Gulph (by means of the Murray), Sydney, and Twofold Bay' (1835:67).

Both the quantity of Aboriginal artifacts found in Canberra and the ethnographic record testify to its equal importance as a meeting place in prehistoric times, and it is interesting to note that local Aborigines knew that the waters of the Murrumbidgee River eventually reached the sea,
even though this did not happen for more than 1000km.,
(Throsby, 1820:September 4, letter to Governor Macquarie).

The climate of the Southern Tablelands is distinctly
cool and rather dry. It has been classified by McAlpine
and Yapp (1969:57) as the sub-humid mesothermal type
according to Thornthwaite's 1931 classification, and has
been described as "a climatic counterpart to that of cold
dry Mexican regions, with sections of France and the British
Isles and specks of Norway" (de Beuzeville, 1943:5 and
compare Table 2:1). Rain is spread fairly evenly through­
out the year, and mean annual rainfall ranges from 22"-35",
the wettest areas being the coastal ranges. There have
been a number of severe droughts on the Southern Table­
lands, but in general the rainfall is fairly reliable.

Mean monthly temperatures range from 18.3-21.7°C. in
summer to 5-7.8°C. in winter. In Canberra the highest
maximum recorded is 42°C., and the extreme minimum is
-7.7°C. The majority of the region has a mean temper­
ature for the hottest month of between 20° and 21.7°C.,
and for the coldest month of 1.1°-7.8°C. In other words,
the climate is continental in type with hot summers and
cold winters. The high temperatures of summer are
moderated by the relatively low humidity and by altitude,
but the latter tends to lower the winter temperature which
unlike the coast is not tempered by land and sea breezes.
The coldness of the winter is exacerbated by frost and fog,
although their incidence is very dependent on the local
topography and very variable even over small distances.
Thus Queanbeyan averages 102 days of frost, Canberra (12km.
= 7 miles away) 77, but the higher ground of Mt.Stromlo,
16km. (10 miles) away, only 16 severe frosts per year
(Bureau of Meteorology, 1968:24). Both frost and fog
are very dependent on cold air drainage at night, and thus
could be largely avoided by the prehistoric inhabitants
camping on the hills. Unfortunately modern towns are
generally placed in hollows and this should be borne in
mind when studying their meteorological data.
In summary, the present climate of the Southern Tablelands is generally comfortable, but tends to be cold in winter especially at night. However the prehistoric inhabitants could have avoided the worst of these winter conditions by choosing sheltered campsites above the cold air drainage hollows, and it would have been climatically quite possible for them to spend both summer and winter on the Southern Tablelands.

Namadgi Ranges: To the south-west of Canberra lie a series of deeply dissected rugged ranges rising to over 1830 metres (6000 ft.) and snow-covered in winter. They comprise the Tidbinbilla, Brindabella, Bimberi, Scabby and Booth Ranges, and are generally known as the A.C.T. Ranges. But rather than employ this contemporary name, I prefer to group the ranges under the generic Aboriginal name recorded by John Lhotsky in 1834, when in the Duntroon area of Canberra he said:

'The people pointed out to me Namadgi range, being 18 miles [28km.] distant south-west, which is covered with snow during a great part of the year' (1835:63).

The same name was earlier recorded by assistant surveyor Dixon in his progress report for May 1829 (M.S.M.L.), where he spoke of meeting 'several tribes from Moneroo and Nammage'.

These ranges form the northernmost outliers of the Australian Alps, together with the 1525 metre (5000 ft.) Bogong mountains lying to their west. The few passes that do exist are mostly over 1400 metres (c.4600 ft.) and therefore snow-covered in winter. Between the ranges lie a series of deep valleys containing north-flowing rivers. The largest of these is the Murrumbidgee, and the generally broad valley it follows provides a natural route southward from the Southern Tablelands to the high tablelands of the Monaro.

Monaro: The term Monaro is here used for the area of high tablelands bounded on the north by the Namadgi ranges, on the west by the Alpine watershed, on
Plate 1

A. The alpine tract in summer: the Ramshead Range, one of the main moth-hunting regions, with Mt. Kosciusko in the far distance, seen from south of the Thredbo Valley.

B. The treeless plains of the Monaro, viewed from near Dalgety south of Cooma. On a clear day the Snowy Mountains are visible from here.

C. The Lower Snowy Valley, and the site of an Aboriginal camp at the junction of the Snowy and Deddick Rivers, Victoria. Some of the Cypress Pine typical of this valley can be seen.
the east by the Gourock and Kybean coastal mountains, and on the south by the Victorian border. This region of some $9600\text{km}^2$ (c.6000 square miles) is approximately that of the three counties of modern Monaro (cf. Hancock's discussion of the fluctuating definitions of Monaro 1972:6), and is the region studied by Costin in his exhaustive 'Study of the Ecosystems of the Monaro Region of New South Wales' (1954). Within the region Costin distinguished four broad but well defined natural environments: alpine, subalpine, montane and tableland (1954:20).

The alpine tract ranges from the tree-line at about 1830m. (6000 ft.) to a maximum elevation of 2230m. (7314 ft.) at Mt. Kosciusko. The subalpine tract occupies the ground between about 1525m. and 1830m. (5000-6000 ft.) forming the tree-line vegetation in the highest areas. Since the winter snow-line lies between about 1525m. and 1675m. (5000-5500 ft.) both these zones are snow-covered in winter, comprising a total area of about 1610 square kilometres (1000 sq.miles). A further $1400\text{km}^2$ (870 sq.miles) in Victoria and $225\text{km}^2$ (140 sq.miles) in the Australian Capital Territory also lie above the winter snow-line, making a total area of $3220\text{km}^2$ (2000 sq.miles) where human occupation would of necessity be only seasonal. Costin's montane tract covers the country between 915m. and 1525m. (3000-5000 ft.), largely characterised by deeply cut rivers and steep precipitous slopes. Below this lies the tableland tract, averaging 610m. – 915m. (2000-3000 ft.) but dropping as low as only 215m. (c.700 ft.) above sea level in the gorge of the lower Snowy River (See plate 1.).

The Monaro Plateau stretches into Victoria from New South Wales, the border being an artificial boundary imposed on the topography. In Victoria the Plateau averages about 915m. (3000 ft.), and is bounded on the south by very steep slopes and deep dissection (Neilson, 1962:280). South of Mt. Kosciusko the main axis of the Great Dividing Range swings westward, and the Victoria Highlands extend in a long arc to end at the 'Kilmore Gate' north of Melbourne. The Victorian Alps are generally known as the High Plains from their subdued relief and open, undulating topography,
contrasting with the surrounding steep, forested regions of much greater dissection. All the High Plains lie above 1220m. (4000 ft.) and the climate is rigorous, the winter snow-line lying between 1370m. and 1525m. (4500-5000 ft.) which is rather lower than in the Snowy Mountains to the north, (Costin, 1962:327). The chief gap in these Victorian Highlands is the 'Omeo Gate' which separates the Kosciusko-Cobberas-Gibbo Range from the 1830m. (6000 ft.) Bogong Plateau. The gorge of the Snowy River also provides a route, albeit a rugged one, from the Monaro Tablelands to the south coast of the continent, and this was the route by which the first explorers penetrated southwards into Gippsland.

The climate of the Highlands is very closely related to physiography. The four orographic tracts - alpine, subalpine, montane and tableland - provide the basis for a broad climatic sequence, which is correlated with vegetation and soil in fig. 4 (after Costin, 1959:435). Within this framework considerable local differences occur, occasioned by minor topography, so that in some cases it is necessary to speak of 'microclimates'.

Temperature is closely related to altitude, but there are also extreme monthly and daily temperature ranges, the difference being as great as 10°C. in the alpine tracts in the summer (cf. Costin, 1954:49-52). At lower levels the range seems to be less in summer and greater in winter than those of the subalpine and alpine tracts. Extremes of temperature recorded in the Monaro include 44.4°C. to -16.4°C at Cooma, 40.3°C. to -10°C. at Bombala, 34.7°C. to -15°C. at Kiandra, and about 26.7°C. to -13.3°C. at Charlotte Pass, below Mt. Kosciusko. Other phenomena which affect human occupation are cold air drainage, frost and wind. High winds are frequent both at higher and lower levels where effective windbreaks are absent, and even in the tableland tract gusts of 80 and 95 km/h. (50-60 mph.) have been recorded. Frosts are also of frequent occurrence, the lower Snowy Valley being the only region which is generally frost-free.
FIGURE 4: Climate, Soils and Vegetation in the Monaro (after Costin 1959:435).
The rainfall gradient is extremely steep, the region being characterised by wet coastal and inland mountains, with drier tablelands in between. Moisture-bearing winds from the west and east are blocked by the mountain ranges, causing an elongated arid belt stretching from Bombala to Queanbeyan. This is shown as the 'Cooma dry-loop' in the 30 inch-isohyet in maps of average annual rainfall in Australia (cf. Taylor, 1958:63). Most of the Monaro tablelands have an annual average precipitation of only 21-25 inches, and the Omeo-Benambra district of Victoria lies in a similar rain-shadow.

A quantitative expression of climate can be given by utilising one of the systems of climatic classifications. For purposes of comparison with world homoclimes, in Table 2:1 Swain's climatic index has been employed. This utilises the criteria of mean temperature for the coldest and hottest month, number of months averaging above 9°C (=48°F), and mean annual rainfall (de Beuzeville, 1943; Costin, 1954:56-8).

Palaeo-Climate: Turning from present climate to palaeo-climate we encounter numerous problems and controversies. Nevertheless some important evidence does exist, particularly with regard to temperatures. In southeastern Australia a long cold unstable period appears to have lasted from about 32,000 to 10,000 years ago. This correlates approximately with the last Wurm/Wisconsin glaciation (Galloway, 1965:603; Davies, 1967:6). The glaciated area in the Snowy Mountains would have only covered some 50km² (30 square miles) but a much larger area down to an altitude of 1000 m. (3280 ft.) or less would have been in the grip of periglacial conditions (Galloway, 1963).

Periglacial evidence of severe former frost action such as large-scale solifluction rubble mantles, patterned ground and block-streams has been found all over the Snowy Mountains (Caine and Jennings, 1968; Costin, Thom, Wimbush, 1967) and similar slope deposits on hills rising from the Monaro tablelands (Costin, 1973).
## TABLE 2:1: Homoclines of stations in the Southern Uplands.

<table>
<thead>
<tr>
<th>STATION</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEV. (Metres)</th>
<th>M.T.C.M. (°C)</th>
<th>M.T.H.M. (°C)</th>
<th>MONTHS 9°C+</th>
<th>ANNUAL RAINFALL (Inches)</th>
</tr>
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<tr>
<td><strong>1. ALPINE</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Hotham Hts, Vic.</td>
<td>36° 59' S</td>
<td>147° 08' E</td>
<td>1859</td>
<td>-2.2</td>
<td>11.1</td>
<td>3</td>
<td>72.77</td>
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<td>135° 19' W</td>
<td>20</td>
<td>-0.7</td>
<td>12.8</td>
<td>3</td>
<td>80.90</td>
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<td><strong>2. SUB-ALPINE</strong></td>
<td></td>
<td></td>
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<tr>
<td>A) Mt Buffalo, Vic.</td>
<td>36° 47' S</td>
<td>146° 46' E</td>
<td>-2.2</td>
<td>11.1</td>
<td>3</td>
<td>72.77</td>
<td></td>
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<td>Brittania Bch. Canada</td>
<td>50° 00' N</td>
<td>126° 00' W</td>
<td>1332</td>
<td>1.7</td>
<td>15.0</td>
<td>5</td>
<td>78.34</td>
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<tr>
<td>B) Kosciusko Hotel, N.S.W.</td>
<td>36° 26' S</td>
<td>140° 16' E</td>
<td>1529</td>
<td>0.0</td>
<td>12.5</td>
<td>5</td>
<td>49.30</td>
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<td>63° 52' N</td>
<td>6° 33' E</td>
<td>24</td>
<td>1.1</td>
<td>13.3</td>
<td>4</td>
<td>46.49</td>
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<td>C) Kiandra, N.S.W. (M.)</td>
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<td>148° 32' E</td>
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<td>-0.6</td>
<td>13.3</td>
<td>5</td>
<td>63.08</td>
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<td>Junesu, Alaska</td>
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<td>136° 30' W</td>
<td>24</td>
<td>-2.8</td>
<td>13.9</td>
<td>5</td>
<td>80.57</td>
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<td><strong>3. MONTANE</strong></td>
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<tr>
<td>A) Yarrangobilly, N.S.W. (M)</td>
<td>35° 34' S</td>
<td>148° 28' E</td>
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<td>1.7</td>
<td>17.0</td>
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<td>10° 25' E</td>
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<td>-2.8</td>
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<td>4</td>
<td>31.10</td>
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<td><strong>4. MONTANE VALLEY</strong></td>
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<td>A) Tumut, N.S.W.</td>
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<td>22.5</td>
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<td>31.44</td>
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<td>6° 0' E</td>
<td>81</td>
<td>6.7</td>
<td>22.2</td>
<td>9</td>
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<td>B) Omeo, Victoria</td>
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<td>148° 32' E</td>
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<td>18.0</td>
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<td>149° 17' E</td>
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<td>6° 21' W</td>
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<td>15.0</td>
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<td>149° 28' E</td>
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<td>24.09</td>
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<td><strong>6. DRY TABLELAND</strong></td>
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<td>147° 40' E</td>
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<td>149° 07' E</td>
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<td>20.0</td>
<td>7</td>
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</table>

Notes. M=Monaro  S.T.=Southern Tablelands  M.T.C.M.=Mean Temperature of coldest month (Celsius)  M.T.H.M.=Mean Temperature of hottest month (Celsius)
In the Lake George basin a sand and gravel spit formed when the lake was about three times deeper than at present was dated by Galloway to 15,000 BP (1967:477), and was interpreted by him as most probably denoting a period of reduced evaporation associated with temperatures of the order of 11°C lower in winter and 8°C lower in summer (1965, Fig. 3). Such conditions would suggest for the Southern Tablelands a cold, dry, windy climate similar to the Russian Steppes. It is interesting to note that aeolian features such as the lunettes or crescentic dunes common on the lee side of lakes in the interior of Australia also occur on the Southern Tablelands, for example on the eastern side of Lake Bathurst (Jennings, 1964:33). These lunettes indicate strong westerly winds, and climates which have no counterparts in present-day Australia (cf. Bowler, 1971).

Recent work by Costin on extensive slope deposits found at 590m. (1935 ft.) on the lower eastern slopes of Black Mountain, Canberra, suggests that they indicate earlier periglacial conditions (1973 in press). Fragments of carbonised wood found in buried organo-mineral soil deposits near the base of the slope deposits yielded an average age of 27,930 + 2,690 - 2,010 years BP. This age is not significantly different from the mean age of slope deposits in the Snowy Mountains, which is 31,700 + 1,700 - 1,400 years BP (Costin and Polach, 1971). There is also agreement with the maximum age of 26,870 ± 900 BP which Coventry (1973:231) has obtained for the oldest slope deposits found in Fernhill Gully in the Lake George basin, and with the date of 29,000 ± 800 BP for the oldest terrace in the lower Shoalhaven Valley (Walker, 1962). The latter, although near sea-level, would reflect conditions in the tableland area which is the main catchment for the Shoalhaven river.

Both age, appearance and aspect suggest a periglacial origin for the Black Mountain deposits. For their formation a mean winter temperature at least 9°C lower and a mean summer temperature 11°C lower than today would be required, with mean annual temperatures at least 10°C less (Costin, 1973). These estimates compare closely with Galloway's
suggestions for a lowering of 8-11°C at Lake George, the bottom of which is 673m. (2207 ft.) ASL. This suggests an actual mean summer temperature of 9-10°C. Such low temperatures would have imposed tree-line conditions and there probably would have been no trees, except perhaps snow gums (*Eucalyptus pauciflora* sens.lat.) in warmer sheltered sites.

Some interesting evidence regarding local vegetation in the Pleistocene comes from Wombeyan Caves at an altitude of 685m. (2247 ft.) at the northern end of the Southern Tablelands. There a fossil bone deposit has been found containing extinct Pleistocene fauna and *Burramys parvus*, but no other arboreal species (Hope, 1971). *Burramys* is a small possum of the pigmy type, which was thought to be extinct till one was captured in 1966 in a ski hut at Mt. Hotham, Victoria. Since then several more specimens have been found on Mt. Kosciusko (Calaby and Dimpel, 1971, 1972) and at 1798m. at Falls Creek on the Bogong High Plains, Victoria (Dixon, 1971:133). Most were captured at a similar altitude of about 1830m. (6000 ft.) in alpine shrubland on the margin of low stunted snow gums which marked the tree-line. *Burramys* therefore seems to favour an alpine habitat in the vicinity of the tree-line. Its presence in the Wombeyan quarry site, with an absence of other arboreal species, has been interpreted by Hope as possibly indicating that the site lay just above the tree-line. No date is available for the site, but it is thought on faunal evidence to belong to the last glaciation (Hope, pers.comm.). If this interpretation of the Wombeyan evidence is correct, it suggests that Lake George and most of the Southern Tablelands would also have been above the tree-line. Arboreal mammals would therefore not have been available then, but large game such as the diprotodontids, macropodids (*Sthenurus, Macropus* etc.), *Thylacoleo* and *Sarcophilus* might have been found roaming the alpine shrub and herbfields of the tablelands.

From these various strands of evidence a picture is beginning to emerge of the environment of the Southern Uplands during the last glacial period as cold and windy with alpine vegetation and a temperature regime similar to that of Mt. Kosciusko today.
Man could have crossed the tablelands at this time, but it is most unlikely that there was any even seasonal occupation, except perhaps in low deep valleys on the fringes of the highlands. Costin suggests that the nearest refuge areas for tree species would have been "the eastern scarp of the coastal ranges to the east, the lower Snowy Valley to the south, the Murray River System to the west, and the Murrumbidgee River System to the north-west" (1973). These would also seem the likely habitation areas for Palaeolithic man, if he was in the Uplands region at all.

In the coastal regions oceanic influences would have made conditions far less severe, so it is quite consistent to find man at Burrill Lake, whilst the nearby mountains were in the grip of full glacial or periglacial conditions.

The Recent Period: How long did the glacial-periglacial period last? The age of basal peats in the Snowy Mountains, such as those on Carruthers Creek and in the Upper Snowy Valley, suggest that the general deglaciation of the alpine zone proceeded rapidly and was well advanced by about 14,400 BP, except in leeward sites such as the north-east cirque of Mt. Twynam, where it was delayed by some thousands of years, as late as 9,000 BP (Costin, 1972). This meant that by about 14,400 - 15,000 years ago, much of the alpine area would have been at least seasonally snow-free. How rapid was the amelioration in climate is uncertain, but the evidence of the basal peats from Mt. Twynam, Badja Fen and the Perisher Valley suggest that conditions and vegetation were similar to those of today by about 10,000 years ago (Costin, 1971: 32, 36).

Within this Recent Period there is some evidence of climatic oscillations, from renewed periglacial activity, pollen analysis and the interruption of peat formation, in particular for a slight cooling off (with mean annual temperatures of 3°C, or possibly more, lower than today) between about 3,000 and 1,500 years ago. Evidence for this cold spell comes from the Ginini bog on the Brindabella Range near Canberra as well as from the Snowy
Mountains (Costin, 1971:32). Such conditions might have discouraged Aboriginal occupation of the Southern Uplands, although the temperature regime would certainly not have been too harsh for man to live all the year round in any of the region below the winter snow-line for the whole of the last 10,000 years.

Aboriginal Impact on the Environment: It is difficult to find any evidence of man's impact on vegetation in the Monaro or Canberra region, although the impact of 'fire-stick farming' is well documented in Tasmania (Jackson, 1968; Jones, 1968; 1969), in the Bunya Mountains of Southern Queensland (Herbert, 1938) and on the Atherton Plateau (Tindale, 1959:43). There grasslands or sedgelands were produced by firing of the rain-forest after a dry spell. The reasons for this firing have been examined by Jones (1969), who cites evidence that it was done for hunting, to clear paths through the rain-forest, to regenerate plant food both for man and his prey, for signalling purposes, possibly to extend man's habitat, and also just for fun. Tindale sees the latter as the main factor, describing the Aborigines as destructive of their environment by rather unnecessarily burning large areas for short-term convenience in hunting, and stating that "similar destructive activities were common to all of the grassland tribes" (1959:42-3).

This imputation of irresponsibility is not supported by the evidence from the Southern Uplands, detailed in Appendix 1A. This suggests that firing was used to clear a path through thick undergrowth but without damaging the trees, for hunting, and to regenerate grass to attract kangaroos. Indiscriminate firing is only recorded in the case of enemies' country, in order to take revenge on them. However, it must be stated that if it did take place, the effects would probably not be discernible since Australian vegetation (except for that in the subalpine-alpine tract) is highly adapted to fire. This adaptation, in turn, may have been due to Aboriginal use of the fire-stick over many millenia, or it may be the result of a long history of fires due to natural agencies such as lightning.
The symbiotic inter-relation of man, grasslands and game is brought out clearly by Joseph Wild in the Lake George area, by Hume and Hovell in the montane forest near Micalong Swamp, by George Bennett on the Bogong Range, and by Alan Cunningham, the botanist, whose 1824 account of burning at Tuggeranong, south of Canberra, deserves quoting in full:

"These interesting Downs had been burnt in patches about two months since, and as the tender blade had sprung up, these portions, having assumed a most lively appearance, formed a striking contrast with the deadened appearance of the general surface, still clothed with the vegetation of the last year. It was common practice of the aborigines, to fire the country in dry seasons where it was wooded and brushy; to oblige game of the kangaroo kind to quit their covery and subject themselves to be speared. The object of these people had in view in firing the herbage of clear open tracts was, that as the young grass grew immediately after such an ignition, especially should rain succeed the conflagrations, which often times were very extensive, Kangaroos and Emues were tempted to leave the forest brushes to feed on the tender shoots, and were thus likewise exposed to their missile weapons." (April 18th, 1824).

Were the treeless plains of the Monaro and Southern Tablelands then a product of Aboriginal use of the fire-stick? I think not, for two reasons. Firstly, there are ample natural explanations, in particular the combination of low temperatures with low rainfall and the phenomenon of cold-air drainage. Thus all local botanists regard these grasslands as true climax vegetation and give little or no importance to the anthropogenic factor (cf. Costin, 1954:130; Pryor, 1954:165 quoted in Appendix 5). Secondly, extensive treeless plains are not a favourable habitat for Aborigines or for game. In addition to the practical problems of lack of firewood, shelter, and bark for making huts, there is not likely to be much game on the open plains, apart from the swift emu and plains turkey, both of which are rather difficult to catch. Very little game was encountered by the first explorers in the Monaro, Captain Currie and Dr. John Lhotsky, and kangaroos are well-known to avoid treeless habitats (Calaby pers.comm.).
Thus if such treeless plains were the product of human agency, we must label the prehistoric inhabitants as irresponsible incendiaries, rather than as conservationists. Such an imputation is not supported by the evidence from Tasmania, where constructive 'fire-stick farming' took place (Jones, 1969), nor by ethnographic evidence from the Southern Uplands, which suggests that its hunter-gatherers were careful of their scarce resources.

The ecological effects of Aborigines' fire-sticks, however, were observed in Gippsland by A.W. Howitt when he was police magistrate there from the 1860's to the 1890's. His paper on The Eucalypts of Gippsland (1890) presents convincing evidence that before European settlement the country was more open and park-like as a result of regular, light burning, either intentional or accidental, by the Aborigines.

Three areas with which he deals are of particular interest, since they contain a number of Aboriginal occupation sites. The valley of the Snowy River at the time of the first settlement was apparently "very open and free from forests...containing a series of grassy alluvial flats, through which the river meandered" (1890:109-10). Likewise in the Omeo district, according to Aboriginal accounts, the hills were open and park-like and the mountains covered with an open forest, rather than the dense undergrowth which covered them by the 1890's. Moreover in the dense scrub of the South Gippsland forest the small number of old trees and discovery of stone axes suggested to Howitt that the country was originally much more open.

Howitt's evidence has been challenged by Wakefield (1970:152-7) on the evidence of Rogers, a grazier from Wulgulmerang, but has been ably defended by Hancock (1972: 26-7).

Thus it seems likely that lightning was not the only pre-European ecological agent and that Aborigines did have an impact on the environment, at least in the forests of Gippsland. Such regular burning would avoid the disastrous forest fires of more recent times, keep the country open for
easy passage of man and beast, and regenerate grass to attract game. There is evidence of the use of the fire-stick in the montane zone up to about 1,220m. (4,000 ft.) (refs. 7, 15, 17, 18 in Appendix 1A), but none at higher elevations. This accords with the high adaptation of Australian vegetation to fire, except for that of the subalpine and alpine zones above 1,525m. (5,000 ft.). It is suggested below that Aborigines would have spent only a few weeks in these zones each summer, would have utilized naturally open frost hollows or ridge tops as routes, and would have no need of widespread fires for Bogong moth-hunting, or for the hunting of game, since terrestrial mammals are few at these high elevations. I propose, therefore, that Aborigines had no effect on high-altitude vegetation, but probably a considerable effect on the vegetation of the lower forested regions, especially in wet sclerophyll and rain-forest zones.
The emergence of Darwin's evolutionary theory produced a period of uncritical interpretation of modern hunter-gatherers as 'living fossils'. During this period ethnographic analogy was over-used to interpret archaeological data. This approach is exemplified in Sollas' *Ancient Hunters* (1911) where Tasmanians are treated as modern representatives of the Lower Palaeolithic, mainland Australian Aborigines of the Middle Palaeolithic, and Eskimos of the more advanced hunters of the Upper Palaeolithic.

This abuse of the ethnographic analogy caused a reaction away from the study of modern hunter-gatherers towards a concentration on the factual data of archaeology. However, the exclusive study of stone assemblages *per se* has great limitations in the study of human behaviour. Hence in the last fifteen years the pendulum has swung again towards the use of ethnographic analogies to elucidate the evidence of excavation, and to aid interpretation of the prehistoric way of life, but in a more controlled and scientific way than before.

Controversy still surrounds the use of ethnographic evidence, as evidenced in the 1968 symposium on *Man the Hunter* (ed. Lee and Devore). However, even the opponents of ethnographic analogy allow that the ethnographic approach can be very fruitful when applied to recently extinct cultural systems. These are variously defined as belonging to *Homo sapiens* rather than pre-sapiens populations (Binford, 1968:275), to the last 40,000 years (Freeman, 1968:263), and to very recent time periods (Howell, 1968:287).

In Australia a strong case can be made for utilizing ethnographic analogies. Firstly, the time-scale (at least as so far discovered) is limited, most archaeological sites
being less than 20,000 years old and the palaeo-environment not vastly different from the modern one. Secondly, geographical closeness increases the validity of the analogy. Thirdly, continuity can be demonstrated from the prehistoric past to the ethnographic present. Within this tight framework, ethnographic models can be used as modern templates of man's relationship with his environment, which can help elucidate the meagre evidence of excavation. The rich Australian ethnography describes a whole way of life, of which only a fragment is preserved in the archaeological record. To ignore this would be like excavating sites in Roman Britain without reading Tacitus, or pre-Hellenic Greece without a glance at Homer.

Because of a strong belief in the value of ethnography to illuminate at least the more recent prehistoric past, I examined the ethnographic records for my region before embarking on any archaeological field-work. In this way it was possible to work from the known to the unknown, and to test hypotheses by excavation. The modern ethnographic model acts as a 'control', with which prehistoric changes in the content, type or distribution of sites can be compared. This approach involves the archaeological study of a whole region rather than a single site, and a focus on the ecology of prehistoric man, rather than on the details of his social organisation, which are not generally recoverable.

Generally in Australia archaeologists have made only passing and eclectic use of ethnography, but recently two important developments have taken place. The first is the beginning of ethno-archaeology, practised by Gould (1967; 1968) in the Western Desert, and defined by Petersen, its main Australian pioneer, as "the study of modern hunter-gatherers with an eye to creating analogical models for use in the interpretation of ancient remains" (1971:239). Unfortunately this technique cannot be used in the south-east of Australia for want of surviving hunter-gatherers, but there a different approach has been developed, the area historical model. This involves using the totality of extant historical records concerning the native population,
to build up a picture of the whole mode of life at the time of first foreign contact. Because the whole ethnography is analysed, instead of merely an occasional analogy being picked out, a more balanced and complete picture of recent prehistoric culture is obtained. This has been done most successfully in Tasmania (Hiatt, 1967-8; Jones, 1971 etc.), in Victoria (Bickford, 1966), and in western New South Wales (Allen, 1968; 1972).

The area historical model has the disadvantage that it relies on the limited records of untrained observers, but the advantage that the culture they observed was less likely to be affected by contact with outsiders than that observed in more recent times by professional ethnographers. Thus although historical records are likely to give a very incomplete picture of Aboriginal culture, they are still worth examining in toto for the authentic glimpse they can give of the hunter-gatherer society which was soon to be obliterated in south-east Australia by the new arrivals.

In the Southern Uplands three factors make a detailed study of the extant ethnographic evidence concerning Aboriginal Society at the time of European settlement not merely desirable, but essential. These are:-

(a) the local paucity of archaeological remains of material culture,
(b) the comparatively young age of most of the archaeological sites,
(c) the knowledge that moth-hunting was an extremely important part of the upland economy. Yet evidence for this comes entirely from the ethnography, moth-hunting being an activity which leaves little or no trace in the archaeological record.

Sources of ethnographic information

Ethnographic evidence must be treated with caution in two main respects. Firstly, many rapid changes occurred after the landing at Sydney Cove in 1788, both in Aboriginal
culture and in the environment. In particular, introduced
diseases greatly reduced the numbers of Aborigines even
before many of them had been in contact with the newcomers.
Secondly, the historical records that exist are by no means
of equal reliability. The most valuable are the first-hand
observations contained in early explorers' and surveyors'
journals, together with other direct accounts in early
travelogues. These are few in the Southern Uplands since
the area was barely touched by the journeys of the early
explorers, but was opened up by settlers, who generally
left no written records behind. Moreover those few
explorers, surveyors, or travellers who did penetrate the
region before or during the first decade of European settle­
ment generally never saw an Aborigine, although they saw
some evidence of their presence in the region. This may
be explained partly by the shy or frightened nature of the
local population, well documented by Wilson (1798, Jan.28th),
Evans (1813, Dec.16th and 21st), Currie (1823, Dec.8th),
contrasting with the more belligerent and numerous Aborigines
encountered by Sturt and others on the riverine plains to
the west. It may also indicate that there were far less
Aborigines in the upland area, a question that is examined
in the following chapter.

The ethnographic observations divide into three types,
the first-hand, eye-witness observations made at the time
of first contact with Europeans, first-hand observations
made later when Aboriginal society had become Europeanized,
and second-hand or general accounts of Aboriginal life.

Ideally, one would use only the first type, as advoc­
cated by Lourandos (1970:95) for Tasmania, but if one were
to do this in the Southern Uplands, one would have to
eliminate almost all the ethnography. However, in my study
of demography I have used only these direct observations,
most of which were made during the first European exploration
of the region. This varied from 1798 in the Southern Blue
Mountains to the 1830's for East Gippsland, so different
criteria have to be used in each district, but in no case
have demographic observations been utilized which post-date
local European settlement by more than ten years.
Some of the objections which Lourandos made to the use of later records when tribes were operating in a Europeanized situation apply to the Southern Uplands. Presumably the acquisition of European hunting dogs changed Aboriginal methods of hunting somewhat, and increased the incidence of macropodids in their diet, although, curiously, I have so far found only one reference to the use of dogs for hunting in the ethnography of the whole of southern New South Wales, although a great many other methods of hunting are described (cf. Lawrence, 1968:197).

However, settled camps and food rations were not generally provided in the Southern Uplands as they were in Tasmania, and local Aborigines continued to live largely as hunter-gatherers. The main modification that European settlement in the Uplands wrought was to deprive the Aborigines of some of their food resources, and to decimate them with European disease.

Clearly one can obtain only a very generalized picture of Aboriginal economy and material culture in this situation, but even information from a somewhat Europeanized situation is preferable to no information at all. In some cases it is possible to check later against earlier accounts of the same tribe or activity, and in these cases I have found an encouraging agreement between sources. The main problems in reconstructing Aboriginal life at the time of first contact are encountered in the fields of demography, language, social and political relationships, as will be seen in the following chapters.

Early Sources: Early direct ethnographic observations in the Southern Uplands come mainly from the journals of explorers and surveyors. Some were excellent observers like Barrallier (1802), others of little merit, like Captain Currie (1823), the first European to meet Aborigines from the Monaro. These early records are valuable in reconstructing the contemporary environment, but unfortunately very few Aborigines were met on these journeys.
Settlement had come to the Canberra region by 1825, to the Monaro by 1830, and to north-east Victoria by 1835. None of the early settlers recorded more than scraps of the Aboriginal way of life, even those who were well-disposed towards the Aborigines, such as Terence Aubrey Murray, or Stewart Mowle, whose closest friend when at Yarralumla from 1838 was the son of a local "chief" (Mowle n.d.:8).

**Travelogues:** Visitors travelling to collect material for a book provide some of the most valuable records. Into this category came the works of Bennett, Lhotsky and Backhouse, all dating from the 1830's. All three were careful observers, and published their accounts soon after their travels, which were thus still very fresh in their memories.

Dr. John Lhotsky was the first to publish an account of the Monaro, but he describes the Monaro tribe as "already very weak,...they are entirely tame, indeed not civilised but corrupted" (1835:106). The journal of his journey tells us little about the Aborigines, but helps to build up a picture of the Upland environment at that period.

In 1844, George Augustus Robinson completed a 3,500 kilometre journey through the Eastern Interior, but his short account contains little of the detailed observation that makes his Tasmanian journals such a valuable ethnographic record. By the end of the 1860's it was too late, diseases such as measles and smallpox had decimated the Aboriginal population of the highlands, and only a few survivors remained. It was from these remnants that investigators such as A.W. Howitt and R.H. Mathews gleaned their anthropological and linguistic evidence at the end of the 19th century.

**The Anthropologists:** As police magistrate in Gippsland from the 1860's to the 1890's Howitt had an unparalleled opportunity for getting to know the people, and these still included large numbers of local Aborigines.
The Uplands tribes covered in Howitt's *Native Tribes of South-East Australia* (1904) are the Yaitmathang [= Jaimathang on fig.5] of Omeo, the Ngarigo of the Monaro, and the Walgalu of the Tumut area. Of these he says, I speak from "personal knowledge of those tribes-people at some time during the last forty years", (1904:preface). In his preface he also mentions some additional sources of information regarding these tribes:—

Ngarigo - Rev. Bulmer; C.I. Duve; John O'Rourke;

Theddora (W. Section of the Yaitmathang)
- Rev. Bulmer; John Buntine; John O'Rourke.

His information on the Upland tribes is likely to be best for the Omeo tribe, since he became Police Magistrate in Omeo in 1863. Howitt (1904:78) says that in 1862 there only remained 4 or 5 of the once numerous Yaitmathang, the discovery of gold and consequent influx of miners in 1852 having proved disastrous for the rest, but no doubt local settlers could have informed him about Aboriginal life.

The Walgalu, like the Omeo tribe, became extinct early. By 1870 there were only a few individuals left, but one of these, a bard or singer of his people, had attached himself to the Ngarigo, and was known to Howitt (1904:102).

The same picture was true of the Monaro. By 1866 only two members of the Ngarigo tribe survived on the Monaro, Bony Jack and his deaf and dumb son, Biggenhook, who died in 1914. It may be from this "remnant of the tribe" that R.H. Mathews personally collected his vocabulary of 260 Ngarigo words (1908:336).

For the tablelands tribes the anthropologists arrived too late, and the little information we have is none too reliable. For example, four vocabulary lists are on record for the Ngarigo, but all very different from each other. (see Chapter 8).

Apart from Howitt, our main anthropological source for the Southern Uplands is R.H. Mathews, but his work in the region did not begin till the 1890's. There are good
FIGURE 5: Tribal map of S.E. Australia (after N.B. Tindale - forthcoming)
reasons, therefore, to distrust some of his information, as was realized by anthropologists such as Baldwin Spencer and Howitt. Just before Howitt died in 1908, he wrote A Message to Anthropologists, "to warn anthropologists to beware of false conclusions arising from erroneous assessments made by later writers (such as Mathews) who coming recently to anthropology, misinterpreted the significance of many of these tribal changes and did not fully understand that new beliefs were becoming superimposed on the true Aboriginal ones" (Mary Howitt Walker, 1971:272).

Reminiscences: The memories of early settlers provide some of the most valuable records of the Aboriginal way of life. They may err in detail or reflect a society modified by European contact, but in general they give us a broadly-based, coherent account of Aboriginal life.

Amongst these indirect accounts, that of Richard Helms is of particular importance, for his Anthropological Notes on the Omeo and Monaro tribes (1895) are the only extant record of the material culture and economy of these people. His notes were based on the accounts of old settlers, and in particular, on the "vivid recollections" of John Barry, who settled on the Mowamba river in about 1843. His account is likely to be as accurate as was possible at that time, for he was a field naturalist, whose powers of critical observation are well displayed in his Report on a Collecting trip to Mt. Kosciusko (1890), which includes observations of aestivating Bogong moths.

The Canberra region is particularly rich in traditions and later recollections about the local Aborigines. The adoption of Canberra as the National Capital in the early part of this century generated much interest in the history of the area, with the result that several local histories were written, drawing on the recollections of pioneers or on boyhood memories, since Aborigines had largely died out in the region by the end of the 1860's. Into this category fall the works of John Gale, born in 1830 and editor
of the Queanbeyan Age for fifty years, Samuel Shumack, who came to Canberra in 1856, William Davis Wright born there in 1841 and W.P. Bluett, who had a particular interest in the Aborigines and said "the information I have gleaned about the Kgamburry tribe is from men living in various parts of the district, who can think back to the forties, and who can remember the stories of earlier pioneers" (S.M.H. 14 June, 1927). In 1927 there were still some twenty persons whose early recollections carried them back to the 1840's and 50's, most of whom were the sons and daughters of parents who had come to the district in its still younger days (Bluett, S.M.H. 2 June 1927).

Amongst these local histories I will be quoting mainly from Bluett, because of his concern with the detail of Aboriginal life, and from William Davis Wright's book on Canberra, published in 1923, but containing recollections of local Aborigines from his boyhood days in the 1850's at Lanyon and Cuppacumbalong. His description of the local tribe was based on "many conversations I had with various members of the tribe".

The most reliable sources are of course firsthand contemporary records, and these direct observations will be utilised as my primary source, but will be supplemented by indirect accounts when necessary. In some cases statements are contradictory, so rather than use an eclectic approach, the totality of observations will be reviewed in order to try to arrive at a true picture.

An examination of the totality of extant historical references to Aborigines in a region the size of the Southern Uplands, 100,000 km², is easier to suggest than to achieve. However I am confident that this has been achieved in the Monaro, the Victorian Highlands, and the Canberra region, thanks respectively to the detailed research of Hancock (1972), Bickford (1966) and Wilson (1968). For the rest of the region, while I have not studied all family papers and newspapers of the period, I have examined all published material, and the relevant unpublished manuscripts and papers held in the National Library, Canberra, and the Mitchell Library, Sydney.
Compared with the coastal region and great inland river basins the ethnography of the Southern Uplands is meagre, but nevertheless from it a much fuller picture of recent Aboriginal life can be pieced together than could ever be derived from the evidence of archaeology.
Chapter 4

Demography

The salient characteristic emerging from exploration of the Southern Uplands was the apparent scarcity of people. Several explorers remarked on it. On reaching Mt. Jellore, nine days walk from the Nepean river, Wilson's party commented 'we have not seen a native since leaving Sydney', and at the furthest point of their journey, Mt. Towrang about six miles north-east of modern Goulburn, 'we really believe that there never was a native in this part of the country' (Wilson, 1798 March 20 and 23). Likewise, the first sign of the natives which Charles Throsby Smith's party saw in 1820 on a journey from Moss Vale was in the Canberra region, where he remarked on "several natives fires" (Throsby Smith 1820 Dec.8th).

Since this apparent lack of population is accompanied by a scarcity of material remains in the region, it seems worthy of detailed analysis to try to determine whether the population scarcity was real, or only apparent.

The questions one would like to answer are:

(1) How much of the Southern Uplands were inhabited all the year round, seasonally, or not at all?

(2) What was the density of population, and how did it correlate with the different ecological zones?

Since the first question concerns basic presence or absence of population, direct observations not only of people, but also of their fires, camps or other signs of their presence in the region are tabulated between the earliest European settlement and 1840. 1840 has been chosen as the termine ante quem because it marks the end of the age of exploration in this upland zone. After that time, natives were generally foundcamped near settler's homes, rather than living independently in the bush. The 82 sightings made on 20 journeys are listed in Appendix 1B. References are to the date of observation, since
some of the unpublished journals lack pagination. The routes of most of the explorers are shown in figure 6, in order to indicate the extent of country covered by their journals. Sightings along the coast are omitted as being outside the scope of this study, but comparisons will be made with what is known of both coastal population density and that of western New South Wales.

The number of unknown factors in such a study is enormous. Variables which will be seen to affect the number of sightings are the presence of Aboriginal guides in the party, the length of time spent in a given locality, the season and weather. Then there are omissions in the explorer's and surveyor's journals, unrecorded encounters, and the bushcraft of the local Aborigines which kept them hidden from the intruder's eyes. It is thus dangerous ever to argue from a lack of evidence of Aboriginal presence to a lack of population. The only valid internal comparisons that can be made are between different sections of one recorded journey, especially when the observer himself comments on the relative frequency or scarcity of encounters.

Another problem is that even before first actual contact with Europeans, the Aboriginal population of at least some of eastern New South Wales had been reduced by the effects of smallpox. A first epidemic broke out among the Aborigines in the Sydney area in 1789, and apparently reduced the native population there by at least half (HRNSW-I,ii:308; Collins, 1798:598). It is not known how far afield this first smallpox epidemic spread, but it was succeeded in 1830 by a second, much more widespread one. According to evidence collected by Cumpston (1966:270) this was severe and caused extensive mortality, spreading from northern New South Wales, through the western parts of that state as far south as north-east Victoria and south-west South Australia. The effects of this epidemic in the Southern Uplands were witnessed in 1844 by Robinson at Yass (ed. Mack. 1941:339).
FIGURE 6: Journeys of exploration in south-eastern New South Wales.
Some confusion has also arisen from the erroneous identification of *impetigo contagiosa*, a severe skin condition which was prevalent in the Southern States between 1830 and 1880, as "native pox" (Cumpston, 1966:270).

The effect which this second smallpox epidemic had on Aboriginal numbers in south-east Australia was severe. On the Murray River it was said to have decimated the native population, even wiping out whole tribes (Curr, 1886:217). Data on population size after 1830 is therefore likely to suggest a much smaller population than was the case. Fortunately in the Southern Uplands almost all our data comes from before 1830, and since there is no evidence to suggest that the 1789 Sydney epidemic extended so far, it seems likely that the Southern Uplands population was basically unaffected by smallpox till 1830.

It seems appropriate at this stage to describe the physical characteristics of the upland Aborigines. We are fortunate to have some photographs of them, taken by two professional photographers, Kerry and King of Sydney, who travelled around New South Wales with portable studios in the second half of the last century. Some of these are reproduced in plate 2. The fine physique of the upland natives is described by several observers. In 1802 George Caley described "Cannabygle and his tribe [of the southern Blue Mountains] to be a stout athletic band, far surpassing other natives in height and stoutness" (HRNSW.v:721). Likewise, Dr. David Waugh of Goulburn took the measurements of Yarraginny, 'chief' of the Wollondilly tribe, in 1848, and expressed the opinion that "such a perfectly formed man would scarcely be found in the British army" (Waugh, 1838:27).

I propose now to look at the direct and indirect demographic evidence from the different ecological zones, and then to synthesize this information and consider the question of population distribution, density, seasonality, and group size relative to other regions in south-eastern Australia.
Plate 2


A. 'Dhraub', Aborigine from Bombala (Kerry no. 1836).

B. Aborigine from the Monaro district (King no. 1303).

C. Girl from the Shoalhaven district (King no. 1364).

D. 'Yenohan' from the Tumut tribe (Kerry no. 1899).

E. 'Warryne' from the Yass district (Kerry no. 1953).

F. Aborigine from Braidwood (King no. 1326).
(a) Nepean River and Southern Blue Mountains

Sources - the journals of Wilson (1798), Barrallier (1802), Blaxland (1813) and Evans (1813).


Of these Barrallier's journal of his journey into the southern ranges of the Blue Mountains, north-west of the Nattai River is our most valuable ethnographic source. The quality, although probably not the quantity, of his observations is a reflection of his acquisition of a local Aborigine as a guide. When voices were heard in the bush or natives seen, Barrallier was able to send Gogy or one of his Aboriginal companions to reassure them about the white men, and stop them running away. None of the other three explorers in this region had Aboriginal guides, and it is probably significant that, apart from a very few chance encounters, the only traces they perceived of the natives were smoke, footsteps, and voices. In other words, the natives were in the area, but were keeping away from the strange intruders. This certainly seems to be the case on Blaxland's and Evans' journeys over the Blue Mountains. The references, although meagre, suggest that natives were present over most, if not all, of the regions traversed, and that they tended to become more numerous on the western side of the Blue Mountains.

From Barrallier's journal we gain an impression of quite a numerous population in the lower regions around the Nepean, Nattai, and Wollondilly rivers, thinning out in the more mountainous country, with less abundant food resources, above. Nevertheless, even there he found "indications which left no doubt as to this country being inhabited, or at all events frequently visited" (Dec.17th). He went on to suggest that the natives "assemble there when they make incursions into enemies' territory, or when some troubadour comes with his party to sing and teach them a new song, a custom which seems to have extended even to these regions". 
Wilson's party in their second journey, which took them south-west from the Nepean river into the rugged mountain country north of modern Goulburn, did not see a single native nor any trace of them. They also stated that they had not seen a kangaroo for three days. There may well be a correlation between lack of game and lack of people, for Barrallier's observations would seem to lend support to this hypothesis. On the two occasions when he was high in the lower Blue Mountains, traces of any inhabitants became scarce at the same time as game (entries for November 26th and December 17th), when he describes the country as very sterile, "no quadrupeds can be seen there".

In summary, Aborigines seem to have been present over most, if not all of the Blue Mountains region, but were more numerous to the west of the mountains (in the Bathurst region) and in the eastern foothills above the Nepean River than higher up.

(b) The Coastal Ranges

Sources - the journals of Charles Throsby (1818), Surveyor James Meehan (1818), and Kearns, Marsh and Packard (1822).

It is interesting that in three of the four encounters recorded with natives on the top of the coastal ranges (refs. 29, 31 and 41, Appendix 1B) the natives are found to have come up from the coast. Thus at the head of Kangaroo Valley, somewhere in the vicinity of Fitzroy Falls, Throsby stated "several natives joined us, most of whom I have seen at Five Islands [= Illawarra on the coast]. They were mostly women and children, only three men. I conceive them to be three families, the whole perfectly naked and slept round fires like as many dogs" (March 29th). Earlier, at the head of Bundanoon Creek, they were met by another two natives from Illawarra, "who had been in search of us". Further south in the Braidwood area on the west bank of the Upper Shoalhaven River, Kearns, March and Packard discovered "several natives...who belonged to the coast but had come up here to hunt" (Feb.11th, 1822). The previous
day from Monga, their furthest east point on their journey from Lake George, and from which they saw the ocean, they remarked "on account of the great Number of Native Fires we then saw in all Directions and our Party being small, we thought it most prudent not to approach the Sea Coast any nearer...well knowing that the Natives in this Quarter are very hostile".

Hostility was not a characteristic of the coastal natives met by Throsby on the lower Shoalhaven (refs.30-32), but their large numbers contrast with the paucity of people on the top of the coastal ranges. This is to be expected, for there is considerable evidence for a denser population along the coastal strip than in the immediate hinterland. This is exemplified in Throsby's account of his journey from Moss Vale to Jervis Bay in April 1818 when large numbers of natives were only met on the coast. Earlier visitors reported the same large numbers around Jervis Bay, for example Grant, Barrallier and Caley in March 1801 (HRNSW.iv:478). At Batemans Bay further south Harper (1826:Oct.) saw large numbers of Aborigines about 1km. (1/2 mile) inland and met a few up the River Clyde, but not in the numbers he saw at the coast.

(c) The Southern Tablelands

Sources - Joseph Wild (1820), Governor Macquarie (1820), Charles Throsby-Smith (1820), Kearns, Marsh and Packard (1822), Alan Cunningham (1824).

On the journeys of Meehan, Throsby and Wild, during which Lakes Bathurst and George were discovered, together with the Breadalbane, Goulburn, and Limestone Plains and the Molonglo and Murrumbidgee Rivers, apparently not a single Aborigine was encountered. The only recorded signs that the country was inhabited were "the fires of the natives who appeared numerous" seen by Joseph Wild from the hills to the north-east of Lake George, and "the several natives' fires" seen at a distance by Charles Throsby Smith's party in the Canberra area in 1820, "the first we have seen since leaving the New Country" [i.e. the Moss Vale area]. Similarly, on
Governor Macquarie's visit to Lake George in 1820 no natives were seen south of the Cookbundoon Range. In 1824 Alan Cunningham did meet an Aboriginal woman at Lake Bathurst, "who had lived all her life in the vicinity", but in the Canberra area suggested that three native dogs which were howling within view of their fire were "proof of the absence of molestation towards these animals by Human Beings, not one of whose traces (by fire or marks on trees) having been observed in our tour through these solitary regions". However, on the following day, April 18th, he found signs of the unseen presence of Aborigines in the burnt patches of grass on the downs south of Tuggeranong.

This paucity of both encounters or signs of Aboriginal presence in the Southern Tablelands cannot be explained away as due to chance or the season of the year, but three explanations are possible. Either the population was very small, or very dispersed, or very shy. I suggest that it was a combination of all three factors, but that dispersal might have been the major factor responsible for the small number of sightings. If shyness had been the main factor, more traces would have been found even if the natives were hiding in the bush. This is illustrated in Hume and Hovell's journey over the hills from Yass to Albury, on which no natives were seen but frequent traces of them were noticed in the valleys.

The size of the population on the Southern Tablelands may have been small, but Aborigines were certainly present at this date in the Canberra area, for there is a strong local tradition (recorded by W. Davis Wright, 1923:6, and W.P. Bluett, 1954:2-3) that Trooper Ainslie went to Yass in search of good pasture for the 6,000 ewes given to Robert Campbell from government flocks, and there fell in with some Aborigines, one or more of whom guided him to Pialligo. Pialligo was in all probability already an established Aboriginal camping place, for the pioneers spoke of "the Pialligo tribe" and a large quantity of stone implements have been found there on the banks of the Molonglo River, including backed blades which would undoubtedly pre-date European settlement.
Then in May 1829 Assistant Surveyor Robert Dixon "met with several tribes of natives" in the Canberra region, "all of which were peaceable" (Progress Report for May 1829). Dixon spent several weeks in the area which would of course have greatly increased his chances of meeting some Aborigines. It can easily happen that travellers merely passing through an area do not meet any local inhabitants and therefore presume that there are none. Such is the case with John Lhotsky's Journey from Sydney to the Australian Alps in January 1834, in which his comment on the Canberra Aborigines was "they are now no more" (p.61). This was taken as literal truth by a later local historian, Frederick Slater, who suggested that the Canberra district was later peopled by a Sydney tribe! (S.M.H., 4 June, 1927).

These unsupported assertions sparked off a whole series of letters from Canberra's pioneers, testifying to the considerable number of Aborigines in the area in the early days of European settlement. Thus W.P. Bluett said (S.M.H. 2nd June 1927) "The domain of the Kgamburry tribe extended from Lake George on the east to the Goodradigbee river on the west, and from near Yass to the headwaters of the Murrumbidgee, an area over which a tribe of 500 would be very thinly spread. The habit of the people of living in small groups, and being constantly on the move, would make it very difficult for any traveller passing through to gauge their numbers...The advent of the white man and his strange cavalcade would have been smoke-wirelessed days ahead, and fear would keep them in hiding".

Samuel Shumack (S.M.H., 11th June, 1927) quoted two eye-witnesses of "a great battle between the Canberra tribe and a tribe that came from the south-west", at which "The Canberra tribe exceeded 500 strong, and the other tribe was equally strong". There is an implication in this account that the number of warriors in each tribe exceeded 500 which of course would imply a much larger size for the total tribal population. Further evidence was quoted by Shumack from the late Michael Sheedy of Canberra, who "stated that in the year 1841 he saw the County Murray tribe at Uriarra, and that there was more than 500 in the tribe".
We also hear from W.P. Bluett of spasmodic raids attempted by "the numerically stronger Lake George tribe and also by their next door neighbours round Yass" (1954:19). There was contact too with a tribe from "the Braidwood side, who periodically came over to see the fat, juicy breed of kangaroos on the limestone plains, and had to be chivvied home again" (S.M.H. 21st May, 1927).

On the Fish river close to the Breadalbane plains (between Goulburn and Gunning) John Lhotsky met a tribe of about sixty encamped, who said they went "as far as Goulburn and Yass Plains, but not as far as Limestone" [i.e. Canberra] "none of them was ever in Sydney" (1834, 41).

In 1844 George Augustus Robinson, then Chief Protector of Aborigines in Victoria, passed through the district, where he noted a camp of natives near Yarralumla, including a number of fine half caste children. Then on the 15th September at Yass he found "three hundred Natives at least", amongst whom the virulent effects of smallpox were apparent (ed. Mackaness 1941:339). Some Yass natives had been previously met and described by William Riley in 1830 (17 Sept.), and George Bennett in 1832 (i:168ff).

The Aborigines' disappearance from the tablelands was speeded by the smallpox epidemic of 1830, influenza, and a severe measles epidemic in the 1860's. In 1856 the local Canberra tribe numbered about seventy (Shumack, 1967:148-51), but by 1873 there was only one pure-blooded member of the tribe left, Queen Nellie, who died in Queanbeyan about 1894.

The contradictory nature of the direct and indirect ethnographic evidence in this case may perhaps be explained as follows:-

The Aborigines were present on the Southern Tablelands but were not seen by itinerant visitors because -

(a) They were generally dispersed, mobile and in small numbers.
(b) They kept to the rivers and woods where food resources were more plentiful than the open plains (cf. ch. 7), whereas the explorers tended to follow
the plains because of the easier passage they afforded to horses and drays.

(c) The European explorers and visitors in this area did not generally have Aboriginal guides, who might have made contact with the local Aborigines.

(d) The 'Canberra tribe', estimated at 500 strong by several local settlers, probably only came together on certain occasions such as corroborees and inter-tribal battles. All the references to tribal numbers refer to these occasions. This 'Canberra tribe' could have been the Ngunawal, who occupied the Southern Tablelands area and could have had their tribal base at Canberra. The other so-called 'tribes' of Yass, Braidwood, and Lake George, were probably clans or sub-divisions of the larger group or tribe, comprising all those who spoke the same language. In his 1930 paper on original Aboriginal population density, Radcliffe Brown defined a tribe as "a number of persons who speak one language or dialects of one language and who practise the same customs" (1930:688). Thus the distinction between one tribe and another is primarily linguistic, and it is these linguistic groups which are shown on Tindale's tribal map in fig.5. The term 'tribe', however, was used very loosely by early ethnographers to describe any large group, as exemplified in the description quoted above by Lhotsky of a group of about 60 as a tribe.

(d) The High Tablelands of the Monaro

Sources - Currie (1823), Lhotsky (1834), Robinson (1844).

On the approaches to the high tableland of the Monaro, Captain Currie met two groups of Aborigines, both extremely frightened, since they had never seen white men or horses before. For the Monaro itself our earliest record of population comes from John Lhotsky who wrote in 1835 (p.106), "the Menero tribe is already very weak, consisting of about 50 men; they are entirely tame (indeed not civilised but
corrupted). This testimony is rather surprising, for white settlers had only penetrated the Monaro in the late 1820's, but presumably disease had already taken its toll. In 1844 near Cooma Robinson wrote, "Syphilitic and other European Disease among the Natives is prevalent, and their numbers are rapidly decreasing" (ed. Mackaness, 1941:328). In 1842 the first official census of the native population was taken, and the Aboriginal population of the Monaro was numbered by Commissioner Lambie as 798 (HRA. 1842). However the name Monaro was then applied to a Squattage District extending to the sea on the south and east, and over the territory of five Aboriginal tribes, according to Tindale's map (fig. 5). In his invaluable book, Discovering Monaro, Sir Keith Hancock has fully discussed the fluctuating definitions of the Monaro region, and the consequent problems in assessing Aboriginal population statistics (1972:6-8,67-69).

(e) The Highland Zone

Sources - Hume and Hovell's 1824 journey.

There are very few direct observations for the Highland zone, except for what can be gleaned from the journal of Hume and Hovell's remarkable journey in 1824. The journal of Hamilton Hume, who had a particularly close interest in Aborigines, is unfortunately no longer extant, and our information comes only from Hovell's journal, and the composite account made from the two diaries by Bland in 1831.

Between Yass and the river Murray at Albury signs of the Aborigines were seen ten times, six on the outward journey and four on the return along the same route. From Appendix 1B and figure 6 it will be seen that four of these references concern the area of Camden Forest north-east of Albury, where "the natives, it would seem from their tracks, are here numerous" (ref.53). In the more mountainous region between the Goodradigbee River and Tarcutta Creek signs of the Aborigines were present but scarce, except in the low mountain valleys of the Goobarragandra and the Tumut Rivers (ref.49-50). Here "the natives appear to be numerous ...they were several times hailed, but could not, although
they replied, be induced to approach". Sturt also suggested that the Tumut valley was well inhabited, describing Tumut River's banks as "better peopled" than those of the Murrumbidgee (1833, II:25).

Elsewhere large groups were observed coming into the Highland zone in the summer months to feast on the Bogong moth. These groups, numbering as many as 500-700 in the Kosciusko region, were said to come from all parts of the country, some of them from a great distance (see Chapter 6). Thus there was a large-scale seasonal movement up into the highlands each summer for a duration of up to three months, and then a dispersal back to tribal territory in autumn.

(f) The Murrumbidgee River

In his traverse of the Murrumbidgee River Captain Sturt remarked on the paucity of people on the middle reaches, saying "there cannot, I should think be a numerous population on the banks of the Morumbidgee, from the fact of our having seen not more than fifty in an extent of more than 180 miles. They are apparently scattered along it in families" (1833, II:50-51).

This may be a slight under-estimate, for addition of all natives sighted to this point (Nos.60-70 in Appendix 1B) gives a total of 60, counting references to "some natives" as three and "several" as four. His 180 miles (290km.) covered the stretch from Yass to Narrandera.

Further down river towards the junction of the Lachlan River with the Murrumbidgee, Sturt again commented on the small number of people seen so far. "The population of the Morumbidgee, as far as we had descended it at this time, did not exceed from ninety to a hundred souls. I am persuaded that disease and accidents consign many of them to a premature grave". However, he found the alluvial flood plains in this part of the Murrumbidgee "much more populous than its upper branches. Then came the reed country, where "we saw no natives, although, from the number and size of the paths that led from the river, in various directions
across the plain, I was led to conclude, that, at certain seasons, it is hereabouts numerously frequented" (1833, II:52, 55, 74).

Curiously, Mitchell made the same comment in May 1836 when in the same area, "A certain space along the river was almost everywhere clear (from reeds or polygonum) from its constant occupation by the natives" (II:80). On the succeeding stretch down to the junction with the River Murray Sturt met a tribe "who could not have amounted to less than one hundred and twenty in number" and who had evidently never seen white men before (II:81). On joining the Murray River, encounters with Aborigines gradually became more and more frequent, and the size of the groups larger and larger, culminating in the threatening crowd of six hundred at the junction with the Darling (II:107).

The particular value of Sturt's observations is the fact that they span only two months in the same season of the year so that observed differences in populations frequency cannot be explained away by the variables of season or drought/wet year.

Conclusions

The ethnographic evidence points to people being present over much of the Southern Uplands, but in small numbers. This evidence only relates to the spring-summer-autumn period, for no journeys and hence no direct observations were made during the winter months.

There is, however, no suggestion anywhere that the Upland tribes 'wintered' on the coast or inland plains, but if such large-scale seasonal migrations had taken place, it is likely that they would have been recorded somewhere in the ethnography. Other factors which make them unlikely are:--

1. Winter would have been the lean time of the year on the coast and on the inland plains as well as in the High Country, and there is evidence in both regions for dispersal of population in winter (Lawrence, 1968:91,95,142; Allen, 1968:17).
2. In northern New South Wales there is evidence for movement away from the coast during the season unfavourable for fishing [i.e. the winter] (Oakes, 1842 in HRA.1, XXII:65; Dawson, 1935:25).

3. All tribal territories of the upland tribes included low montane valleys, well below the snow-line, where tribes could spend the winter. [For further discussion of seasonal movement see Chapter 8].

The ethnography suggests some differences in population density, the coast being more densely populated than the coastal ranges and the lower reaches of the Murrumbidgee. It is also implied that the low mountain valleys were far more densely populated than the higher ranges. There thus seems (in both the Blue Mountains and the Snowy Mountains region) to be a correlation between lack of population and increased altitude, which may in fact relate to reduced food resources in the higher zones.

Population density: The only information on population density in one of the mountain areas comes from the Valley of Omeo on the Victorian High Plains where "A.C. Wills, former Police Magistrate and Warden, stated that in 1835 there were about 500 or 600 men, women and children resident during a few months of each year at the headquarters of the Gundanora tribe on the elevated plain of Omeo. In 1842 they frequently assembled in larger numbers" (Radcliffe-Brown, 1930:691). This implies, although it is only an implication, that these five to six hundred people all belonged to the Gundanora tribe. This figure has probably not been affected by the ravages of smallpox, since Omeo appears to have escaped the 1830 epidemic like the rest of Gippsland (Curr, 1887,III:545). Calculation of this tribal strength against the tribal territory as shown in figure 5, by Tindale, (who calls the Omeo tribe 'Jaitmathang'), gives a population density of 1.8km² (1.5 square miles). However, this tribal territory cannot be taken as typical of the mountain regions, since Omeo, the centre of the summer gatherings, is at only 640 metres,
(2100 ft.), and has an equable climate all the year round. When George MacKillop's Aboriginal guide was asked if the cold was ever great in Omeo, he replied, "When all the hills of Maneroo got on white nightcap [i.e. snow], in Omeio black-fellow not want it blanket" (quoted by Andrews, 1920:26).

On the New England Tablelands the density appeared to be much lower on the evidence of G.P. MacDonald, the Commissioner of Crown Lands, who in 1842 estimated "From personal observation on these occasions and information gathered by the police, it does not appear to me that their number in New England exceeds five or six hundred" (HRA. I, xxii:172). This number, even taking the higher figure of 600, spread over a pastoral district of 21,077km² (13,100 square miles) gives a low population density of about 1:35km² (1:22 square miles). This could reflect the harsh environment compared with the richly endowed riverine valleys to the east and west. Moreover these Northern Tablelands lack any special food resources, such as the Bogong moths of the Snowy Mountains, or the Bunya Bunya nuts of Southern Queensland (see Chapter 6).

For the Southern Uplands the only other relevant clue is that contained in Government despatches in 1828 for the Wellington Valley region, a piedmont zone at the foot of the western slopes of the Great Divide:-

"no one tribe exceeds 260 and in a space of two degrees of latitude and three of longitude from Wellington Valley...there are not at most 2000 souls". (HRA.I, xiv, March 1828).

Calculation of these figures against the indicated area gives a density of 1:22km² (1:14 square miles) for this piedmont zone.

More reliable because it pre-dates the smallpox epidemics, although very vague, is the estimate of Governor Phillip in 1788, who calculated that 1500 Aborigines lived on the coast around Port Jackson, Broken Bay and Botany Bay (HRNSW.I,ii,191). This gives an approximate density of 5 people per 1.5km² (1 square mile), or four people per 1.5km. (1 mile) of coast.
Clearly one cannot reconstruct population density for a whole region from these meagre data, but there is another method of at least making rough estimates. This is to calculate average tribal size against the area of tribal territory indicated on linguistic and cultural grounds, recognizing that even approximate tribal boundaries are often uncertain and tribal size is known to have varied greatly. Aboriginal population of Australia in 1788 has been estimated at a minimum of 250,000 and more probably some 300,000 (Radcliffe-Brown, 1930:696). This estimate is based on a thorough consideration of the data from a series of separate districts, and has not been seriously challenged by later anthropologists. 574 separate tribes with distinct languages have been distinguished by Tindale (1940) which suggests a mean number of persons per tribe of approximately 500. Radcliffe-Brown recognised that the density of the Aboriginal population varied greatly in different parts of the continent, and suggested that this variation was closely linked with the food supply.

Extrapolating this figure of a tribal strength of 500-600 from the Omeo to other upland tribes, one obtains a population density of about 1:16km² (1:10 square miles) for the Ngarigo of the Monaro, and about 1:22km² (1:14 square miles) for the Ngunawal of the Southern Tablelands. These estimates are comparable with the 1:22km² (1:14 square miles) ratio calculated above for the Wellington region in 1828, but the latter post-dates the ravages of smallpox, and therefore is probably too low. The Omeo information is independent of smallpox, and also dates from the earliest years of European settlement long before the Omeo gold-rush, so should not be too different from the pre-European numbers.

Using mean tribal size to assess population density is fraught with pitfalls, and no more can be said of the results than that they fit the evidence on relative population sizes gained by other methods.
Comparison with other regions: If one accepts the tenet that in general more people would be seen in those areas with the greatest populations, then for comparison with other areas it is valid to quantify the number of recorded ethnographic sightings, always remembering the numerous imponderables in any such exercise. The system adopted is that used previously in an examination of the population of western and central New South Wales, in order to facilitate comparison with those regions (Allen, 1968:12-13). Firstly, groups of Aborigines are quantified so that a 'tribe' equals 30, a family 5, and some or several 3. A 'party' is also counted as 5, unless the precise number is given.

Omitted are references relating to the coast, the lower Murrumbidgee River, and the Bathurst area, the latter because it was included in Allen's Eastern Region, with which comparisons will be made. This will henceforth be called the Western Slopes, and the location of this and Allen's other regions can be seen on figure 7.

Seasonality: In grouping these sightings under the four seasons of the year, it must be noted that in the Southern Uplands no journeys were undertaken, and hence no Aborigines seen, during winter, which actually lasts from mid-June to mid-September.

The results are shown in Table 4:1, where it is clear that the majority of sightings were made in summer and autumn, or more precisely, between November and May. This was the case also on the Western Slopes of the Tableland zone, Allen's Eastern Region, where Allen commented, "when groups were seen, and some quite large ones were, they were observed predominantly during the summer months" (1968:20). Nor was it a case of observers only being present during those summer months, for in both regions on some occasions observers are known to have been journeying without sighting any Aborigines (see above, and Allen, 1968:20).
FIGURE 7: Transect across New South Wales showing the zones referred to in the text.
Table 4:1

DIRECT SIGHTINGS OF ABORIGINES IN THE SOUTHERN UPLANDS

<table>
<thead>
<tr>
<th>Month of Observation</th>
<th>No. of Observations</th>
<th>Size of groups seen</th>
<th>Total</th>
<th>Season %</th>
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<tr>
<td>December</td>
<td>6</td>
<td>6;5;3;2;1;1;</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>6</td>
<td>60;50;40;8;5;5;</td>
<td>168</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Summer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>191 (44%)</td>
</tr>
<tr>
<td>February</td>
<td>1</td>
<td>5;</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>5</td>
<td>15;10;5;5;</td>
<td>37</td>
<td></td>
</tr>
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<tr>
<td>June (4th)</td>
<td>2</td>
<td>30;2;</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>0</td>
<td>0;</td>
<td>0</td>
<td>Winter</td>
</tr>
<tr>
<td>August</td>
<td>0</td>
<td>0;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>September (29th)</td>
<td>1</td>
<td>2;</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>1</td>
<td>8;</td>
<td>8</td>
<td>Spring</td>
</tr>
<tr>
<td>November</td>
<td>9</td>
<td>30;10;8;7;4;3;2;2;2;</td>
<td>68</td>
<td>78 (18%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td>430</td>
<td></td>
</tr>
</tbody>
</table>
**Group size:**  Allen drew attention to the smaller average group size observed on the Western Slopes than on the plains to the west (1968:23). Average group size is certainly different, that for the Western Slopes being 12, for the Darling River 15, and for Coopers Creek 35. However closer analysis of the data indicates that mean group size is a misleading statistic. Table 4:2 clearly shows that across the whole region the vast majority of groups seen number 10 people or less, the percentages in this category only varying from 59% to 83%. Clearly the means were heavily skewed by the occurrence of a few very large groups in the western zones.

Group size in fact seems fairly similar across New South Wales, except that more very large groups were seen on the western plains than in the uplands. However, if Bogong moth gatherings had been included (all were excluded as indirect observations), this difference would probably also have disappeared.

It is possible that the small groups of seven or less seen in 63% of observations in the Southern Uplands are equivalent to the "hearth groups" of Tasmania, which ranged in size from 2 - 7 people. Its core was a single family consisting of man, wife, children, aged relatives and sometimes friends or other relatives. They formed a domestic and possibly foraging group, camping round the same fire and often occupying a single hut. It is also possible, but pure speculation, that the larger groups could be bands, similar to those well-documented in Tasmania and the size of which ranged from about 30-80 people (Jones, 1971:A19,23).

**Relative population densities:**  These can only be suggested in the very broadest of terms, since a very random sample of ethnographic observations is being compared from a series of different size areas and time-spans. Allen's time span is defined as from the first European penetration to the time of large-scale settlement, but this tended to be a longer period in western than in eastern New South Wales. A further difficulty is
### Observations of Group Size across New South Wales.

<table>
<thead>
<tr>
<th>No. in Group</th>
<th>Allen's North Region</th>
<th>Allen's West Region</th>
<th>Allen's Central Region</th>
<th>Allen's South Region</th>
<th>Allen's East Region</th>
<th>Southern Uplands</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>8</td>
<td>4</td>
<td>9</td>
<td>20</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>4 - 7</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>12</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>8 - 10</td>
<td>7</td>
<td>1</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11 - 15</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>16 - 20</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>21 - 30</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>31 - 40</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>41 - 50</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>51 - 60</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>61 - 70</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>71 - 80</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>81 - 90</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>91 - 100</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>101 - 200</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>201 - 300</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>301 - 400</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0 - 10</td>
<td>28</td>
<td>9</td>
<td>30</td>
<td>34</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>(65%)</td>
<td>(69%)</td>
<td>(59%)</td>
<td>(71%)</td>
<td>(83%)</td>
<td>(74%)</td>
</tr>
</tbody>
</table>

**Total Observations**: 43 13 51 48 23 35

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Data from Western New South Wales is taken from Table 1:5, Allen (1968). Allen's regions are shown in Fig.7.
that if only gross totals of people seen are compared, the regions where most observers were present will probably appear to have the highest populations. To enable valid comparisons between regions where different numbers of observers were present at a given time, Allen therefore divided the total number of people seen each month by the number of observers present, presenting the results as a net, as opposed to a gross total (1968:13-14). These results are shown in Table 4:3, together with the equivalent totals for the Southern Uplands.

Table 4:3

<table>
<thead>
<tr>
<th></th>
<th>Gross No. of people seen</th>
<th>Net No. of people seen</th>
<th>Mean Group Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. N.S.W. North</td>
<td>1418</td>
<td>780</td>
<td>35</td>
</tr>
<tr>
<td>(Coopers Ck.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W. N.S.W. West</td>
<td>144</td>
<td>136</td>
<td>13</td>
</tr>
<tr>
<td>W. N.S.W. Central</td>
<td>746</td>
<td>575</td>
<td>15</td>
</tr>
<tr>
<td>(Darling R.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W. N.S.W. South</td>
<td>572</td>
<td>421</td>
<td>13</td>
</tr>
<tr>
<td>W. Slopes (East region)</td>
<td>231</td>
<td>143</td>
<td>12</td>
</tr>
<tr>
<td>Southern Uplands</td>
<td>430</td>
<td>209</td>
<td>12</td>
</tr>
</tbody>
</table>

The general trend to a high population on the western plains and a low one on the eastern tablelands is quite clear. No detailed work has yet been done on coastal population estimates for eastern New South Wales, but the indications suggest that it would have been considerably higher than that on the tablelands.

This apparently low-density population of the Uplands does not agree with Birdsell's hypothesis of a correlation between high rainfall and high density population (1953:206). Here other variables are clearly of more importance, such as temperature and available food supplies. In such
regions Aboriginal density can more easily be correlated with stream gradient, the steep-sided valleys of the upper reaches providing less abundant food than the broad valley lands of the lower rivers as Birdsell suggests in the same paper (ibid:188). Sturt's observations on both the Murrumbidgee and Darling Rivers suggest that the upstream sectors were less densely populated than the lower parts (1833, I: 139, 187; II: 81-134). Mitchell, who visited the Darling River at the same time of the year as Sturt and saw similar fishing activities being carried on, also suggested that the upstream sector was less densely populated (1838, I:86). The reasons for this are less easy to establish, but the problem of available food resources and their association with population density will be considered in Chapter 7.

Summary: The ethnographic evidence suggests that there may be a correlation between elevation and population density, the more elevated regions being less populous than the lower coastal or inland zones. Three journeys in particular suggest this, that of Throsby in 1818 who met more people as he descended from the coastal ranges to the sea board, that of Hume and Hovell in 1824, and that of Sturt in 1829.

The best evidence is that provided by internal comparisons during journeys. Firstly Throsby in 1818 was met by ever-increasing numbers of people as he descended from the tablelands to the coast. Secondly, Hume and Hovell in 1824 found traces of many people in the montane valleys but almost none on the ranges. Thirdly, Sturt twice remarked on the increasing population as he travelled down the Murrumbidgee River, and analysis of his recorded sightings substantiates his impression.

Comparison with the inland plains of New South Wales suggests a considerably higher population in the Darling basin and the Coopers Creek region than on the Western Slopes and Southern Uplands. Group sizes tended to be small, apart from the occasional large gathering, in all regions, 60% or more of groups observed comprising less than ten people.
Data on actual population density are meagre and unreliable, but suggest that density on the Southern Uplands would have been lower than on the coast, and might have ranged from around 1:8 km$^2$ (1:5 square miles) in favourable low montane valleys such as Omeo to as low as 1:35 km$^2$ on the high tablelands of New England, with the Southern Tablelands and the Monaro falling somewhere in between, perhaps in the order of 1:15 to 1:20 km$^2$ (1:10 or 15 square miles).

It is interesting that Jones' estimate (1971:A Table 1) of population density for the inland montane Big River tribe in Tasmania, based on much more reliable evidence than the above, is 1:12 - 1:15 km$^2$ (1:7.5 - 10 square miles).

The demographic picture suggested by this ethnographic evidence is of a comparatively small population in the upland area, moving around in small groups, apart from occasional large gatherings for ceremonial purposes or moth-hunting. They were more in evidence in mid-summer than in other seasons, but it is not suggested that there was a large scale movement out of the Uplands in the winter months (See Chapter 8). This low density population does not correlate with low rainfall, but rather with increased stream gradient and elevation. Increasingly harsh climate and decreasing food supplies are likely to be the factors responsible for this correlation, and this question will be explored further in the succeeding chapters.
Chapter 5

Material Culture

Many items of material culture, including habitations, clothing and adornments, and a high percentage of equipment and weapons, do not generally survive in the archaeological record. In these cases ethnographic records and museum collections are particularly valuable in supplying a picture of material culture, of which otherwise one could only hope to reconstruct a small fragment from the evidence of excavation. To emphasise this point, the very few imperishable items in the following ethnographic accounts are underlined; including artifacts of bone which are only imperishable in certain environments. In addition to this reconstruction of Aboriginal equipment in the Southern Uplands, attention will be focused on distribution patterns from which economic or cultural inferences can be made.

I. Equipment

Several detailed descriptions of the Aboriginal complement of weapons and equipment survive from the Southern Uplands, the earliest coming from Barrallier (1802:773) on his journey northwest of the Nepean River into the southern fringes of the Blue Mountains, and another from Meredith (1861:105-7) from her observation of Aborigines in 1839 west of the Blue Mountains at Bathurst.

Typical of these accounts is that of the Canberra district by William Davis Wright, who wrote:-

'In their nomadic style of life, always on the move, they carried their weapons with them, up to at least the year 1850. Their usual battery was anything from two to six spears, some of them with fearsome barbs quite an inch in length, so that, once driven home in flesh of man or beast, extraction was only possible by driving the spear head through. As a rule, however, the spears were unbarbed, and with the 'thrower', a contrivance for throwing the spear,
with which considerable force and accuracy could be attained. Then the nulla nulla, a weapon made of solid wood with a knob at one end and a smooth handle. There were two kinds of shields used, one for defence against the nulla nulla, a very solid affair, and a broader one to guard against spears. These shields were usually well and carefully made, with a grip on the inside to hold and manipulate the working. Add to these the invariable boomerang or two, and a primitive tomahawk made of hard polished stone, and a warrior was fully equipped'. (1923:58-9).

Remarkably similar was the typical equipment of the Highland Aborigines of Omeo, as described by Richard Helms (1895:400-1).

'Their weapons consisted of clubs (nulla nullas), boomerangs, shields (hielaman), stone tomahawk (umigong), and three or four kinds of spears, which were made of reeds, seedstalks of the grass-tree, boxtree, or if procurable, ironbark. ...The boomerangs were different, the larger sort was used for fighting, and a smaller sort, which was more curved than the other, they threw at birds. This if thrown against the wind would return to the thrower after making one or two circles in the air. The commonest implement was the yam stick, a plain stout cudgel about four feet long, sharpened and hardened in the fire at one end. It was used for digging out roots and other food from the ground, and in case of need served for defensive purposes. For carrying water they made a vessel out of bark in the shape of a small canoe. For this purpose they thinned a suitable piece of bark at both ends and placed it in hot ashes to make it soft and pliable, and whilst in this state the ends were folded and tied.

Their canoes were mostly made of bark which was gathered in folds at both ends, after these had been sweated in hot ashes, and fastened together with withes and wooden pins...The wooden canoes were made out of a suitable log, and their manufacture demanded a great deal of labour. They had to be entirely worked with stone implements, assisted by lighting a fire inside, which when carefully managed would destroy the bulk of the wood to be removed. Generally they adopted a partly hollow tree for this purpose'.

1These dug-out canoes are the only ones recorded in the whole of the Murray Valley and Victoria (cf.Bickford, 1966) so they may be a post-European phenomena. Alternatively they may be a type only used in the high country, for which Helms is our only authority.
Apart from weapons, the only other items of equipment I have found mentioned are baskets and bags made of long dry grass and Kurrajong bark by the women (Meredith, 1861: 105-7) and nets for collecting Bogong moths made from fibre of *Pimelia* spp. (Helms, 1895:396 - see next chapter).

**Spears:** Spears have been divided into a number of different types following the only detailed classification yet done of Australian spears, that of Davidson (1934). They can be separated into specialised fishing types and the more generalised hunting and fighting spears, and direct observations of them in use are listed in Appendix 2A.

Sea-fishing spears tended to be the multi-pronged type, widely recorded at Sydney, on the river Nattai by Barrallier (1802, Nov.14) and at the foot of the Cambewarra Mountains by the Shoalhaven River by Backhouse (1843:433), but not in the Southern Uplands.

Fishing spears in the Southern Uplands region were generally 3.6 to 4.2 metres long (12-14ft.), made of hard wood, well-sharpened but not barbed in any way. These were seen in use on the Murrumbidgee River by George Bennett in the Yass district, and at Bathurst by Mrs. Meredith (Bennett, 1834, I:121; Meredith, 1861:105).

A distinction between fighting and hunting spears is made by Curr (1883:144).

'Made expressly for war, we have heavy spears eight or ninefeet [2.4m. or 2.7m.] in length, weighing about four pounds [1.8kg.], some with barbs, cut out of the solid, extending a foot [30cm.] from the point; others, jagged with sharp flints or pieces of quartz, fastened by means of gum into two grooves, which extend upwards from the point of the weapon from eight to fourteen inches [20-25cm.]....For the chase, we have lighter weapons, generally thrown with the aid of the wommera. The points of this class of spears are usually plain and of heavy wood, two feet [60cm.] in length, and the shafts of reeds, where obtainable. In other cases, the heavy portion is much longer, and is finished at the blunt end with a piece of grass-tree or other light wood. Though designed for hunting, these spears are constantly used in fights...A barbed spear, weighing about five pounds [2.2kg.], is in use in some tribes for killing an emu. With it
the hunter ascends a tree...and as the emu passes underneath, plunges the weapon into its back'.

Thus although designed for different functions, it seems that often the same spears would be used for man or beast, as attested in the Southern Uplands by Meredith (1861:105) and Davis-Wright (1923:58).

_Death Spears:_ 'Made by embedding a series of small jagged stone chips in a gum layer which has been smeared over the head of the spear' (Davidson, 1934:147).

One particularly important feature of the death-spear is the armament of small stone flakes it bore, for these should be traceable in the archaeological record, whereas most other spears would disappear without trace. These barbs are described as being of 'flint or agate' (Bland, 1831:80-1) or of 'quartz' (Eyre, 1845:306) or 'crystals [presumably quartz] bound securely on with kangaroo sinews' (Meredith, 1861:105).

Some death spears are illustrated in figure 8. A few examples survive in museums, with stone barbs set in resin in single or double rows extending as far as 25cm. from the wooden tip. Specimens recorded by Mulvaney in European Museums bore as many as 22 hafted small untrimmed stone flakes, usually of quartz (1969:93).

The use of death spears is recorded at Bundanoon and Cambewarra in the coastal ranges (Throsby, 1818, Mar.28th and Backhouse, 1843:433), Canberra and Bathurst (Meredith, 1861:105), in Camden forest north of Albury (Bland, 1831:80) and in the highlands of Gippsland (Howitt, 1904:351). They were also found on the western slopes of New South Wales (Oxley, 1820:117, 236 and 256), but only one example has been recorded in the inland plains, on the Darling River at Bourke (Dunbar, 1943:172).

The death spear, it seems, had a mainly coastal distribution in Australia, specimens having been found from Sydney to the Gascoyne region of Western Australia, in Cape York, the Kimberleys, and the Mitakoodi area of north-west Central
FIGURE 8: (a) Bark huts observed in Kangaroo Valley (after Backhouse (1843:469)).
Queensland. Independent origin seems unlikely in view of the peripheral distribution and specialised nature of the death spear, and Davidson (1934:149) suggests that it is a weapon of some antiquity, perhaps the immediate successor of the plain acicular spear and preceding the type with barbs cut in the solid wood, which it outflanks in distribution in several regions.

In the Southern Uplands Davidson's most recent all-wooden type of barbed spear has not been recorded, but no weight can be put on its apparent absence. However it seems certain that the two most common types of spears in the region at the time of first European contact were the plain wooden spear and the death-spear.

**Grass-tree and Reed spear-shafts:** The material used for the spear shaft varied according to the local resources. On the Tablelands wood, such as that of *Callitris* (Murray pine) was used because it is light and floats, or the stalk of the grass-tree, *Xanthorrhoea australis*, but further south in Victoria reed spears were very common (cf. Davidson, 1934:fig;9). Helms mentioned them as being used in the Omeo district, and Hume and Hovell when north of the river Murray in Camden forest observed:

'spears made of strong knotted reeds, about 6 feet long [1.8m.], to which was affixed a piece of hard wood, about 2 feet in length [60cm.], with a rounded point, barbed in some instances with numerous small pieces of flint or agate' (Bland, 1831:80-1).

Sturt also came across reed spears on the lower Murrumbidgee. On the tribes of this inland region he commented:

'They use the same weapons, as far as the productions of the country will allow them. But as the grass-tree [*Xanthorrhoea*] is not found westward of the mountains, they make a light spear of a reed. These they use for distant combat, and not only carry in numbers, but throw with the boomerang [*sic*] to a great distance and with unerring precision, making them to all intents and purposes as efficient as the bow and arrow. They have a ponderous spear for close fight, and others of different sizes for the chase' (1833, II:54).
Further north, however, in western New South Wales reed spears seem to be absent, together with grass-tree spears and the spear-thrower or woomera. These absences are associated, for as Richard Helms said:

'The reed and grass-tree spears were thrown with the woomera, but the heavier and larger wooden spears were thrown with the hand' (1895:400).

Cunningham made a similar comment, based on observations on his journeys west of Bathurst and Liverpool.

'They (the natives over the Great Dividing Range to the west) do not use the woomera in throwing their spears, which are made of a very hard wood and not of the Xanthorrhoea arborea [australis] as on the coast' (In Lee, 1925:191).

Many of these inland plains tribes therefore lack light weight spears of reeds or the grass-tree and consequently do not use the woomera, but here these traits appear to be linked to availability of raw materials, and have no cultural significance. On the other hand two traits which may have diagnostic value are the presence of the death spear on the Southern Uplands, and the greater general prevalence of spears there than on the western plains.

The relative frequency of spears is difficult to quantify, but Allen's distribution map of spears (1968:50) shows that spears were mainly seen in his eastern region, on the western slopes of the tablelands and in the Bathurst region. Their frequent presence on the Southern Uplands substantiates the impression that spears are more numerous in the upland wooded zones than out on the plains. This seems unlikely to be the result of greater hostility in the upland region, for ethnographic evidence suggests its inhabitants were generally timid and shy, and Sturt on the Murrumbidgee river experienced hostility not from the people upstream, but downstream on the plains. Since fishing was carried on with spears on both the plains and the uplands it is difficult to correlate the greater use of spears in the upland zone with greater amount of fishing, in fact there was probably less fishing in the uplands.
However, there was probably more hunting of large land mammals in the wooded hill country than on the plains. This suggestion is based on ethnographic evidence that there were few kangaroos on the plains at the time of the first explorers, for example Mitchell on his way down the Darling River saw no kangaroos or emus beyond the Bourke area (1839, I:308, and see Allen, 1968:43-4). There is also scientific evidence that the kangaroo population of western New South Wales has increased greatly since the development of pastures there (Frith, 1964:8).

The presence of the death-spear on the Southern Uplands and its virtual absence from the inland plains suggests that culturally the highland zone may be linked more closely with the coast, where the death spear is widely distributed, than with the centre of the continent. Alternatively, it may indicate the regions where hunting was important, since its stone barbs would seem to have been developed to make a horrible gash which would cause the quarry to die through loss of blood. Those death spears with backward pointing barbs could not be drawn out, and so would have a similar effect. As a weapon therefore it would be well-suited for spearing large game as well as being lethal in human combat.

There thus appears to be an association between the presence of death-spears and the hunting of large game. In this case, death-spears should be regarded primarily as extractive artifacts, rather than combat weapons.

Spears were probably an important item of trade. Grass-tree spears are specifically mentioned as being traded after initiation ceremonies at Bega, together with other wooden implements (Howitt, 1904:719 and see chapter 8 below).

Making fire and cooking methods: The seed-stalks of the grass-tree (*Xanthorrhoea australis*) were also used for kindling fire by friction.

'One of the pieces was flattened and laid on the ground, and the other, pared to a point, was twirled between the flat hands. The friction
soon produced sufficient heat to cause some of the fine loosened particles...to glow, which was, with the addition of some powdered charcoal and dry pounded bark fibre, fanned into a flame' (Helms, 1895:396).

Helms also describes cooking methods in the Southern Uplands as either simple roasting over a fire, or baking in a ground oven filled with heated stones on which the game was placed and covered first with bark and green bushes and then with hot ashes (1895:393).

II. Wearing Apparel

Possum and kangaroo-skin cloaks are characteristic of the southern half of Australia, and their distribution, characteristics and manufacture have been well described by Mountford,(1960, 1963). Here, therefore, I will give only one local description which was not mentioned by Mountford, Bennett's observations on the cloaks of the Yass Aborigines (1834, I:175-6):

'Both sexes wear cloaks made from several skins of the opossum, kangaroos, or other animals joined together. In cold weather the fur is worn turned inwards, making a warm and comfortable garment; neither males nor females appear to regard it as a covering required for decency, but merely as a protection against the inclemency of the weather, as it is frequently thrown aside. The skins of either the opossum or kangaroo are used for cloaks, and are prepared, when recently taken from the animal, by stretching them out upon the ground with small wooden pegs, the inner side being scraped with a shell, until they are rendered perfectly clean and pliable. The skins when dry are stitched neatly together, with thread made from the long tendons of the muscles about the tail of the kangaroo; (which when dried are capable of being divided into threads of almost any degree of fineness); the needle is formed of a piece of bone; and a number of these skins sewn together form the cloaks in general use. Among both males and females many have a sort of tatauing, or ornamental marks scratched upon the inner part of the cloak, according to the taste of the owner'.

Other occurrences of skin cloaks in the Southern Uplands are listed in Appendix 2B.
The above account suggests two potential archaeological manifestations of skin-cloak manufacture, shell scrapers and bone awls. However, some stone implements are also mentioned in certain other accounts. Three basic processes were involved in the preparation of skin-cloaks, the scraping off of flesh from the skin, the working of the skin to make it loose and flexible (in some areas involving the scratching of designs onto the skin to make it pliable), and the sewing together of the skins into a cloak or rug. Implements ethnographically recorded as used in these manufacturing processes are listed below:

1. Scrapers used for cleaning the skins
   a) Mussel shell (Bennett, 1834, I:175; Smyth, 1878:349).
   b) "A sharp-edged piece of quartz" was used to shave the flesh off skins by Aborigines of the Port Lincoln tribe, South Australia (Schurmann, 1879: 210).
   c) "A small sharp-edged stone" was used to scrape kangaroo skins (smeared with grease) until they were flexible in Western Australia (Hammond 1933:30).
   d) A large stone flake was used for dressing skins in the northern Flinders Ranges of South Australia (illustrated by Mountford, 1963: Plate 33C).
   e) Reniform slate scrapers were used to scrape fat and fleshy tissue from possum skins according to a reliable Aboriginal informant of the "River Murray tribe". Who gave Basedow (1925: 176) the following detailed account:-

'The freshly removed skin was laid, fur downward, over a cylindrical rod and drawn tightly around it with the fingers of the left hand. The implement was then gripped by the opposite hand in such a way that the convex edge was against the palm and the flat surfaces between the fingers and thumb. Holding the rod in a vertical position, the concave (or straight) cutting edge was placed against the skin over the rod and worked at an angle downwards, the cutting edge shaving...
'off all adherent pieces of fat and other soft tissue in doing so. The position of the skin, relative to the rod, was frequently changed and the process continued until the whole inner surface of the pelt had been prepared and cleaned in a similar way.

The advantage of a concave cutting edge obviously was that by an accommodation of the two curves, presented by the implement and the rod, respectively, a greater area of skin was scraped with every downward movement of the hand; and the process was performed without so much risk of cutting the skin as would have been the case with the ordinary convex or straight-edged stone scraper or a plane surface'.

This is important evidence of the advantage of a concave working edge on a tool for scraping skins, particularly the possum skins, which were less tough than kangaroo skins. The kidney-shaped slate scrapers of South Australia are described and illustrated by Edwards (1963:515-23). The thin concave working edge tends to be use-polished, and the concavity to be about 6cm. long by 2cm. deep. Edwards suggests that "the reniform slate scrapers were specially designed and ideally suited for scraping the smaller and more delicate skins, such as those of the opossum. The smooth, relatively soft, use-polished functional edge enabled them to be scraped effectively without damage" (1963:522).

2. Implements used for making the skins pliable

a) **Stones.** "The smaller skins were rubbed with stones to make them flexible, or are scored or ornamented with various devices cut with a flint or a shell" (Eyre, 1845, II:313). The use of stones for this purpose is also recorded in a description recorded in Adelaide in 1842 (S.Aust.News, 15th Oct.1842, p.46).

b) **A smooth-barked tree.** "The skin rugs [of the Ngemba tribe of the Darling River] were made of the skin of the doe kangaroo, Murraway; this was stretched and dried in the shade, rubbed with ashes, then with emu oil or goanna fat, and pulled backwards and forwards over a smooth-barked tree to make it pliable". (Dunbar, 1943:142).
These two accounts thus suggest that a smooth, round stone or object might be used to render the skins pliable.

3. Implements for scratching designs on the skins

This was in fact another way of making the skins more pliable, and was employed in eastern and south-eastern Australia, but apparently not in south-western Australia or Tasmania. The significance of the designs has been discussed in detail by Mountford (1963:538-40), so will not be dealt with here.

a) Mussel shell (Howitt, 1904:742)

b) A flint or the sharp edge of a shell (Worsnop, 1897:15).

4. Implements for sewing the skins together

Bone points (together with animal sinews as thread) are the only implement mentioned for this purpose. Fish bones were sometimes used (Bunce, 1857:75; Meredith, of the Bathurst Aborigines, 1861:107), or, according to Eyre, (1845, II:310), "the fibula of the emu or kangaroo pointed at one end by being rubbed on a stone".

The range of implements used in the manufacture of skin cloaks has been considered in detail, because of the strong possibility that skin clothing had been utilized throughout human occupation of the colder parts of Australia, and that traces of its manufacture may be present in the archaeological record.

In the Southern Uplands it is suggested that the cloaks were usually large, like those figured from Victoria and from northern New South Wales by Mountford (1963:Plates 31 and 32A). It also seems likely from the ethnographic evidence that they were generally made from possum rather than kangaroo skins. No specimens survive from the Southern Uplands, but those from Victoria and northern New South Wales figured by Mountford are made of possum skins. The rug from Condah (described by Mountford, 1960) contains 50 possum pelts and measures 1.8m. x 1.5m. (6 x 5ft.), and that from Echuca is 2.2m. x 1.6m. (7-1/2 x 5-1/2 ft.) and
is made of 81 possum skins (Mountford, 1963:530-1).

Possum skin was widely used also for belts, and possum tails for decoration. Personal adornment also involved the use of red ochre, white pipe clay, the incisor teeth of the kangaroo, and a forehead fillet plaited from the bark of the kurrajong tree (Bennett, 1834, I:177, 325; Helms, 1895:397).

The great use of possum skin in the upland zone contrasts with the riverine area to the west, where, once beyond the edge of the Western Slopes with their savannah woodland, trees and hence possums were scarce. However kangaroo skins would have been available there and skin cloaks were worn in the Darling River basin (Allen, 1972: 126).

III. Habitations

Huts seem to have been very widely used over the region, serving to keep out both the cold and the rain. The type of hut is not usually specified in the ethnographic references, (listed in Appendix 2C), but the evidence suggests that they would generally be of bark rather than simply of boughs. For the Canberra area, Davis Wright (1923:59) wrote that:

'When in the vicinity of a settler's homestead...they merely erected bough shelters, just enough to shield them from the rain, frost etc., but in the bush proper they could erect very good bark huts, quite warm and comfortable'.

Elsewhere he implied that bark huts were the norm, saying 'The natives' canoes, like their huts, were always made of bark' (ibid.62). Curr also bears witness to the comfort of bark huts:

'Having camped out a good deal in the bush, I do not hesitate to pronounce the bark hut of the Blacks the most comfortable shelter I have met with, where firewood is obtainable, and much preferable to a tent' (1886:98).
Both bough and bark huts seem to have been used also in the high country of the Australian Alps, for in his Anthropological Notes on the Omeo and Monaro tribes Richard Helms mentioned both types. He implied, however, that the normal type was of bark, saying that:

'Their habitations were simply shelters made of a few sheets of bark put against a pole on the windy side' (1895:397).

This accords very closely with George Bennett's description of bark huts used in the Yass area and on the Bogong Range above the Tumut Valley. The 'gunyah' of boughs seems to have been used for more temporary shelters, such as that erected on the occasion of a marriage to prevent being overlooked (ibid:391).

Bark huts also appear to have been usual in the lower Blue Mountains at the time of Ensign Barrallier's visit in 1802, where he said 'Gogy had built for me a very large hut, made with the bark of the trees' (1802:761). These bark huts were clearly very speedily erected, for elsewhere Barrallier recounted:

'The place where I decided to spend the night was on the territory of the highlander Bungin. He gave proof of his friendliness...by building a hut for me. The natives do not allow any stranger to inhabit the territories they have appropriated for themselves. They themselves build huts for the strangers they wish to receive as friends' (ibid. 755).

In the Tumut Valley Hume and Hovell remarked:

'Their huts or camps (which are constructed in the same manner as those in that part of the country which we inhabit) [i.e. the Sydney region] have been frequently met with' (Bland, 1831:22).

Since George Bennett had remarked the presence of bark huts in the same valley, it seems reasonable to assume that Hume and Hovell's huts were also bark huts. Some slight supporting evidence comes from Blaxland's comment on the western side of the Blue Mountains towards Bathurst.

'The natives on this side of the mountains appear to have no huts like those on the eastern side, nor do they strip the bark or climb the trees' (1813, May 31st).
In fact Blaxland may be wrong or may be referring to people further west, for bark huts were mentioned at Bathurst by Boswell (1840:4) and Mrs. Meredith (1861:103). From the latter's description they barely warrant the title of huts, being:

'primitive erections (a few strips of bark raised slantingly against a tree) under which they crawl during bad weather'.

It seems that bark huts were widespread over the upland region, together with the occasional use of more flimsy bough shelters. The bark huts were quickly erected, and were probably more often rough temporary shelters than real huts. Of five contemporary descriptions of bark huts in the Southern Uplands, only one is a complex structure, the pyramidal hut inland from Jervis Bay described and illustrated by Backhouse (1843:469). The others were described as sheets of bark supported by props (Yass Plains), tree branches placed over bark-sheets (Gouldburn Plains), a slight shelter formed of a few sheets of bark, and large sheets of bark propped up with sticks (Kangaroo Valley) and are illustrated in figure 8 (Bennett, 1834:1, 168, and 324; Backhouse, 1843:434-5).

Bark huts therefore appear to have been common in the Southern Uplands and the coastal regions of New South Wales, together with the occasional use of bough shelters. Further west the bark huts become less common as one leaves the eucalypt savannah woodland of the western slopes for the semi-desert shrub steppe. There, bark was no longer readily available, and was replaced by grass and boughs, and in the Darling Basin by mud and grass thatch.

The difference in material is less important that the greater complexity of construction, durability and warmth of the huts of the inland plains.

The huts on the Darling River were probably erected for winter use, and their widely-scattered distribution was interpreted by Allen as suggesting some population dispersal in winter, contrasting with the great gatherings to exploit
riverine foods when plentiful in the summer months (Sturt, 1833, I:255; Howitt in Brough Smyth, 1878, II:302).

In contrast, the bark huts of the Uplands appear to have been quickly erected, but more flimsy and less warm. The hill people's possession of possum-skin rugs, however, would compensate for any lack of warmth in their habitations, whereas large possum cloaks were absent from the inland plains.

The contrast in habitations had struck Mitchell on his journeys across New South Wales for he commented on the people of the Darling River:

'They do not wander so much as those who hunt the kangaroo and opossum in the higher country nearer our colony [Sydney]. Hence the more permanent nature of the huts on the Darling' (1839, I:307).

IV. Summary

Equipment: Mitchell's suggestion that the hill people had habitations adapted to high mobility is reinforced by their general lack of the range and quantity of equipment present in the Darling River Basin. No nets, traps or weirs are mentioned for the Southern Uplands, where the equipment seems restricted to the minimum. A few spears for hunting and fishing, a spear-thrower, a stone axe for chopping, and a skin cloak for keeping warm apparently sufficed for a man, while the women seem to have had little more than a digging stick, a cloak and a carrying vessel.

Thus the most noticeable feature of the equipment of the Aborigines of the Southern Uplands is its meagreness. This contrasts strongly with the much greater range of equipment recorded both on the coast of New South Wales and on the inland plains (cf. Lawrence, 1968:151-4, Table 4; Allen, 1968:49-60).

Is it possible that this contrast reflects the paucity of ethnographic records on the Southern Uplands, rather than a real difference? It is difficult to be sure, but
the case is strengthened by analogy with the New England tablelands to the north, which also show a paucity of equipment compared with the adjoining coastal zone (cf. McBryde, 1966b:45).

**The Archaeological Record:**  The items of this recent material culture which could be found in the archaeological record can soon be listed:-

- stone axes
- stone implements (unspecified) for wood-working
- stone barbs from death-spears
- shell for scraping skins
- bone as needles or awls for making skin-cloaks
- stone tools for skin manufacture
- pierced incisor teeth of kangaroos as ornaments.

To this list can be added a number of commodities which clearly had importance in local Aboriginal material culture. These were skins of possum and kangaroo, bark for making shelters, wood or grass-tree for spear shafts, shields etc., ochre and pipe-clay for ornament and keeping warm, hard rock for making axes, and sandstone for re-sharpening the edge. Amongst these items, possum skin cloaks, wooden implements and grass-tree spears and other products were certainly traded (Howitt, 1904:719), and it is probable that commodities such as stone-axe blanks and ochre were also bartered (see chapter 8).

The ethnographic record suggests that the majority of stone tools were used for manufacturing rather than extractive purposes, and that the main manufacturing tasks were the production of wooden artifacts and the processing of skins. These are both activities which are likely to be characteristic of the earliest as well as the latest human occupation in the upland regions, and it is possible that the stone tools employed will reveal both a considerable antiquity and continuity of morphological characteristics.

The very few imperishable items recorded in the ethnography show how extremely limited a picture of this material
culture is likely to be gained from archaeological evidence. In this situation the establishment of a palimpsest of Aboriginal life at the time of European contact is most helpful, if not essential, in broadening and interpreting the picture gained from archaeological evidence.
Chapter 6

Of Moths and Men

I. Ethnographic Records

On the 12th December 1832 George Bennett in company with some Aborigines climbed from the Tumut valley up to the 'Bugong Mountain'. In his own words:

'It is named the "Bugong Mountain", from the circumstance of multitudes of small moths, called Bugong by the aborigines, congregating at certain months of the year about masses of granite on this and other parts of the range. The months of November, December and January are quite a season of festivity among the native blacks who assemble from far and near to collect the Bugong, the bodies of these insects contain a quantity of oil and they are sought after as a luscious fattening food' (1834:265-6).

When he ascended the Bogong Range on that day he found traces of Bogong moth-hunting in the form of recent fires, and deserted bark huts, but at each fresh granite peak the tribe was found to have cleared the crevices of moths and moved on, till the day was so far advanced it was thought advisable to return. His account of the gathering and cooking is therefore not actually eye-witness, being culled from his Aboriginal guides.

The only eye-witness account of moth-hunting is that of Robert Vyner, who in 1865 visited the same range as Bennett, in company with an Aboriginal guide, 'Old Wellington'. The peak ascended by Vyner was called by the Aborigines 'Numoiadonga', and took six hours to reach. I suggest this was Numanananga Peak (map ref. 29501964 SMA. 1 mile series), approached from the Tumut valley to the west (see plate 6). Vyner's observations were narrated to A.W. Scott as follows:

'The moths were found in vast assemblages sheltered within the deep fissures, and between the huge masses of rocks, which there form recesses, and might almost
'be considered as caves. On both sides of the chasms the face of the stone was literally covered with these insects, packed closely side by side, over head and under, presenting a dark surface of a scale-like pattern\(^1\) - each moth was resting firmly by its feet on the rock, and not on the back of others, as in a swarm of bees. So numerous were these moths that six bushels of them \([10.2\text{cu.ft.}=0.29\text{m}^3]\) could easily have been gathered by the party at this one peak; so abundant were the remains of the former occupants that a stick was thrust into the debris on the floor to a depth of four feet \([1.2\text{m.}]\).

Mr. Vyner tells me that on this occasion he ate, properly cooked by Old Wellington, about a quart of the moths, and found them exceedingly nice and sweet, with a flavour of walnut, so much so that he desired to have "another feed"... The Bugong moths are collected and prepared for food by the aborigines in this wise: a blanket or sheet of bark is spread on the floor; the moths, on being disturbed with a stick fall down, are gathered up before they have time to crawl or fly away, and thrust into a bag. To cook them a hole is made in a sandy spot and a smart fire lit on it until the sand is thoroughly heated, when all portions left of the glowing coal are carefully picked out, for fear of scorching the bodies of the insects - as in such a case a violent storm would inevitably arise, according to their superstitious notions. The moths are now poured out of the bag, stirred about in the hot ashes for a short time, and then placed upon a sheet of bark until cold. The next process is to sift them carefully in a net, by which action the heads fall through, and thus the wings and legs having been previously singed off, the bodies are obtained properly prepared. In this state they are generally eaten, but sometimes they are ground into a paste by the use of a smooth stone and hollow piece of bark, and made into cakes'.

(Moore, 1869:46-7).

Moth-hunting in the Kosciusko region is described in detail by Richard Helms, who saw the millions of moths there when on a collecting trip in 1889, and learnt of the Aborigines' exploitation of this food from old settlers and 'an informant, who has lived in Monaro for over forty-five years' (1890:14). The following description is given in his *Anthropological Notes* on the Omeo and Monaro tribes and shows close agreement with George Bennett's account, but in which he says 'After the above was written, I met with Dr. George Bennett's work "Wanderings of a Naturalist in New

1 See plate 3 and 4.
Plate 3

Bogong moths aestivating on the wall of a crevice near the summit of Mt. Gingera, Australian Capital Territory. Note how each moth rests with its fore tarsi gripping the rock surface and its mid and hind legs on the backs of the moths behind. This means that Aborigines could collect the moths by dislodging the bottom row with a stick, whereupon those above also fell down into the net or bark dish held below.
South Wales" (1895:394-5). Helm's account is of particular interest for the indications he gives of the size and duration of the moth-feasts. 

'As early as October, as soon as the snow had melted on the lower ranges, small parties of natives would start during fine weather for some of the frost-riven rocks and procure "Bugongs" for food. A great gathering usually took place about Christmas on the highest ranges, when sometimes from 500 to 700 aborigines belonging to different friendly tribes would assemble almost solely for the purpose of feasting upon roasted moths. Sometimes these natives had to come great distances to enjoy this food, which was not only much appreciated by them but must have been very nutritious, because their condition was generally improved by it and when they returned from the mountains their skins looked glossy and most of them were quite fat. Their method of catching the insects was both simple and effective. With a burning or smouldering bush in the hand the rents in the rocks were entered as far as possible, when the heat and smoke would stifle the thickly congregated moths, that occupied nearly every crack, and make them tumble to the bottom of the cleft. Here an outstretched kangaroo skin or a fine net made of kurrajong fibre would receive most of the stupefied and half singed insects, which were then roasted on hot ashes. This process required some care and attention in order to prevent the bodies of the moths getting scorched, and therefore the ashes required to be not too hot and had to be free from large glowing embers. The insects were thrown upon the ashes and well mixed with them, and then the whole was stirred with sticks till the wings and legs had broken away and the body was cooked, when it generally shrivelled to the size of a grain of wheat. The mass was freed of the ashes by dropping it by degrees into some vessel or on a skin and allowing the wind to sift it; the food was still further cleansed from adhering particles of dust and other unpalatable substances by gently rubbing it between the hands, and rolling it backwards and forwards from one to the other whilst blowing from the mouth. The taste of the roasted bodies of the "Bugongs" is, according to some Europeans who tried them, sweetish and nut-like and rather pleasant eating.

This unique food supply is restricted to the highest mountains of Australia, but here it can always be found in abundance during the summer months'.

This account is an expansion of his earlier (1890:14) paper on the same topic, but a few extra facts can be culled from the latter. These are firstly that thousands of crows
[?ravens] were always to be found about the rocks where the Bogong moths congregated. These would provide an excellent signal of the presence of moths. Secondly, Helms intimates that the moth-hunters were men by using the term 'blackfellows'; thirdly, that they might return from the mountains if the weather changed; and fourthly, that they lived for months on almost nothing else but the moths.

Helms also gives us a detailed description of the moth-collecting nets. Apart from the smooth stone pestle for grinding moths mentioned by Vyner, these nets are the only specialised equipment used in moth-hunting, so his account deserves quoting in full:-

'The fine nets made of kurrajong fibre mentioned above seem to have been especially designed for the purpose of collecting the "Bugong". They had very fine meshes and were manufactured with great care, and being attached to a couple of poles they could be readily folded up when they had to be withdrawn from the crevices. A shrub, \(\text{Pimelea}\) sp., growing abundantly in places by the river sides to a height of three to four feet, furnished the fibre. The bark of this bush was stripped and allowed to dry, was then placed in water, and weighted down with some stones for several days till the non-fibrous portions were partly rotted. It was then taken out of the water and spread in the sun to dry till it was quite crisp, after which the fibre was freed by beating with sticks or flat stones. All this was the women's work, and they managed to produce a tenacious material from it that could be spun into the finest threads' (Helms, 1895:396).

In order to synthesise the different accounts of moth-hunting table 6:1 has been prepared. There is a general agreement between these four writers that the moths were to be found in abundance on the high granite ranges during the summer months and were exploited by the Aborigines for two to three months or more. They were collected on bark sheets, nets or skins, carefully cooked so as not to scorch the bodies, winnowed and eaten, forming a palatable and highly nutritious food. Other writers add a few more facts to these accounts, and these data are incorporated in the following discussion of particular points of interest.
A. The Bogong Peaks, 1719m. (5636ft.), the highest peaks of the Bogong Range, Tumut, and one of the main moth localities, seen from the Bulls Flat - Goobragandra Valley to the east.

B. Frost hollow on the Bogong Range where Bora Rings and an Aboriginal camp-site are situated, viewed from Bogong Mountain to the north-east.

C. The Bogong Cave, A.C.T., which contains debris from aestivating moths. Square L is in the foreground.
<table>
<thead>
<tr>
<th>Reference</th>
<th>DATE OF OBSERVATION</th>
<th>SOURCE</th>
<th>LOCALITY</th>
<th>NUMBER AND DESCRIPTION</th>
<th>PROVENANCE OF ABORIGINES</th>
<th>NUMBER OF Moths AVAILABLE</th>
<th>DURATION OF FEASTING</th>
<th>METHODS OF CATCHING Moths</th>
<th>COOKING METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennett</td>
<td>1834 1:265-74</td>
<td>12th December 1832</td>
<td>Aboriginal guides</td>
<td>Bogong Range, Tumut</td>
<td>'a tribe'</td>
<td>'From all parts of the country'</td>
<td>November, December, January</td>
<td>Fires made to suffocate them with smoke, and also swept off in bushels full</td>
<td>Fire lighted on ground, ashes cleared and moths placed on heated ground, stirred, winnowed</td>
</tr>
<tr>
<td>Vyner</td>
<td>Account related to A.W. Scott quoted 1873</td>
<td>1865</td>
<td>Eye witness</td>
<td>Bogong Range, Tumut</td>
<td>'Vast assemblages' 6 bushels could have been gathered at one peak. Debris 4 feet deep</td>
<td>'Vast assemblages'</td>
<td></td>
<td>Moths were knocked down with a stick onto a sheet of bark and put in a bag</td>
<td>Fire lighted on sand, glowing coals cleared and moths poured onto the heated sand, stirred then placed in a sheet of bark until cold. Then sifted in a net.</td>
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<td>Helms</td>
<td>1890:14-5, 1895:394-5, &amp; p. 406-7</td>
<td>1893</td>
<td>'An informant who has lived in Monaro for over 45 years'</td>
<td>Kosciusko and 'the highest ranges'</td>
<td>500-700 Aborigines about Christmas to a great gathering from friendly tribes for about two months</td>
<td>'Vast assemblages' Millions</td>
<td></td>
<td>Insects stifled by a burning bush, 'collected on kangaroo skins or fine nets expanded on two poles'</td>
<td>Insects thrown onto the ashes after embers removed from fire, stirred with sticks, wind-sifted on some vessel or a skin, rubbed between hands.</td>
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<tr>
<td>Jardine</td>
<td>1901:53-4</td>
<td>1845</td>
<td>Knowledge of Curraj-da-bidgee Tribe, N.S.W. from 1844 and presence at Jindabyne in 1845</td>
<td>Kosciusko region</td>
<td>100 Aborigines seen on way to mountains at Jindabyne</td>
<td>Different sections of the same tribe collect together and resort to the mountains</td>
<td>'Two to three months'</td>
<td>Caught with a net in the rock shelters</td>
<td>Sand heated with large fires, moths placed in oven in burning hot sand and covered up. Cooked in a few minutes. Picked out of the hot sand with sharp sticks.</td>
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<td>TABLE 6:1 Cont'd</td>
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<table>
<thead>
<tr>
<th>BENNETT</th>
<th>VYNER</th>
<th>HELMS</th>
<th>JARDINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Eating and preservation</td>
<td>Eaten straightaway 'or placed in a wooden vessel and pounded by a piece of wood into masses or cakes resembling lumps of fat ... these masses will not keep above a week and seldom even for that time, but by smoking they are able to preserve them for a much longer period'</td>
<td>Generally eaten straightaway 'but sometimes they are ground into a paste by the use of a smooth stone and hollow piece of bark, and made into cakes'</td>
<td>Eaten straightaway</td>
</tr>
<tr>
<td>12. Taste</td>
<td>'Resemble a sweet nut'</td>
<td>Vyner ate about a quart of the moths and found them 'exceedingly nice and sweet, with a flavour of walnut, so much so that he desired to have another feed'</td>
<td>'Sweetish and nut-like and rather pleasant eating'</td>
</tr>
<tr>
<td>13. Effect on eaters</td>
<td>'First time on diet 'vomiting and other debilitating effects are produced but after a few days they become accustomed to its use, and then thrive and fatten exceedingly'</td>
<td>'Returned fat and with a polished skin'</td>
<td>The Aborigines went up to the mountains looking very thin and miserable, but returned in from 2 to 3 months looking fat and sleek.</td>
</tr>
<tr>
<td>14. Value of food</td>
<td>'Luscious and fattening'</td>
<td></td>
<td>'Nutritious and palatable'</td>
</tr>
<tr>
<td>15. Division of labour</td>
<td></td>
<td></td>
<td>'The gins are not permitted to eat this food, so are sent in the forest to collect roots etc. during the feast'</td>
</tr>
<tr>
<td>16. Ceremonies etc. accompanying moth-hunting</td>
<td>'The assemblage of so many different tribes ... causes frequent skirmishes. Sometimes this place and season is chosen to decide animosities by actual battles, and the conquered party lose their supply of Bogong for the season'</td>
<td>Corroborees of 500-700</td>
<td>Aborigines from friendly tribes on Kosciusko about Xmas</td>
</tr>
</tbody>
</table>
Sex of the moth-hunters/gatherers: Helms and Jardine suggest that moth-hunting was a male activity, and Jardine states that the women were not permitted to eat the moths. The other accounts shed no light on this statement, but it is contradicted by Mrs. John McDonald of Uriarra, A.C.T., who had known the days when the Aborigines gathered on her property to feast on the moths (see Gale, 1927:57-8). She told John Gale that:

'It was the yearly custom of the blacks to assemble from all the neighbouring districts, with their gins and piccaninnies, to some hundreds in number, for the purpose of feasting on the grubs...These were gathered by the majority of the congregated blacks and gins, while a small detachment remained at home to prepare for the cooking or roasting of the grubs'.

In view of this evidence, it seems extremely unlikely that the women were not allowed to eat the abundant moths, whilst the men were growing fat and sleek on them. It is possible, however, that the actual moth-hunting and cooking was an exclusively male affair, for the women at Uriarra may well have left the valley to collect, not moths, but vegetable foods, as indicated by Jardine (see Table 6:1).

Because the collecting of moths appears to be primarily, if not exclusively, a male activity, I have used the term 'moth-hunting', rather than 'moth-gathering'. Apart from the lack of euphony of the latter, 'gathering' tends to denote a female but 'hunting' a male activity (cf. passim 'Man the Hunter'. Lee and Devore 1968). And whilst the actual collecting of moths was easy and could be termed 'gathering', the activity as a whole involved ascending long distances through rugged country and climbing rocky tors, and thus would be more suited to young male hunters than to women with young children or old people.

Locales for moth-hunting: Most of the ethnographic observations relate to the Kosciusko region or the Bogong Range, Tumut, but moth-hunting is also recorded for three other ranges: the Brindabella and
Tinderry Mountains in the Canberra region, and the Victorian Alps. The early extinction of the Omeo and other highlands Aborigines of Victoria has resulted in a marked lack of information about the highland tribes, and Helms' 1895 account is almost our only source. He implies, but does not explicitly state, that the Victorian highland tribes exploited the Bogong moth, but confirmation is given by von Lendenfeld in his Report on the Gold Fields of Victoria (1886:72):

'The high tablelands which constitute the nucleus of this range [the Bogong Range of Victoria] are inhabited by a species of moth belonging to the Noctuina [sic]. The caterpillars of it are exceedingly abundant, and formed, half-roasted, at certain seasons, a favourite food of the Australian natives. The natives call these caterpillars "Bogong", which name was afterwards applied to the habitat of the Bogong'.

In the Canberra region moth-hunting on the Brindabella range is attested by the evidence of Mrs. McDonald of Uriarra (recorded by Gale 1927:57-8). She recounted how the moths were cooked on a very large flat rock slab behind the homestead, and derived the name 'Uriarra' from 'Urayarra' which meant 'running to the feast'.

Earlier evidence for moth-hunting in the Canberra district comes from Eyre's autobiographical journal of his residence and exploration in Australia from 1832-39. Whilst looking over a 'very fine property of 1260 acres at Molonglo Plains' which was offered to him at a price of four shillings per acre, he learnt that - 'at the Tinderry mountains a kind of moth...congregates...in such great numbers that the blacks flock from all quarters to catch and eat them...they taste like a burnt almond. The Blacks never look so fat or shiny as they do during the "Bougan" season and even their wretched half-starved dogs get into good condition then, in such profusion and so fattening are they' (I:55 m.s.M.L.).

These ethnographic records of moth-hunting refer to five different mountain ranges that span the whole arc of the Australian Alps. It therefore seems likely that Bogong
Tribes participating: The exploitation of Bogong moths seems to have been highly organised, at least in the main moth localities such as the Bogong Range, Tumut, and the Kosciusko region. A.W. Howitt recounts how:

'About the year 1840 my friend, the late Mr. A.M. McKeachie, met two young men of the Ngarigo tribe at the Snowy River, near to Barnes's Crossing [nr. Dalgety]; one of them carried two peeled sticks each about two feet long [60cm.] and with notches cut in them, which they told him reminded them of their message...Their message was that they were to collect their tribe to meet those of the Tumut River [Walgalu] and Queanbeyan [Ngunawal] at a place in the Bogong Mountains, to eat the Bogong moths' (1904:693).

Which other tribes participated? Those which would have had Bogong moth summer habitats within their tribal territories would be the Jaimathang or Omeo tribe, the Djilamatang of the Upper Murray and the Minjambuta or Mt. Buffalo Tribe (see figure 5). The territories of three clans of the Kurnai of Gippsland, the Krauatungalung, the Brabralung, and the Brayakaulung, also extended northwards up to the top of the Great Dividing Range, giving them potential access to moth localities.

Of these tribes, it seems that the Omeo tribe were moth-hunters, on the basis of von Lendenfeld's evidence quoted above. Helms mentions that the Omeo tribe were friendly with both the Mt. Buffalo tribe, the Monaro tribe, and the Queanbeyan tribe (1895:388). He goes on to say:

'Probably the customs of these four tribes were identical, because they lived in frequent intercourse and combined against their common enemies. These were the Braidwood, the Twofold Bay, the Gippsland Tribes, and those living near the borders of the Murray from below Albury'.

This suggests a sort of highlanders' confederacy, comprising the Minjambuta, Jaimathang, Djilamatang, Dudoroa,
Ngarigo, Walgalu and Ngunawal tribes, set in opposition to the tribes of the coast. Inter-tribal relations will be considered further in chapter 8, but two more pieces of evidence which relate to the provenance of moth-hunters must be examined here.

First are the recollections of Thomas Wilkinson of Yallowin, an old property which stands at the foot of the Bogong Range in the Tumut valley. These recollections were dictated to his son not long before his death in 1904, and deal with the period from 1838. Of the Aborigines he says:

'The blacks used to come in from Yass, Wellaregang, Omeo and Mitta Mitta and hold corroborees at Yallowin. I have seen 300 there at one time...The blacks increased in number after a while and 600 of them used to come in from Tumbarumba way. Not more than a dozen of them could speak English...The Bogong moths caught in the mountains named after them were a great relish with the blacks...Different tribes of blacks were met with but they were nearly all friendly towards each other. If any outsiders came along, though, they were soon made short work of' (1970:7-9).

The localities from which these moth-hunters are said to have come are all within the territories of the highland tribes, except for Tumbarumba, but 'from Tumbarumba way' could be interpreted as meaning that it was en route rather than the actual provenance, and Tumbarumba does lie on the natural route from the Upper Murray valley.

Finally, there is the statement of Payten, based on the recollections of old settlers of the Jindabyne district, that:

'From Eden, Bega, Braidwood, Tumut, the Upper Murray, and Gippsland the tribes wended their way to the tablelands and thence to the foot of the main range' (undated m.s.M.L.:1).

There is another reference to Aborigines coming up from the coast 'every summer on hunting expeditions and to feast on the bogong moths', but this also derives from 'accounts handed down by the first settlers' (Kennedy, 1932:106).
However, there seems to be a strong tradition in the Bombala-Dalgety region that coastal Aborigines did come up each summer from the Eden-Bega district (Mr. Williams of Numbla Vale, pers.comm.). There is also a record of a visit to Canberra in 1862 or 1863 of a south coast tribe, who then went on in autumn to Tumut (Shumack, 1967:150).

Unfortunately all these references to coastal-highland intercourse date from a period when the advent of the Europeans had wrought many changes in tribal relations. (These are discussed in chapter 8). It is possible, therefore, but not proven, that coastal Aborigines also participated in Bogong moth feasts in pre-European times. Certainly, the Taula, Djiringanj, and Walbanga tribes from the Eden, Bega, and Batemans Bay - Braidwood regions respectively, would be the most likely candidates, since their territory abutted onto that of the tribes of the Monaro and Southern Tablelands, who were certainly moth-hunters, and since Howitt records friendly relations between them and the tableland people, at least in 1883 (1904:512-3, 520). The Kurnai of Gippsland would be less likely, since they were traditionally enemies of the montane tribes.

In summary, it seems certain that all the highland tribes, including the Ngunawal of the Southern Tablelands, participated, and possible that tribes from the east coast of New South Wales or the south of Gippsland took part. All the highland tribes had sources of Bogong moths within their own territories, but at least two or three tribes seem to have foregathered in one place, such as the Tumut Bogong Range or the Kosciusko area, rather than each to exploit solely its own regional moth resources.

Character of the moth feasts: The moth feasts appear to have been not entirely peaceful, according to Bennett (1834, I:273) and Payten (m.s.:2-3). Two types of battle are distinguished by Bennett, the small skirmish resulting from the presence of so many different tribes on the same range for the same purpose, and the pre-arranged battle, the vanquished losing
their supply of moths for the season. Inter-tribal pitched battles are also said by Payten to have taken place between the New South Wales and Victorian tribes, on the corroboree grounds at the foot of the ranges.

Corroborees, however, are the most frequently mentioned accompaniment or prelude to the moth feasting. Payten suggests that a corroboree was held when the tribes converged at the foot of the mountains, and further corroborees when additional groups were met. His evidence relates to the Kosciusko region, but similar corroborees took place in the Tumut Valley, where they were apparently linked with initiation ceremonies. There the sequence of events seems to have been a gathering of the tribes at Yallowin below the Bogong Range, corroborees in the valley for six days, and then an initiation ceremony including tooth avulsion at the Bora ground on top of the range. This is situated in the same area as the moth-sites (see chapter 9), so that moth-hunting could have been carried on at the same time (Wilkinson, 1970:7).

For details of the organisation of moth-hunting our only data are the recollections of the old settlers of the Jindabyne area as recorded by Payten (m.s.:1-4).

"The excursions of these tribes and groups were contrary to the usual fixed tribal boundaries... and would be carried out under proper rules and procedures... The pilgrimage halted on these corroboree grounds at foot of the main range for which were probably two very good reasons. The exchange of greetings and ensuing social ceremonies. Secondly because they were not permitted by tribal laws to proceed to the tops until a certain rite had been performed.

This rite was performed near two large granite rocks on the Big Bugong, by what was described as an advance party. Bull roarers were used and the ceremonial was accompanied by much noise and shouting. On completion of the rite a smoke signal was put up and only then, never before, the tribes assembled on the corroboree grounds broke up into their separate groups and proceeded independently to the tops.

Eventually reaching the tops some groups camped there, others built their mia mias lower down in more sheltered positions making a daily excursion to gather the moths. There is some evidence to
'show that the groups did not wander over the tops indiscriminately, but that each group may have had its own pitch. A chief known as "Dicky Cooper" brought his group to the same place year after year. This locality came to be known as Dicky Cooper's Bugong'.

Such organisation would clearly be necessary (a) to prevent tribes ascending to the summits before the moths had arrived, and (b) to make sure there was an adequate supply for each tribe by splitting the tribes up into smaller groups. These may well have been bands or family 'hearth groups', but there is no evidence regarding their size or composition. The concept of each group having its own pitch would avoid conflict, and would be a very practical way of dividing long mountain chains amongst a series of groups from both sides of the range. Some pitches would of necessity be well above the tree-line in the Snowy Mountains, and there the mia mias would no doubt be built lower down in less exposed positions where firewood was available, but elsewhere camping places would probably be found close to the moth habitats.

The moth-supply: All writers about moth-hunting emphasise the supreme abundance of the moths, descriptions ranging from millions to incredible quantities. However, there were two worrying features about moth migrations. The exact timing of the migrations is variable, hence the necessity for announcing the moths' arrival by smoke signal. A greater worry than a possibly protracted wait would have been the possibility of the moths being blown away by a storm whilst in flight. Vyner recounted that the Aborigines on the Bogong Range, Tumut, were afraid of scorching the bodies of the insects, 'as in such case a violent storm would inevitably arise, according to their superstitious notions' (cf. Bodenheimer, 1951:98). And when asked what was the significance of the ceremonies with the bull-roarers on the summits, the Aborigines told Payten's informants that 'it was to frighten the debil debils away' (m.s.:3).
Occasionally the Aborigines must have lost their moth supply, for storms did carry the moths off course and even right out to sea, as described by A.W. Scott, who saw long lines of their bodies washed up on the beaches near Newcastle (1869:40). On the 14th September, 1867, the Rev. W.B. Clarke could not conduct services in his Sydney church because it was full of moths; he counted more than 80,000 on the windows. And more recently, a flight occupied Electricity House in Canberra, and blacked out the National Capital. The loss of the season's moths would have been a severe blow to the Aborigines, for clearly the moths were an extremely important element in their subsistence pattern, providing a protein-rich diet which put them into first-class condition after the leanness of the winter.

Food preservation: Bennett describes how after cooking, the moths might be pounded into 'cakes' resembling lumps of fat. These would not keep for more than a week, but 'by smoking they are able to preserve them for a much longer period' (1834, I:272).

Certainly it would seem that they were carried down to the valley, for in the Tumut Valley Wilkinson described the moths thus:

'After being properly cured for eating they were more like prunes than anything else. They were carried about in Coolamons (the hollowed out bend of a tree)' (1970:9).

How long they could be preserved is another question. In practical experiments at different times four batches of cooked Bogong moths, 2 smoked and 2 unsmoked, grew mould in less than seven days, but this may reflect faulty cooking techniques. Alternatively the Aborigines may not have objected to the mould. The lack of Bogong moths last summer prevented any further experimental work to try to resolve this question of preservation.

However, the impression one receives from the ethnographic accounts is that the Aborigines feasted on the moths till all were eaten or at least all that were not too
inaccessible to catch. The latter would then re-migrate to their breeding grounds in about March. It is difficult, therefore, to envisage such huge quantities of moths that after 3-4 months of feeding several tribes, there would be many moths left to be preserved for future use.

Comparison with Bunya-Bunya: There are some clear parallels between the Bogong moth feasts and the Bunya Bunya gatherings in Southern Queensland (cf. Petrie, 1904), but also some basic differences. Similar features are the long distances travelled to the feast, its seasonal nature, the abundance and high food value of the nut-like seeds, and the festivities which accompanied the gathering. The concept of one man owning certain trees which his sons inherit is also reminiscent of Payten's suggestion that a group would own one particular moth-peak.

Differences between the two festivals are firstly, the Bunya-Bunya tree (a Queensland pine, Araucaria bidwillii) bears fruit only once every three years. Therefore it could not be relied upon, as the Bogong moths were, as a seasonal part of the annual diet.

Secondly,

'the supply is vastly larger than can be consumed by the tribes within whose territory the trees are found. Consequently, large numbers of strangers visit the district, some of them coming from very great distances, and all are welcome to consume as much as they desire, for there is enough and to spare, during the few weeks which the season lasts' (S. Bennett 1867:268).

This is not the situation with the Bogong moths, for although the supply was large, it was not necessarily larger than could be consumed by all the mountain tribes in the four months the moths were generally available.

Thirdly, the Bunya seeds could be preserved for some months by burying them in the beds of creeks. When dug up, they had an offensive smell, but were eaten with great relish (John Mathew in Curr 1887, III:161-2; Petrie,
Visiting tribes also purchased bags of the seeds when they returned home in exchange for other non-food items (Petrie, 1902). Bogong moths could also perhaps have been preserved by smoking for some time but as they were available so much longer, large-scale preservation seems unlikely, and there is no evidence for Bogong moths being traded as food.

The main difference, I think, is that the Bunya-Bunya nuts were not a staple part of the annual diet, but rather an occasional treat, rather like the feast and festivities accompanying the occasional stranding of a whale on the beach. They were also more limited geographically and temporally than the Bogong moths, so strangers from far and wide could be invited to join the feast in a way which was probably not practicable for the moth-hunters, although the organisation of the two festivals appears to be similar.

II. The Scientific Evidence

The two-way migration of the Bogong moth is a phenomenon of great interest in itself, which has been studied in detail by Dr. I.B. Common of C.S.I.R.O. Entomology Division (1954:223-63).

The moth, Agrotis infusa (Boisd.) (Lepidoptera:Noctuidae) has an annual life cycle illustrated in figure 9, which also shows its migration routes. The seasonal pattern of migration and aestivation is described by Common as follows:

'There is strong evidence that large populations of the larvae of A. infusa occur commonly during the winter over a wide area of New South Wales...Major migrations have been observed in a southerly direction in the spring and early summer towards the mountains of southern New South Wales and Victoria, and a similar movement in a northerly and westerly direction away from the mountains has been observed in the late summer and early autumn. There is also evidence that very large populations of the moths aestivate in a sexually immature condition at high altitudes for a period of several weeks when they do not seek food' (1954:253-4).
In September-October each year moths of the spring generation migrate to the mountains, and Common observed large flights flying at altitudes of about 600 to 1500m. above the ground towards the A.C.T. peaks from September to November. Before settling in their permanent 'camps' above 1300-1370m. (4250-4500 ft.) temporary camps were occupied at lower altitudes in the Brindabella Range, the moths clustering amongst rocks on scree slopes and even on the underside of fallen tree trunks. The location of these temporary and permanent moth camps is shown on figure 17. The regular moth camps there all have a westerly aspect, the Mt. Gingera camp occupying fissures, clefts and small caves in the summit rocks, and for some distance down the south-west slope and at the north-west end. The dark and dry portions of these rock crevices are usually covered with a mass of quiescent moths forming a scale-pattern on the walls (see plate 3). Each moth rests with its fore tarsi gripping the rock surface and its mid and hind legs on the backs of the moths behind. Moths that join the cluster later thrust the anterior part of their bodies beneath the abdomens and wings of the moths before them. In such compact formations, the individuals are probably able to resist desiccation much more effectively than are isolated moths.

On the floor of the rock-crevices is a deposit of moth debris, composed of moth scales and particles of chitin. Mortality is probably caused by a mermithid nematode parasite when its larvae emerge from parasitized moths in mid-summer. This parasite appears to be confined to the moth camps, where its life cycle has been adapted to the aestivation habit of its host. In places on Mt. Gingera the debris from dead moths is more than 30cm. (1 ft.) in depth, indicating to Dr. Common that 'the camp had been occupied for a very long time' (ibid. 228). How old then would be the camp on Bogong Mountain where Vyner found the moth debris to be 120cm. (4 ft.) deep?

It has not yet been possible to date the antiquity of the moth migrations, but archaeological evidence described in chapter 13 suggests that they are at least a thousand
years old. Common suggests that the migration and the facultative diapause which occurs in the adults of the spring generation have arisen in order to escape the breeding grounds in summer, when 'they are dominated by perennial grasses unpalatable to the larvae' (1954:224,260). However, he also thinks the migrations most probably began in response to increasing heat in the breeding grounds (Common, pers.comm.). Such a warming-up phase would have taken place at the end of the glacial period probably between about 15,000 and 8,000 years ago (see chapter 2), but there appears to have been another colder spell, followed by an amelioration about 1,500 years ago. Which, if either, of these warming-up periods the moths migrated to the mountains to escape, must remain for the moment an open question.

Value of diet: Common also studied the fat content of the moths, and found the average fat content of the males' abdomens exceeded 61% and of females 51% of their dry weight. This would form a very high-protein diet, so it is no wonder the Aborigines returned fat and sleek after two or three months of feasting on Bogong moths.

Distribution: It should be emphasised that, at least nowadays, moths do not occupy every granite summit above 1370m. (4500 ft.), but show a preference for the deepest and darkest cracks and crevices. Some granite tors are therefore more attractive to moths than others. In the summer of 1972-3 the only place in New South Wales where Bogong moths were found in any quantity was the 1500m. granite tors of the Bogong Range above Yarrangobilly. These contain innumerable dry dark crannies and caves. Very similar formations are found on the Ramshead peaks in the Kosciusko range, and deep deposits of moth wings and chitin testify to the past presence of large numbers of moths, but no live ones were seen there last summer.

In this Ramshead and Bogong Range, one tor would probably contain habitats for a large enough moth population
to feed one group of people for a season, but where the tor is less dissected and smaller, a larger area would be needed. However, when plentiful, moths will aestivate even under boulders on a scree slope, so peaks like Kosciusko itself which lack caves and crevices might well then become a moth habitat.

The distribution of known Bogong moth camps on the granite peaks of the southeastern Highlands is shown in fig. 9. A few areas in northeastern New South Wales would appear to be high enough to attract aestivating moths, but no summer assemblages have been reported from this region, nor any utilisation of this food by local Aborigines. Outside Australia Agrotis infusa is found only in New Zealand, where it does not appear to carry out any two-way migration or aestivation.

Jardine estimated that the Aborigines must have eaten several tons of moths during their two or three month stay each year (1901:54) and Vyner said he ate on one occasion a 'quart' [1 litre] of the moths, and then came back for more (Scott, 1869). It would be difficult to find these quantities now, for the numbers of moths seem to be decreasing rapidly. In none of the last four summers, 1969-1973, has the quantity of moths on Mt. Gingera approached anywhere near those recorded and photographed by Common in the early 1950's. Moreover, moth aestivation sites are now restricted to a higher elevation than they were 140 years ago, when moths were to be found at 1220m. (4000 ft.) on the northern half of the Bogong Range (Bennett, 1834:267). A search of the Warrogong area described by Bennett as 'where the Bugong-moths congregate', revealed only a very small amount of debris from dead moths.

The reason for this general decrease in Bogong moth numbers is probably the ever-increasing use of insecticides in the pastures of western New South Wales and southern Queensland, where they breed. Agrotis infusa, which was of such value to the Aborigines, was named Agrotis vastator by the European settlers, and considered to do considerable damage in its larval stage to crops such as wheat and
linseed on the heavy black soils of its breeding grounds. However, it emerges that cutworms such as *Agrotis infusa* "rarely form dense masses as larvae", unlike the destructive army worms, webworms, scarabs, plague locusts or grasshoppers (Wallace, 1970:361-6).

Dr. Common of C.S.I.R.O. is of the opinion that the decrease in Bogong moth numbers may be due to a naturally fluctuating population, but the ethnographic evidence suggests that in the protohistoric period their numbers were both large and reliable.

Nowhere, now, do moths form 'a dark cloud' as they rise in the air (Jardine, 1901:54), or are ravens found by the thousand around the rocks where millions of moths congregate (Helms, 1890:14). It begins to look as if the coming of the European is proving as disastrous for the moths as for the men in the Monaro.
Chapter 7

Economy

I. Ethnographic Evidence and Food Resources:
   Land Resources

Subsistence activities of the Aborigines in the Southern Uplands are here reconstructed as far as is possible from direct and indirect ethnographic observations. The range of foods exploited is described, and their relative importance assessed in the total diet. A general survey of food resources is undertaken, with particular attention to the relative abundance, or scarcity, permanent or seasonal availability, and ease or difficulty of procurement of the various foods. From this resources survey and ethnographic evidence a reconstruction is attempted of the annual hunting and gathering cycle, season by season. The picture that emerges is compared with the economy of similar highland zones, and contrasted with that of the coast and inland plains of New South Wales.

The wide range of foods known to have been exploited in the Southern Uplands is illustrated in Appendix 3A, which lists all observations both direct and indirect of hunting and gathering activities. In the ethnography fifty-three different foods are mentioned, of which sixteen are derived from riverine sources and thirty-seven from the land. Table 7:1 quantifies this information in an attempt to assess the relative importance of different foods. Data from indirect observations and generalized accounts are included to try to attenuate the problems.

1 The region of the Southern Uplands is a geographical entity with regard to fauna, and corresponds exactly with that defined as the south-eastern highlands by Dr. H.J. Frith, head of the Division of Wildlife Research, C.S.I.R.O. (1969:16).
Table 7:1. Observations of subsistence activities in the Southern Uplands.

<table>
<thead>
<tr>
<th>Food</th>
<th>Direct obs.</th>
<th>Indirect obs.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land mammals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large terrestrial</td>
<td>2</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Small terrestrial</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Arboreal (possums)</td>
<td>9</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emu</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Eggs</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td><strong>Insects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grubs</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Bogong moths</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td><strong>Vegetable Foods</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Yams</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Roots</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Fruits</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Honey and manna</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td><strong>Riverine foods</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Fish</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Eels</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Shellfish</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Crayfish</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Platypus</td>
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<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Aquatic birds</td>
<td>0</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Turtle</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>21</td>
<td>33</td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td>43</td>
<td>81</td>
<td>124</td>
</tr>
</tbody>
</table>
inherent in direct observations of subsistence activities. These are:

(a) Foods procured by women are likely to be poorly represented since, as shown in Chapter 4, women were seen less frequently than men.

(b) Some activities, such as fishing and possum-hunting, are more likely to be observed than more mobile ones like kangaroo-hunting.

(c) In the Uplands regions, no journeys, and hence no direct ethnographic observations, have been recorded in the winter months.

It will be seen in Table 7:1 that vegetable foods, the traditional preserve of women with their digging sticks, are much better represented in the indirect than the direct references. The same applies to large terrestrial mammals, for although kangaroos and wallabies are generally thought to have been an important item in the diet, actual hunts were seldom observed. Clearly no weight can be put on the exact number of references to any particular food, but its percentage of the total may throw some light on its relative importance.

The greatest number of ethnographic references on Table 7:1 are to possums, large terrestrial mammals (mainly kangaroos and wallabies), fish, aquatic and other birds, yams and other tuberous roots, reptiles and Bogong moths.

Factors which will be considered below in assessing the likely relative importance of these foods in the total diet are the ease or difficulty of procuring them, their abundance or scarcity, and permanent or seasonal availability.

A. Possums: Statements made by writers on five different regions within the Southern Uplands suggest that possums were of primary importance in the subsistence diet. Thus Barrallier said that the natives of the lower Blue Mountains "usually feed upon possums and squirrels, which are abundant in that country" (1802:751);
normal diet of the Canberra Aborigines was described as being "possums and yams" by John Gale (1927:58); that of the Bathurst tribe to be possums and kangaroos (Meredith 1861:94); possums were said to be "the most frequent meal" in the Monaro - Omeó region by Richard Helms (1895:394) and "to constitute the ordinary animal food of the natives" in north-eastern Victoria by Brough Smyth (1878,1:188).

The abundance and ease of capture of possums is also attested by Brough Smyth:

'They furnish the natives with an abundant supply of animal food in all the well-timbered tracts...in situations suitable to them are very numerous...they are taken with comparative ease' (1878,1:188).

On the latter point one might have some doubt since possum-hunting usually involved climbing quite lofty trees, but Brough Smyth testified that the Aborigines were "very expert and nimble in climbing to a great height, whether the tree be straight or crooked, or of large or small dimensions...The natives takes his tomahawk and cuts a notch in the bark of the tree about three and a half or four and a half feet from the ground [1-1.4m.]". Possums also appear to have been present in reasonably large numbers at all seasons in the wooded parts of the Southern Uplands, although like kangaroos their numbers appear to have increased as their Aboriginal predators decreased (Brough Smyth, 1878, 1:184).

**Macropodidae:** Kangaroos and wallabies were present in abundance on the open grasslands and park-like savannah woodland found by the early explorers on the Southern Uplands. Thus Barrallier described the foothills of the Blue Mountains as "covered with kangaroos which resemble a flock of goats grazing peaceably" (1802: 767); in the Braidwood region in 1822 Kearns said "the country abounded in kangaroos and emus" (Feb.8th); around Lake George Alan Cunningham encountered flocks of kangaroo and emu (1824:April 7th); and Hume and Hovell found plenty of kangaroos on the banks of the Murrumbidgee River, on the top of the ranges, and in the mountain valleys of the
Goobragandra and Tumut Rivers (1824: Oct. 26th, 28th; Nov. 2nd, 3rd). On the tablelands macropodids would have been more plentiful in winter than in summer, for, as Bennett observed in the Tumut valley in 1832, "it is usual for kangaroos to frequent the high land during the summer, seeking the more sheltered situations in winter" (1834, I:290). In general they frequent the montane tract, but in summer in the Canberra region they are found up to 1525m. (5000 ft.) and in the Kosciusko region up to 1830m. (6000 ft.). Generally the winter snows would drive them down at least below the snowline around 1300m. (4500 ft.) from June to September.

The only problem was to catch the kangaroo. This was by no means as easy as climbing a tree for a possum. The natives of the lower Blue Mountains were described by Barrallier as usually feeding upon possums and squirrels (i.e. gliders) and also upon kangaroo-rat and kangaroo, "but they can only catch this last one with the greatest trouble, and they are obliged to unite in great numbers to hunt it" (1802:751). He then gave a vivid description of one of these kangaroo drives:

'When the natives assemble together to hunt the kangaroo, they form a circle which contains an area of 1 or 2 miles, according to the number of natives assembled. They usually stand about 30 paces apart, armed with spears and tomahawks. When the circle is formed, each one of them holding a handful of lighted bark, they at a given signal set fire to the grass and bush in front of them. In proportion as the fire progresses they advance forward with their spear in readiness, narrowing the circle and making as much noise as possible, with deafening shouts, until, through the fire closing in more they are so close as to touch one another. The kangaroos, which are thus shut into that circle, burn their feet in jumping on every side to get away, and are compelled to retire within the circle until the fire attacks them. They then try to escape in various directions, and the natives frightening them with their shouts throw their spears at the one passing nearest to them. By this means not one can escape. They roast the product of their chase, without skinning nor even gutting the animals, and then divide it among themselves, after having cut each animal into pieces".
A similar co-operative method of kangaroo-hunting is to drive them into a river, as recorded by Bennett in the Tumut Valley. Another method used by the natives, he said, was "on observing one approaching, by remaining perfectly quiet, they are mistaken by the animals for the charred trunk of a tree, and fearlessly advancing, are speared or killed by clubs" (1834, I:287).

On the New England Tablelands large permanent nets were apparently erected in the richest hunting grounds (Gardner, 1854, I:186), but these are unrecorded in the Southern Uplands. Probably the most common means of procuring kangaroos for food, however, was by the use of fire. This could serve a dual purpose, for by the firing of dry grass and undergrowth game such as kangaroo was obliged to flee into the open where it could be speared, and when the young grass grew again after the fire, game was tempted out of the bush to feed on the tender new shoots, and therefore was again exposed to the hunters. The considerable number of sightings of smoke from large-scale fires and of burnt ground are detailed in Appendix 1A. In four instances it is specified that the country had been set on fire for the purpose of hunting, or that where it had been burnt tender young feed was springing up. Geographically, the observations are widely dispersed, and occur both on the grass of open tablelands and on wooded ranges, but not up to subalpine or alpine levels.

Wombats are barely mentioned in the ethnography, but would have been readily available, especially in the wet sclerophyll forest, fairly easy to catch, and make excellent eating.

C. Birds and Reptiles: Of the other foods suggested to be the staples in the diet of the Southern Uplanders, birds, snakes, lizards and emus would have been available all the year round. Bluett described the emu as more difficult to catch than kangaroos, wallabies or wombats (1954:6); although they were plentiful on the Southern Tablelands they would always have been less common
in the cold highlands (Frith, 1969:38). Probably for this reason the flesh of an emu was forbidden eating for the Omeo and Monaro tribes "till some time after the arrival at the age of manhood" (Helms, 1895:393). Likewise among the Wolgal tribe of the Bogong Range "Novices were forbidden to eat...above all, emu eggs" (Howitt, 1904:564). Emus are still fairly plentiful in the lower Snowy Valley and a small flock is sometimes seen in the Snow Gum country around Cabramurra and Kiandra (Wimbush, 1971:27).

There were certain similar taboos on the eating of emu, and also of duck on the central Murrumbidgee River region (Sturt, 1833, I:54-5). Sturt commented, "This evidently is a law of policy and necessity, for if the emus were allowed to be indiscriminately slaughtered, they would soon become extinct". There is no record of any such restrictions on the eating of ducks in the Southern Uplands region, where they seem to have been particularly plentiful. On his first sight of Lake Bathurst Governor Macquarie described the lake as "covered with innumerable flocks of wild ducks and a great many black swans" and at Lake George he noted "ponds full of black swans, Native Companions, and ducks" (1820:153, 159). Aquatic birds also appear to have been abundant on the smaller lagoons, swamps, and along the rivers; "the waters held ducks by the hundreds of thousands ...when frightened they flew across the face of the sun, and darkened it like a heavy cloud" recollected W.P. Bluett of the Queanbeyan, Molonglo, and Murrumbidgee Rivers (1954:6). In the Southern Uplands there are eight resident breeding species of duck and three common visitors (Frith, 1969:88).

No duck snares, nets or other special bird-hunting equipment are on record for the Southern Uplands, but even without sophisticated equipment, aquatic birds could have been hit on the wing with a boomerang (Helms, 1895:401), or caught in pits dug at the side of lagoons and covered with grass as in the Sydney district (Collins, 1798:558), with slip nooses attached to triangles of bent reeds or long rods as used at Moorunde on the lower Murray River (Eyre, 1845, II:285), or caught by hand by a diver under-

1Native Companions = Brolgas (Grus rubicunda) see Frith, 1969:154,158.
water breathing through a reed, a method witnessed in the Goulburn area by early settler, Charles Macalister (1907:88).

After breeding in July-August, the Mountain Ducks (*Tadorna tadornoides*) each year concentrated on large lakes such as Lake George, and big flocks of as many as 2000 flightless, moulting birds would be found there, and probably easily caught (cf. Frith, 1969:92).

Wild turkeys (the Australian bustard, *Eupodotis australis*), would have been another excellent source of food, weighing on occasion over 8kg. (18 lbs.) (Macquarie, 1820:154), although their fleetness of foot and preference for the open plains would make them difficult to catch, like emus. According to John Lhotsky, they were plentiful on the Southern Tablelands, but were not observed on the Monaro Downs (1835:25).

Smaller birds probably provided an important source of protein throughout the region, since they could be hit with a stone with comparative ease, even by children, as observed by Gould (1967:49) in the Western Desert of Australia. Dr. J. Hope witnessed the same phenomenon in the Highlands of New Guinea (pers.comm.). There, any teenager could obtain birds, eggs, or fleglings, whereas skill and experience was needed to hunt most of the mammals. Over 150 species of birds have been recorded in the Monaro (Costin, 1954:98-101), many of them resident throughout the year, although some seasonal altitudinal migration takes place from the highlands to the tablelands in winter. Of 100 perching birds recorded in the Australian Capital Territory, 59 are resident, the others being nomadic or regular summer migrant visitors (Dept. of Interior, 1968:40-1).

II. Riverine Foods

Fish appear from Table 7:1 to have been an important item in the diet, but were not mentioned in any of the general accounts as rivalling possums, kangaroos or yams as a staple food. This stems, I think, from the comparative ease with which fishing could be seen by itinerant
observers, and from the fact that all direct observations in the region belong to the spring-summer-autumn period when there was likely to be more fishing than in winter. Seasonal variation in river flow on the Southern Uplands is not as great as in the lower stretches of the rivers to the west, but in winter, from May to September, the water is too cold and the fish move downstream. They move up again in about September to spawn, and will move several hundred kilometres up towards the headwaters. Thus from October to April there would be plenty of fish movement right throughout the Tablelands rivers.

In the rivers of the Southern Tablelands fish were certainly plentiful. Barrallier described the Wollondilly River as "teeming with different species of fishes and shells" (1802:765). Hume and Hovell found the rivers around Yass abounding with excellent fish, "like those in the Lachlan" (1824:Oct.21st). And in the Queanbeyan River Kearns, Marsh and Packard caught a great quantity of fish, "the largest of which weighed about 15 pounds[7kg.]. They were rock cod and perch" (1822:Feb.2nd).

In reviewing the native fish resources of the Southern Uplands a distinction must be made between the westward flowing Murrumbidgee-Murray-Darling drainage system and the south-eastern slopes system characterised by rivers which are generally short and have a large run-off. To the latter belong the Shoalhaven and Snowy River, which discharge annually $0.6 \times 10^9$ and $1 \times 10^9$ metric tons respectively (Lake, 1971:9-11).

Different groups of freshwater fishes are found in these two drainage systems, and are listed in Appendix 3B from data in Lake's *Freshwater Fishes and Rivers of Australia* (1971).

In the Murrumbidgee River and in all except its uppermost tributaries Murray Cod (*Macullochella macquariensis*) occur in fair numbers and average 4-13kg. (10-30 lbs.), specimens of up to 30kg. (66 lbs.) being not uncommon. Other fish which are of a reasonable size and make excellent eating are the Trout Cod (*Macullochella mitchelli*) which
weighs up to about 16kg. (35 lbs.), and the Silver Perch (*Bidyanus bidyanus*) which can reach a length of 60cm. (2 ft.) and a weight of 8kg. (17 lbs.), but in the Canberra region is generally in the 1-2kg. (2-4 lb.) range. In the cooler higher reaches of the Murrumbidgee River and its tributaries such as the Cotter River, Macquarie Perch (*Macquaria australasica*) favours the same localities as the introduced trout, and reaches about 30cm. (1 ft.) in length.

In the Snowy River and its tributaries and in the other southward and eastward-flowing rivers of the south-eastern slopes drainage system eels (*Anguilla australis* and *A. reinhardtii*) would have provided an excellent food source. They grow to over 1 metre in length and to the thickness of a man's arm. In Australian rivers they do not make an annual migration as they do in New Zealand, but may spend ten to twenty years in freshwater before descending to the sea to spawn. Other fish available in this south-eastern drainage system would have been the Australian Grayling (*Prototroctes maraena*), which has been taken high up in the Snowy River, and grows to a maximum of 30cm. This Grayling probably spawns in freshwater (Lake, 1971:21-2). Still common in the Snowy River below Jindabyne is the River Blackfish (*Gadopsis marmoratus*) which reaches a size of 20-35cm. Various species of *Galaxias* are also found in the Southern Uplands, but most are less than 10cm. long.

Most of these fish were considerably more common in prehistoric times than they are today, when several species, such as the Australian Grayling, the Macquarie Perch, the Trout Cod, and the River Blackfish are threatened with extinction (Lake, 1971:50-3).

It seems clear then that fish of a good size would have been abundant in the Murrumbidgee system and that smaller fish would have been available in the lower reaches of the mountain streams. In the Snowy River system no very large fish would have occurred, but the large eels found there might have occupied an important place in local subsistence.
Fishing methods: Eels were caught by Aborigines in the Sydney region in hollow log traps (Collins, 1798:558), and were stupefied by an infusion of bark in inland ponds near Twofold Bay (Robinson, 1941:336).

In the Southern Uplands region three methods of taking fish are described (references in Appendix 3A). The first is an individual activity, the fish being speared from a canoe, with a bait on the end of a spear, or simply run through from the bank, as Mrs. Meredith graphically described in the Bathurst region:

'The Macquarie cod sometimes weighs seventy pounds [32kg.] or more. The natives catch them with spears made expressly for the purpose, in the use of which they are very adroit...These fishing-spears are twelve or fourteen feet long [3.6 to 4.2m.], made of hard wood, usually some kind of Eucalyptus, well sharpened at the end, but not barbed in any way...The native thus armed crouches or lies down on the overhanging bank of the river, or on a fallen tree or old log over the water, intently and motionlessly watching his prey. He then slowly and stealthily glides his spear down towards the water; then dips it a little way, then pokes it farther and farther, so softly as not to alarm the fish; and when quite certain, with one thrust runs it through the unfortunate cod, and brings him up.' (1861:105).

The other two methods both involve group co-operation. In the Canberra region Samuel Shumack recorded (1967:151):

'One of the old hands described to me the blacks' primitive manner of fishing. There was a long water-hole in the Molonglo River near the Duntroon dairy, and about a dozen stalwarts would enter the water at one end. A few minutes later most of the tribe would enter the waterhole at the other end and move forward, making all the noise possible. This disturbance drove the fish to the other end, where the natives speared a great many.'

In the Araluen valley of the Coastal Ranges Martin Brennan (1907:211-2) witnessed a different method of fishing:

'I have seen them in the Duah river dam the course, place the leaves and branches of ti-tree or hickory in the waterhole, then insert poles under the rocks and into crevices, when after a short period the fish
'floated to the surface apparently dead, but in reality only stupefied from the narcotic effects of the leaves.'

Crayfish, Shellfish etc.: Other riverine food resources which we know were exploited by the upland Aborigines were platypus, crayfish, tortoise, and shellfish. There is no evidence on which to assess their prehistoric abundance or scarcity, although shellfish at least were plentiful in the Wollondilly, and presumably other rivers of the Southern Tablelands (Barrallier, 1802: 765). The type of shellfish was not recorded except by Alan Cunningham who found "bivalve shells of Genus cardium" in the Murrumbidgee River south of Canberra (1824: April 17th), but large mussels of the superfamily Unionoidea are common in the Murrumbidgee-Murray system and in the rivers of eastern New South Wales and Victoria (McMichael, 1967; McMichael and Hiscock, 1958).

The presence of fresh-water tortoise (also called turtle) was observed in Lake George in 1822 (Kearns: Jan. 30th), and was probably the Eastern Long-necked Tortoise (Chelodona longicollis) which is still common in the pools of the Molonglo-Murrumbidgee Rivers. Aboriginal use of this food is suggested in general accounts of the Canberra and Bathurst Aborigines.

With regard to fresh-water Crustacea, some confusion has been caused by the use of three names, crayfish, lobster and yabbie. In fact they are all different species of freshwater crayfish, distinguishable from marine crayfish by their possession of large chelae or nippers. Among the various species of crayfish, two were of interest to the Aborigines, the large spiny crayfish, Euastacus armatus, of the major streams and the small 'Yabbie', Cherax sp., of the ponds and swamps. The latter were considered delicious eating by George Bennett, who recorded on the Yass Plains that "they burrow deep into the mud, and the blacks capture them by thrusting the hand into the holes, and dragging them out, although they often extend to such a
depth that the whole length of the arm is inserted before
the animal is secured" (1834, I:211). Yabbies measure up
to about 13cm. (5 inches) long, but the spiny crayfishes
of the major rivers are much larger, measuring 30-45cm.
(12 to 18 inches) in length, and weighing 1-3kg. (3-6 lbs.).
They are found under large stones in the rivers, and were
taken by hand by the Aborigines when the rivers were low
(ibid:213). Other small crayfish are found in the small
streams and soaks of the mountain ranges right up to the
topmost permanent waters on Mount Gingera and Mount Kosci­
usko, and could have provided at least a tasty mouthful
there, along with the colourful Corroboree Frog (*Pseudo­
phryne corroboree*).

Seldom were Aborigines' food preferences recorded in
the Southern Uplands, but Bennett noted two items they
particularly liked, the flesh of an emu, regarded as "a
highly luscious treat", and the young of a platypus
described as "Murrey budgeree patta" (Very good to eat)
(1834:298; 1860:110). The young were obtained by digging
out the burrows in the summer, but adult platypus were
also speared from the banks with small wooden spears
(Collins, 1798:321). Platypus (*Ornithorhynchus anatinus*)
is found in all permanent streams in the upland region
which have fairly large pools, even up to the alpine zone.
They are seen at all times of the year, but are most abun­
dant during the spring and summer months.

General consideration of these riverine resources
suggests that on the criteria of size and availability the
only species which could have played an important part in
the Aboriginal diet would be the large fish, crayfish and
shellfish found in the warm waters of the Central Murrum­
bidgee and its lowland tributaries, and perhaps the eels
of the Snowy River system. In the spring and summer
months these foods would perhaps have provided a magnet
towards the rivers and lagoons of the tablelands. However,
a glance at a map will show that the tablelands are so
abundantly supplied with rivers and lagoons, that they
would be a natural camping place without any such special
food resource. This makes it difficult to distinguish 'riverine' from 'non-riverine' regions as has been done in western New South Wales, and therefore to assess the relative importance of riverine foods in the diet. In this sense one could term the whole Southern Tablelands and Monaro 'riverine'. In the Southern Uplands region it is altitude, rather than distance from a major river, which makes the environment non-riverine, since the fast-flowing mountain streams and swamps provide far less food resources than the major rivers and lakes below.

III. Vegetable Foods

In the Southern Uplands the vegetable food most often mentioned by ethnographers was 'yams'. These are not the yams of tropical latitudes (Dioscorea spp.), but the white, milky tubers of the bright yellow daisy, Microseris scapiger. The small tubers have a coconut-like flavour, and were compared by Brough Smyth with the Spanish vegetable scorzonera (1878, I:209). They occur at all latitudes from sea-level to Alpine summits, and were called Mirr-n'yong. These 'yams' were clearly an important food in the Sydney region, for Hunter noted that the banks of the Hawkesbury River had the appearance of being ploughed, so extensive were the diggings for yams (1793:150).

Much utilized also on the coast were the fern root (Pteridium esculentum and/or Blechnum spp.) and the nut of the Zamia palm (Macrozamia), but it is suggested that vegetable foods were only eaten when other food was scarce (Bradley, 1786-92:107) and were more important when away from the coast (Dawson, 1830:310 regarding Port Stephens).

A resources survey of edible plants indigenous to the Southern Uplands has been carried out to supplement the meagre ethnographic information listed in Appendix 3A. Table 7:2 was compiled by me after collecting together all available ethnographic references to plants utilized by Aborigines, and checking them against the local flora. My sources of ethnographic observations were Maiden's Useful native plants of Australia (1889), Lawrence's
C1968 - Table 9) lists for the South Coast and his and Allen's (1968) for the riverine area of New South Wales, Jones' for Tasmania (1971:Table 1), and Golson's for Northern Australia (1971:211 ff.). The plant foods listed on Table 7:2 occur in the Southern Uplands and are:

(a) Those known to have been utilized by Aborigines,
(b) Those which are edible, and which were probably utilized.

In the table those of group (b) above are distinguished by the absence of an ethnographic reference, or by a bracketed reference to Maiden (1889). Two Floras have been used in compiling this list, that of the Canberra region by Burbidge and Grey (1970) and that contained in Costin's Ecosystems of the Monaro (1954)\(^1\).

Problems encountered during this resources survey of vegetable foods were that considerable changes in the distribution and abundance of species have taken place in the last 150 years. This is particularly the case on the tablelands, where some native grasses have completely disappeared since the introduction of European stock. In other cases it is suggested that some plants such as bracken are much more widely distributed today than in prehistoric times. It is also not known if some species are native to the region or were introduced after European settlement. However, botanists such as Pryor (1954:163) have said that it is possible to reconstruct the plant communities of presettlement days "with a good degree of certainty". Therefore, although there may be some errors in detail, one can gain a fairly accurate picture of the plant foods available to the Aborigines before their disruption by the colonists in the nineteenth century.

\(^1\) I have been fortunate to have the opportunity of discussing this topic of edible plants with Burbidge, Grey and Costin in person. I wish to acknowledge their helpful advice and criticism, and also that of Ingwersen, as a result of which I have greatly expanded and improved my original draft. Any omissions or errors, however, are of course my own responsibility.
**TABLE 7:2 Edible Plants of the Southern Tablelands and Highlands of South-east Australia.**

<table>
<thead>
<tr>
<th>GENUS AND SPECIES</th>
<th>COMMON NAME</th>
<th>USE OF SPECIES</th>
<th>REFERENCE</th>
<th>OCCURRENCE</th>
<th>HABITAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTERIDOPHYTA - CYATHEACEAE</td>
<td></td>
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<tr>
<td>Dicksonia antarctica</td>
<td>'Tree fern'</td>
<td>Trunk was split open and starchy pith eaten raw or roasted.</td>
<td>M:22</td>
<td>In moist gullies in wet sclerophyll forest. Not widely found but available throughout year.</td>
<td>Wet sclerophyll.</td>
</tr>
<tr>
<td>Cyathea spp.</td>
<td>' '</td>
<td>' '</td>
<td>M:21</td>
<td>Much less common than Dicksonia, but has a less bitter blander taste.</td>
<td>Wet sclerophyll.</td>
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<td>DEENSTAEDTIACEAE</td>
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<tr>
<td>Pteridium esculentum</td>
<td>'Bracken'</td>
<td>Thin starchy rhizomes eaten raw or roasted.</td>
<td>M:54</td>
<td>In Dry and Wet Sclerophyll forest. Common, and rhizomes available late summer to autumn.</td>
<td>Tableland - Montane.</td>
</tr>
<tr>
<td>BLECHNACEAE</td>
<td></td>
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<tr>
<td>Blechnum spp. (4)</td>
<td>'Fern'</td>
<td>' '</td>
<td>M:54</td>
<td></td>
<td>Tableland to sub-Alpine.</td>
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<tr>
<td>GYMNOSPERMAE - PODOCARPACEAE</td>
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<tr>
<td>Podocarpus lawrencei</td>
<td>'Mountain Plum'</td>
<td>Fleshy stalk of fruit edible.</td>
<td>(M:53)</td>
<td>Summer - Autumn. Locally abundant, but small yield.</td>
<td>Sub-Alpine.</td>
</tr>
<tr>
<td>ANGIOSPERMAE - GRAMINEAE</td>
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<tr>
<td>(syn. Antichilaria australis)</td>
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<tr>
<td>Sorghum leioscladum</td>
<td></td>
<td>' '</td>
<td>Bluett 1954:6</td>
<td>Sets a considerable amount of seed in summer.</td>
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<tr>
<td>TYPHACEAE</td>
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<tr>
<td>Typha orientalis</td>
<td>'Bulrush' or</td>
<td>Glutinous rhizomes were roasted.</td>
<td>M:66 and Bennett 1834:183,</td>
<td>Fairly rare. (Gathered in large bundles on Murray and Lachlan rivers in summer).</td>
<td>On tableland rivers.</td>
</tr>
<tr>
<td>T. domingensis</td>
<td>'Balyan'</td>
<td>' '</td>
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<tr>
<td>(syn. T. brunnii)</td>
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<tr>
<td>CYPERACEAE</td>
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<tr>
<td>Eleocharis arctica</td>
<td>'Tuber Spike-Rush'.</td>
<td>Small tubers were eaten raw.</td>
<td>M:35</td>
<td>Tubers are c. 4 x 2.5 mm. Seeds may also have been eaten.</td>
<td>On rivers on low table-land.</td>
</tr>
</tbody>
</table>

M = Maiden, Useful Native Plants 1889.
<table>
<thead>
<tr>
<th>GENUS AND SPECIES</th>
<th>COMMON NAME</th>
<th>USE OF SPECIES</th>
<th>REFERENCE</th>
<th>OCCURRENCE</th>
<th>HABITAT</th>
</tr>
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<tbody>
<tr>
<td><strong>LILIACEAE</strong></td>
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</tr>
<tr>
<td>Anguillaria dioica</td>
<td></td>
<td>Edible tubers</td>
<td></td>
<td>Fairly common.</td>
<td>Tableland.</td>
</tr>
<tr>
<td>Bulbinopsis bulbosa</td>
<td>'Native Leek'</td>
<td>Edible tubers</td>
<td>Br. Smyth 1878, I:212</td>
<td>Common in grassy woodland areas, where locally abundant. Flowers about October in lowlands but in late summer on high mountain ridges.</td>
<td>Tableland-Sub-Alpine.</td>
</tr>
<tr>
<td>Thysanotus tuberosus</td>
<td>'Fringed Lily'</td>
<td>Roots and base of stem eaten.</td>
<td>Br. Smyth 1878, I:212</td>
<td>Not uncommon in woodland or open forest habitats.</td>
<td>Montane.</td>
</tr>
<tr>
<td><strong>XANTHORRHOACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lomandra longifolia</td>
<td>'Mat rush'</td>
<td>Base of leaves edible.</td>
<td></td>
<td>Common in savannah woodland and forest habitats.</td>
<td>Tableland - Montane.</td>
</tr>
<tr>
<td>Xanthorrhoea australis</td>
<td>'Grass Tree' or 'Blackboy'.</td>
<td>Base of young inner leaves eaten raw, or roasted.</td>
<td>M:67</td>
<td>Found in dry sclerophyll zones, locally abundant. Flowers late, shoots in autumn.</td>
<td>Tableland - low Montane.</td>
</tr>
<tr>
<td><strong>HYPOXIDACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ORCHIDACEAE - c. 27 spp.</strong></td>
<td>'Orchids'</td>
<td>The small tubers were roasted.</td>
<td>Bennett 1834, I:81.</td>
<td>Fairly abundant. Tubers largest in autumn-winter, but orchids easiest to find when flowering in Spring.</td>
<td>Tableland - Most common in dry Sclerophyll.</td>
</tr>
<tr>
<td>Castrodia semenoides</td>
<td>'Potato Orchid'</td>
<td>Tubers (similar to kidney potatoes) were roasted.</td>
<td>M:32</td>
<td>Not common. Found in leaf litter under Snow Gums.</td>
<td>High Montane Sub-Alpine.</td>
</tr>
<tr>
<td><strong>CASUARINACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casuarina stricta</td>
<td>'Mountain She-Oak'</td>
<td>Leaves and young cones were chewed (raw).</td>
<td>M:15</td>
<td>In dry sclerophyll available winter-spring. Locally common.</td>
<td>On low hills up to 760 m.</td>
</tr>
<tr>
<td>GENUS AND SPECIES</td>
<td>COMMON NAME</td>
<td>USE OF SPECIES</td>
<td>REFERENCE</td>
<td>OCCURRENCE</td>
<td>HABITAT</td>
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<tr>
<td><strong>PROTEACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banksia spp.</td>
<td></td>
<td>Flowers were sucked for nectar.</td>
<td>M:10</td>
<td>Locally common in dry sclerophyll in spring - summer.</td>
<td>Tableland - Montane.</td>
</tr>
<tr>
<td>Grevillea spp. (7)</td>
<td></td>
<td>&quot; &quot;</td>
<td>M:33</td>
<td>Common, available spring - autumn.</td>
<td>All zones.</td>
</tr>
<tr>
<td>Persoonia spp. (3)</td>
<td>'Geebung'</td>
<td>Fruits were eaten (raw)</td>
<td>M:51</td>
<td>Fairly common in dry sclerophyll, fruits in summer.</td>
<td>Montane.</td>
</tr>
<tr>
<td><strong>LORANTHACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amyema spp.</td>
<td>'Mistletoe'</td>
<td>Sticky fruits were eaten.</td>
<td>Bluett 1954:5</td>
<td>Common.</td>
<td>Tableland - Montane.</td>
</tr>
<tr>
<td><strong>SANTALACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Excoecaria cupressiformis</em></td>
<td>'Native Cherry;'</td>
<td>Fleshy pedicels of fruits were eaten (raw)</td>
<td>M:30 Bluett 1954:5</td>
<td>Common in dry and wet sclerophyll, summer fruiting.</td>
<td>Tableland - Montane.</td>
</tr>
<tr>
<td><em>E. nanus</em></td>
<td>'Alpine Ballart'</td>
<td>&quot; &quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PORTULACACEAE</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Calandrinia eremaea (rel. to Calandrinia balomensis)</td>
<td>Edible fleshy leaves; seeds numerous, can be ground and baked like Portulaca.</td>
<td>M:17</td>
<td>In dry sclerophyll in summer, rare, and very small.</td>
<td>Low Tableland.</td>
<td></td>
</tr>
<tr>
<td>Portulaca oleracea</td>
<td>'Pigweed'</td>
<td>Leaves were eaten raw and seeds ground and baked.</td>
<td>M:53</td>
<td>May be locally introduced. Available in summer.</td>
<td>Tableland.</td>
</tr>
<tr>
<td><strong>WINTERACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. zeerophila</td>
<td>'Alpine Pepper'</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</td>
<td>Common in Snow Gum woodland.</td>
<td>Sub-Alpine - Alpine.</td>
</tr>
<tr>
<td><strong>PITOSPORACEAE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Billardiera scandens</td>
<td>Appleberry</td>
<td>Pleasant, slightly acid berries were eaten raw.</td>
<td>M:10</td>
<td>Fruits spring - summer.</td>
<td>Dry sclerophyll forest. Tableland - Montane.</td>
</tr>
<tr>
<td>GENUS AND SPECIES</td>
<td>COMMON NAME</td>
<td>USE OF SPECIES</td>
<td>REFERENCE</td>
<td>OCCURRENCE</td>
<td>HABITAT</td>
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</tr>
<tr>
<td><strong>PITTOSPORACEAE Contd.</strong></td>
<td>'Australian Blackthorn'</td>
<td>Honey can be sucked out of numerous flowers.</td>
<td></td>
<td>Late autumn.</td>
<td>Tableland - Montane.</td>
</tr>
<tr>
<td><em>Bursaria spinosa</em></td>
<td>'Native Raspberry'</td>
<td>Small fruits were eaten raw. M:55</td>
<td>Common in wet sclerophyll forest. The sweet fruits (not abundant) ripen summer - autumn.</td>
<td></td>
<td>Tableland - Sub-Alpine</td>
</tr>
<tr>
<td><strong>ROSACEAE</strong></td>
<td>'Wattle'</td>
<td>Seeds from the young pods were roasted. M:3-4; Sturt 1849, I:226.</td>
<td>Common. Pods ripen spring - summer.</td>
<td></td>
<td>Tableland - Sub-Alpine.</td>
</tr>
<tr>
<td><strong>GERANIACEAE</strong></td>
<td>'Native carrot'</td>
<td>Large fleshy roots were roasted. M:33</td>
<td>Available summer-autumn. Common in damp habitats.</td>
<td></td>
<td>Tableland - Alpine.</td>
</tr>
<tr>
<td><em>Geranium sandersi</em></td>
<td>'Yellow Wood-Sorrel' or 'Sour Grass'</td>
<td>Small leaves eaten raw. M:50</td>
<td>Moderate amount in dry and wet sclerophyll forest.</td>
<td></td>
<td>Tableland - Sub-Alpine.</td>
</tr>
<tr>
<td><strong>OXALIDACEAE</strong></td>
<td>'Native flax'</td>
<td>The numerous small seeds were eaten. M:39</td>
<td>Similar to linseed, but half the size. In dry and wet sclerophyll forest; available late-summer. Common in grassy mountain gullies and open sites at high elevation, such as Mt Ginini.</td>
<td></td>
<td>Below 760 m.</td>
</tr>
<tr>
<td><em>Linum marginale</em></td>
<td>'Black Kurrajong Tree'</td>
<td>Young roots eaten, and seeds (hard but can be crushed). M:59</td>
<td>On rocky slopes and low hills. Seeds available summer-autumn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENUS AND SPECIES</td>
<td>COMMON NAME</td>
<td>USE OF SPECIES</td>
<td>REFERENCE</td>
<td>OCCURRENCE</td>
<td>HABITAT</td>
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</tr>
<tr>
<td>MYRTACEAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eucalyptus viminalis</td>
<td>Manna gum or Ribbon gum</td>
<td>Sweet crumbly white manna gum exudes from the bark. Eaten raw.</td>
<td>M:27</td>
<td>Common, Manna available in summer, but only in small quantities in the Canberra-Monaro region.</td>
<td>Tableland-Montane.</td>
</tr>
<tr>
<td>Callistemon spp. (3)</td>
<td>'Bottlebrush'</td>
<td>Flowers were sucked for nectar.</td>
<td>Blaxland 1823:36.</td>
<td>Common.</td>
<td>Tableland-Sub-Alpine.</td>
</tr>
<tr>
<td>UMBERLIFERAEB</td>
<td>Daucus hellidjatus</td>
<td>'Australian carrot' Small, carrot-like root was eaten.</td>
<td>Ling Roth 1899: 95.</td>
<td>Common.</td>
<td>Montane.</td>
</tr>
<tr>
<td>EPACRIDACEAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lissanthus strigosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Astrolora humifusa</td>
<td>'Cranberry Heath'</td>
<td>Sweet pulp of small berries (eaten raw).</td>
<td>M:8</td>
<td>Not very common, but can be locally abundant in dry sclerophyll. Fruits early spring to autumn.</td>
<td>Tableland-Montane.</td>
</tr>
<tr>
<td>Stypehilea triflora</td>
<td>'Five Corners'</td>
<td>Sweet pulp of small fruits was eaten raw.</td>
<td>M:61</td>
<td>Uncommon.</td>
<td>Tableland - lower hills.</td>
</tr>
<tr>
<td>SOLANACEAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solanum linearifolium</td>
<td>'Kangaroo Apple'</td>
<td>Large fruit (2 x 2 cm) was eaten raw or roasted.</td>
<td>M:57</td>
<td>Only eaten when outer skin bursts in summer, mealy, slightly acid taste. Not very common.</td>
<td>Tableland.</td>
</tr>
<tr>
<td>RUBIACEAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coprosma quadrifida</td>
<td>'Native Currant'</td>
<td>Pea-sized succulent fruit was eaten raw.</td>
<td>M:19; Backhouse 1843:446</td>
<td>Abundant fruits in late summer to autumn. Locally common.</td>
<td>Wet sclerophyll (Tableland - Sub-Alpine)</td>
</tr>
<tr>
<td>COMPOSITAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microseris scapigera</td>
<td>'Yam Daisy' or 'Murnong'</td>
<td>Sweet milky tubers were roasted.</td>
<td>M:45</td>
<td>Common especially in sub-alpine zone. Summer-autumn flowering. A staple food in S. Uplands.</td>
<td>Dry and wet sclerophyll. Tableland-Alpine.</td>
</tr>
<tr>
<td>GENUS AND SPECIES</td>
<td>COMMON NAME</td>
<td>USE OF SPECIES</td>
<td>REFERENCE</td>
<td>OCCURRENCE</td>
<td>HABITAT</td>
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</tr>
<tr>
<td>CAPRIFOLIACEAE</td>
<td><em>Sambucus gaudichaudiana</em></td>
<td>'Native Elderberry'</td>
<td>White berries were eaten raw.</td>
<td>M:56</td>
<td>Rare. Fruits summer-autumn.</td>
</tr>
<tr>
<td>CRUCIFERAЕ</td>
<td><em>Cardamine</em> spp.</td>
<td>'Cress'</td>
<td>Eaten raw.</td>
<td>M:13</td>
<td>Found on water-courses.</td>
</tr>
<tr>
<td></td>
<td><em>Rorippa</em> spp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUNGI</td>
<td><em>Fistulina hepatica</em> Fr.</td>
<td>'Beefsteak Fungus'</td>
<td>Roasted.</td>
<td></td>
<td>In areas above 20 inches rainfall</td>
</tr>
</tbody>
</table>
The Subalpine and Alpine Tracts: The tubers of the yam daisy, Microseris scopigera, attain much larger dimensions above about 1800 metres than lower down (Brough Smyth, 1878, I:209; and personal observation), so they would have been a plentiful food source in the high country. The easiest time to find the tubers would be in summer when the plant is in flower. Its bright yellow flowers clothe the tops of the ranges very widely, and there is no reason to think that it would have been any less abundant in the prehistoric past, at least during the Recent Period.

Other vegetable foods which might have been exploited above 1500m. (5000 ft.) are the tubers of orchids (Orchidaceae), the native carrot (Geranium spp.), the seeds of native flax (Linum marginale), fern roots (Blechnum spp.), and a number of berries, but none of these would have been sufficiently abundant to form a major food source, like the yam daisies.

The Montane Tract: The vast majority of the edible foods listed in Table 7:2 belong to this ecological zone, intermediate between the snow country above, and the open tablelands below. Amongst the foods, those which might have formed staples are starred on Table 7:2. My criteria for staple foods are that they should provide fairly abundant food, either in size or quantity, and be available for at least one quarter of the year. Very few of the local vegetable foods meet these criteria, for most are too limited in quantity or seasonal availability. The only montane foods which I think may have contributed substantially and regularly to the diet are the root-starch of ferns and bracken, the starchy pith of tree-ferns, the sugary base of the inner leaves of the grass-tree, and perhaps the tuberous roots of orchids and lilies. These would all have been available regularly. Fern root has been recorded as a staple food in the Sydney region (cf. Lawrence, 1968:198) and on the northern coast of Tasmania together with the tree fern and grass-tree (Jones, 1971:91-5). However in the Southern Uplands
neither ferns, tree-ferns, nor the grass-tree are as widely distributed as in these other parts of Australia. It is difficult to assess their prehistoric occurrence accurately, but it seems likely that it was not very different from that today, except that bracken-fern (*Pteridium esculentum*) is slightly more widely distributed now than in pre-European times (cf. Pryor, 1954:163,172). Tree-ferns and the fish-bone fern (*Blechnum* spp.) are generally confined to damp gullies in the wet sclerophyll forest, and the grass-tree (*Xanthorrhoea australis*) is not widely found. However, the starchy tubers of orchids, lilies and the daisy yam may have made a considerable contribution.

Within the montane zone, it appears from Table 7:2 that the wet sclerophyll forest would have provided more vegetable food than the dry sclerophyll, the main contribution of which would have been the grass-tree and a number of fruits. Some fruits such as the native cherry (*Exocarpus cupressiformis*) and the native currant (*Coprosma* spp.) are fairly abundant in season, but in size or quantity none rivals the introduced blackberry.

The Tableland Tract: The grasslands are the ecological zone most conditioned by settlement, but even there the prehistoric distribution of species has been reconstructed with some certainty. The combination of low rainfall with low temperatures has inhibited tree-growth, and much of both the Southern Tablelands and the Monaro Tablelands is open grassland. The original grasses did not include *Panicum decompositum*, the native millet which formed a staple food on the western plains of New South Wales (cf. Allen, 1968:40-2). However, two other species of grass which seed prolifically were present, *Themeda australis* (Kangaroo Grass) and *Panicum effusum* (Hairy Panic-Grass). It would seem that the seeds of these grasses could have been harvested and baked, but there is no record of such exploitation apart from one very late ethnographic reference to the use of Kangaroo Grass (Bluett, 1954:6).
If the grass-seed had been an important part of the upland prehistoric economy, one should find the same high numbers of grindstones and 'mullers' (the upper stone of a pair of grindstones) as found on the western plains. However Allen's distribution maps (1968:9 and 10) of 91 grindstones and 225 mullers from the Australia Museum, Sydney show that none fall into the Southern Uplands region. This might possibly have been thought to be the result of a lack of collections from the upland region, but my own analysis of more than fifty stone assemblages from open camp sites in the region showed the same general lack of even broken grinding-stones. A few grinding-stones have been found, but their general scarcity and the lack of ethnographic observations suggest that seed-grinding was not a major part of the economy.

What was the reason for this evident lack of utilization of available grass-seed? There are three main possibilities. Either the Aborigines did not exploit the full range of available foods, or the summer exploitation of grass-seed was not compatible with some other summer activity such as moth-hunting, or there were some problems associated with the exploitation of grasses other than *Panicum decompositum*.

I find it hard to believe that in a region where it was comparatively hard to make a living, the Aborigines would not fully exploit all available food resources, although there are precedents for this, such as the absence of fish from the diet of ethnographically observed Tasmanian Aborigines (Hiatt, 1967:113). We cannot believe that all Aborigines were away from the tablelands at the time the grasses were setting their seed, particularly as some groups were observed there (see Chapter 4). I therefore decided that the most likely explanation is that there is a significant difference between *Panicum decompositum*, the native millet utilized so extensively in western New South Wales, and the other grasses, which caused one to be used as a staple and the others as at most only a minor food. Further investigations showed this to be the case. Kangaroo Grass
(Themeda australis) tends to grow in small clumps, and the seeds to ripen at different times, so would give a low return for the effort involved in gathering it. *Panicum effusum* (Hairy Panic-Grass) was probably not exploited for a completely different reason - it causes photosensitivity, leading to eczema of exposed skin, swelling of the head, liver damage and jaundice, and can be fatal to some animals (Gardner and Bennetts, 1956:224-5; Hurst, 1942:19-20).

The other possible staple vegetable food of the table-lands is the bulrush, *Typha* spp. The rhizomatous roots of this were roasted, and provided starch and sugar, together with a considerable quantity of fibre. Bulrushes were said by Mitchell to be the principal food of the Lachlan River Aborigines:-

'It contains so much gluten, that one of our party made, in a short time, some excellent cakes of it; and they seemed to be lighter and sweeter than those prepared from common flour. The natives gather the roots and carry them on their heads in great bundles within a piece of net...and, indeed, this was obviously their chief food among the marshes' (Mitchell, 1838, II:61).

The use of bulrushes was recorded on the Yass, Murrumbidgee and Tumut Rivers by Bennett (1834:183), and no doubt they were utilized wherever available, but they are rare in the Canberra region and Monaro, being confined to the lower tablelands on the sides of lagoons or slow-flowing rivers. Their distribution is very limited compared with that on the lower reaches of the Murrumbidgee, Lachlan, Darling, Murray Rivers, so it seems likely that they were a minor but not a major food source for the Upland Aborigines. Grinding stones were not used in their preparation so their exploitation would leave no trace in the archaeological record.

In summary, the vegetable food resources of the region are limited compared with those of the inland riverine plains or the coastal zone of New South Wales. It would be very hard if not impossible to subsist on them *per se*, although they would make a valuable contribution to the diet.
It is suggested that among the vegetable foods, the most plentiful would be the tubers of yam daisies (*Microseris soapigera*) and of orchids and lilies (*Orchidaceae* and *Liliaceae*); the roots of ferns (*Pteridium esoulemtum* and *Blechnum* spp.) and of bulrushes (*Typha domingensis*); the starchy pith of tree-ferns (*Dicksonia antarctica* and *Cyathea* spp.); the young shoots of the grass-tree (*Xanthorrhoea australis*); and some fruits in season.

These foods would be most plentiful in the montane zone, but in summer the subalpine zone would also be able to make a contribution. On the tablelands the general lack of both grindstones and ethnographic evidence suggests that grass seeds were not a staple as they were in western New South Wales. However, the glutinous roots of bulrushes may have been important on the lower reaches of the rivers and on the lakes of the tablelands.

IV. The Annual Hunting-Gathering Cycle

**Winter:** Winter would undoubtedly be the leanest time of the year, and there is ethnographic evidence that the Uplands Aborigines were in bad condition by the beginning of spring (Jardine, 1901:53; Gale, 1927:58). In winter the main foods available would be possums, kangaroos, wallabies, wombats, and other land and arboreal mammals, ducks and other birds, reptiles, fern roots, the pith of tree ferns, the leaves of the grass-tree, and the tubers of *Liliaceae*. These could be procured from the montane valleys, wet sclerophyll forest being particularly rich in both animal and vegetable foods, or from bases on the low tableland rivers. The open plains and frost hollows would doubtless be avoided because of the cold winds and high incidence of frost.

**Spring:** In late winter to early spring some wattles begin to bloom and the seeds from their ripening pods could be picked out and eaten (cf. Backhouse, 1843D). The first orchids begin to appear in August - September, when
their tubers could be roasted. These are not large, but orchids are fairly plentiful in the Uplands, 27 species occurring in the Canberra region. However, the most important added food source of spring would be the fish, which become plentiful in the larger rivers from about September to May. Then in late spring, (October - November) the Bogong moths migrate to the mountain ranges, where they would have provided a major source of protein for up to four months.

Summer-Autumn: This would have been the time of plenty, for as well as all the normal food sources, Bogong moths would be available till about March, fruits would be plentiful, and the abundant tubers of the yam, *Microseris soapigera*, could be located from its yellow daisy flowers. On the tablelands there would be plenty of crayfish and fish, ripe grass seed and bulrushes. The pattern of movement might well have been to exploit the major high-level resources of Bogong moths, yam daisies, and fruits from October - November until February, and then return to the tablelands for the fish, crayfish, and possibly the grass seed and bulrush roots.

Conclusion: In the economy of the Uplanders moths and mammals were of primary importance. Possums, macropodids, wombats, reptiles, and birds, some vegetable foods (particularly the daisy yam and ferns), were available all the year round, but other foods tended to be seasonal. Among these, fish and Bogong moths probably played the largest part in the diet. Their exploitation involved seasonal movement from the low tableland rivers up some 1200m. (4000 ft.) to the alpine summits, but the zone which would have provided the most abundant animal and vegetable food was the montane tract, particularly the wet sclerophyll forest.
V. Comparison with Other Regions

New South Wales: A broad comparison in terms of the frequency with which different foods are recorded in the ethnography shows up some interesting differences across a transect of New South Wales. Those regions compared are the Cooper's Creek zone, the Darling River basin, the Western Slopes, the Southern Uplands, and the South Coast. Percentages for the latter have been calculated from data in Lawrence (1968: Table 7 and 8), and figures for the first three from Allen (1968:30-1).

No weight, of course, should be attached to the precise figures, but differences between regions are sufficiently great to merit attention. These are shown numerically in Table 7:3, and graphically in figure 10. Direct and indirect observations have both been included, for the reasons already given and to keep sample sizes at an adequate level.

On the basis of these comparisons, the five areas tend to fall into three broader groups, the Cooper's Creek - Darling Basin region, the Western Slopes - Southern Uplands, and the east coast. The diet of the coastal zone is characterized by a very high percentage of fish and vegetable foods, that of the tableland zone by the greater importance of insects and a preponderance of land mammals, and that of the western plains by the prevalence of seed grinding. These are the distinguishing features of the regions, and in other respects the four inland zones seem remarkably similar. The percentage of fishing activities observed on the Southern Uplands is lower than that on the riverine plains of the Lachlan and Darling Rivers as one would expect, but even there fish apparently did not play the major part in the diet that it did in the economy of the east coast.

The percentage of vegetable foods in the total diet appears fairly constant in all the inland regions, but increases steeply in the coastal zone. This correlates with the increased rainfall found on the coastal scarp,
FIGURE 10: Comparison of economy and material culture across New South Wales.
## TABLE 7:3 Ethnographic observations of subsistence activities across New South Wales.

<table>
<thead>
<tr>
<th></th>
<th>WESTERN NEW SOUTH WALES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coopers Creek</td>
</tr>
<tr>
<td><strong>RIVERINE - MARINE</strong></td>
<td></td>
</tr>
<tr>
<td>Fish, crayfish and shellfish</td>
<td>24 (16%)</td>
</tr>
<tr>
<td>Aquatic birds</td>
<td>11 (7%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>35 (23%)</td>
</tr>
<tr>
<td><strong>LAND MAMMALS</strong></td>
<td></td>
</tr>
<tr>
<td>Large terrestrial</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Small terrestrial</td>
<td>19 (13%)</td>
</tr>
<tr>
<td>Arboreal</td>
<td>1 (1%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>23 (15%)</td>
</tr>
<tr>
<td><strong>INSECTS, GRUBS</strong></td>
<td>9 (6%)</td>
</tr>
<tr>
<td><strong>BIRDS (non-aquatic)</strong></td>
<td>10 (7%)</td>
</tr>
<tr>
<td><strong>REPTILES AND AMPHIBIANS</strong></td>
<td>20 (13%)</td>
</tr>
<tr>
<td><strong>VEGETABLE FOODS</strong></td>
<td>28 (19%)</td>
</tr>
<tr>
<td>Seeds</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>Roots</td>
<td>10 (7%)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (3%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>49 (33%)</td>
</tr>
<tr>
<td><strong>TOTAL OBSERVATIONS</strong></td>
<td>146</td>
</tr>
</tbody>
</table>
with the consequent wet sclerophyll vegetation which is far more productive of vegetable foods than open grasslands. The exception of course are the seed-producing grains found on the dry western plains of New South Wales, and their importance in Aboriginal diet there emerges clearly from the ethnography. In the central tablelands district a combination of low rainfall with low temperatures renders the grasslands unproductive for vegetable foods, but on the mountain ranges there is a limited supply of foods such as fern root which form staples on the east coast.

The Southern Uplands emerge from these comparisons as the region without a staple vegetable food. The tubers of Microseris scapigera, orchids and lilies, could never have been so numerous and easily collected as the ferns and tree-ferns of the coast, or the great expanses of native millett of the western plains. It seems that the Uplanders would have had to rely rather heavily on moths, land and arboreal mammals, fish and birds as the mainstay of their diet.

Tasmania: A mammal-based economy is characteristic of peoples living in the higher latitudes, and comparison with inland Tasmania shows some similarities. In Table 7:4 the percentages of different foods mentioned in the ethnography of inland Tasmania are compared with those from the Southern Uplands. The Tasmanian data are taken from Hiatt (1967:117), and comprise direct observations only. The resulting sample is regrettably small, but allows some general comparisons to be made. (The Southern Uplands sample comprises both direct and indirect observations, for the reasons already stated).

Firstly, the diet of the inland Tasmanians appears from this data to have been far more restricted than that of the Southern Uplanders. There seems to be a much narrower range of foods exploited, with a marked preponderance of macropodids, wombats, and vegetable foods. Fish are entirely absent from the diet, as they were even in coastal Tasmania at the time of first European contact. Without fish or Bogong moths, subsistence would have been
**Table 7:4. Comparison of the Ethnographic Records of Subsistence from the Southern Uplands and Inland Tasmania**

<table>
<thead>
<tr>
<th></th>
<th>Inland Tasmania</th>
<th>Southern Uplands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of direct Observations</td>
<td>% of Total</td>
</tr>
<tr>
<td>Macropodids</td>
<td>11</td>
<td>29%</td>
</tr>
<tr>
<td>Marsupial carnivores</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Small marsupial mammals</td>
<td>6</td>
<td>15%</td>
</tr>
<tr>
<td>Wombats</td>
<td>7</td>
<td>18%</td>
</tr>
<tr>
<td>Monotremes</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>10</td>
<td>26%</td>
</tr>
<tr>
<td>Land Birds</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Fish</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shellfish</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Crayfish</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Turtle</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Insects</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Eggs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Reptiles</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>39</strong></td>
<td></td>
</tr>
</tbody>
</table>
even tougher than in the Southern Uplands, but the Tasmanian inland tribes adapted to their montane environment by occupying lower more favourable parts of their territory in winter, and supplementing the inland diet with periodic visits to the coast for marine foods.

Ethnographic evidence collected by Jones (1971, Appendix: 74-9) on the Big River tribe shows that generally they moved down to the valleys and coast during the winter months, but that they could survive in the Plateau country all the year round if necessary, as when making their last ditch stand against extermination by the Europeans. Their main food appears to have been macropodids, possums, wombats, and vegetable foods. They also would have been able to drink the semi-intoxicating sap of *Eucalyptus gunii* (Cider gum). (This unfortunately does not occur in our Southern Uplands.) The Big River tribe in normal times did not live exclusively on inland foods, but like all other Tasmanian tribes, had seasonal access to the sea shore and the abundant coastal foods.

The map of known surface sites reproduced by Hiatt (1967: 197) supports this concentration of inland occupation in the lowlands, but stone implements from the shore-line of Lake Augusta and Crown Lagoon (Lourandos, 1968: 42) show that the Aborigines did penetrate into the moorland of the central plateau at 1220m. (4000 ft.). Other traces of occupation have been found at the Lagoon of Islands at about 900m. (2900 ft.), and around other lakes in the Central Highlands of Tasmania (Jack Thwaites, pers.comm.).

Thus the pattern of occupation and the diet of the montane Tasmanian tribes appears similar to those of the Southern Uplands of mainland Australia, except that the Tasmanians lacked the Bogong moth, and found it necessary to supplement their diet with marine foods.

The Kuzedika Paiute of California: The closest parallel I have found to the pattern of seasonal movement and insect exploitation revealed in the Southern Uplands is that of the Kuzedika Paiute of Mono Lake, California (Merriam, 1955: 71-7; Davis, 1963: 202-11).
There, in the western Great Basin, the Kuzedika Paiute practised seasonal transhumance, moving each year from about 1950m. (6400 ft.) on the valley floor up to 2440-3050m. (8000-10,000 ft.) on the Sierra Nevada. In this way the Kuzedika were able to exploit a succession of food crops that matured at different altitudes. Each spring they left their winter camps in the valley bottoms, and moved upwards to hunt sheep and the migrating deer, and to harvest grass seeds and bulbs in the meadows. Later they moved to the high pine forests, where caterpillars of *Coloradia pandora* were abundant, and easily gathered. Hundreds of pounds of these caterpillars would be collected, dried and stored. Then a descent would be made to the valley floor, to harvest and preserve the lake-fly larvae which washed ashore in windrows along the margins of Mono Lake. Finally, in the autumn, pinyon nuts would be collected and stored for the oncoming winter. The Kuzedika Paiute were also hunters, but, at least in the proto-historic period, insect and vegetal crops provided their staple foods.

Heavy reliance on insects, necessitating seasonal transhumance, is a common feature of the economy of the Kuzedika Paiute and the tribes of the Southern Uplands, but there are also great differences. In particular, the seasonal temperature fluctuations and the relief are much greater in the western Great Basin, resulting in a much higher degree of environmental determinism on the economy. Transhumance was essential to exploit the maximum food resources, available at different elevations, and to avoid the cold of the mountains in winter. The extreme climate also necessitated sedentarism and the storage of food during the winter months.

Thus although in similar latitudes (the 30's North and South) local geographical factors have imposed on the Kuzedika Paiute the winter sedentarism and food storage typical of people of higher latitudes such as the Ainu of Japan and the Eskimos (cf. Watanabe, 1968:69-70).
Conclusion: The subsistence of the Southern Uplands includes both hunting, fishing, and gathering of vegetables and insects. However, the Southern Uplands exhibits the same correlation between latitude and mode of subsistence as proposed by Lee (1968:41-8) on the basis of data in the Ethnographic Atlas (Murdock, 1967). Lee demonstrated a general correlation between:

(a) societies with hunting as the dominant mode of subsistence and latitudes more than 60° from the equator with very cold climates;

(b) fishing societies and cool to cold temperate latitudes (40° to 59° from the equator) with cold climates with mean annual temperature 0° - 10°C (32° - 50°F);

(c) gathering societies and warm-temperate, subtropical, and tropical latitudes (0°-39° from the equator) with mean annual temperatures of more than 10°C (50°F). (The mean annual temperature of the Canberra region is approximately 12°C (55°F), that in the Snowy Mountains (Kosciusko Hotel) at 1530m. (5081 ft.) about 6°C (43°F)).

Climatically and latitudinally the Southern Uplands belongs to group (c), the societies relying on gathering, defined by Lee as "collecting of wild plants, small land fauna and shellfish" (1968:41-2). Presumably insects would also be included in this category, and if possums are included in "small land fauna", then there is a very good case for describing the economy of the Southern Uplands as based on gathering. Hunting and fishing were also important, but using the term 'gathering' in its broadest sense, to include not only plants, but insects and small land and arboreal mammals, the Southern Uplanders may be termed predominantly gatherers.
Chapter 8

Tribal Territories, Relations, Trade and Cultural Zones

In this chapter I will firstly examine the relationship of tribal to natural boundaries, inter-tribal relations and trade, and the cultural affinities of the Southern Uplanders. Then the ethnographic evidence will be summarized, and a number of hypotheses set up for testing by archaeological fieldwork.

Tribal boundaries: Tindale used no criteria other than linguistic evidence to draw the tribal boundaries on his map (1940:140-51), but the result shows a high degree of correlation between tribal and geographical boundaries. This is particularly marked in the Southern Uplands region, where the crests of mountain ranges and the watershed between the tablelands and the coast provide natural boundaries.

Tribal territories tend to have their widest extension along the richest resource zone. Thus coastal tribes maximize the marine resources, but their tribal territories also extend inland to the top of the coastal scarp, across a series of ecological zones which include a variety of food resources. The highland tribes likewise appear to have their territories orientated to maximize their greatest food resource, Bogong moths, for their longest boundaries extend along the crest of the ranges.

It is also noticeable that the territory of each of the Southern Upland tribes includes at least one low, fairly frost-free valley suitable for winter occupation. Thus the Ngunawal of the Southern Tablelands have the Central Murrumbidgee, The Walgalu the Tumut, The Ngarigo the Lower Snowy, The Djilamatang the Upper Murray, and the Jaimathang the Omeo Valley. This suggests that occupation of the highland zone may have commenced by a series of groups each based in a montane valley.
FIGURE 11: Tribal movements in the exploitation of Bogong moths are indicated by the black arrows.
Seasonal movements: 'The natives in the interior travel great distances at particular seasons, and on particular occasions'.

So pronounced Charles Throsby in 1819 (Field Book, May 7th), having been convinced, as he says, from observations made on both his journey to Bathurst and that to Shoalhaven in 1818. There is ample evidence to support his opinion, and this is tabulated in Appendix 3C. The reasons for these journeys were many and varied, hostile incursions into another tribe's territory, escape from vengeance in one's own tribe, initiation ceremonies and corroborees, exchange of songs, marriage, trade and the procuration of food.

Annual seasonal movements seem to be associated with the food quest, the outstanding example being the summer exploitation of the Bogong moth, graphically portrayed in figure 11. This evidence was discussed in detail in chapter 6, and the conclusions reached there were that:

1. Moths were a summer staple for all those tribes whose territories included major moth aestivation sites, namely the Walgalu of the upper Tumut, the Ngarigo of Monaro, the Djilamatang of the upper Murray, the Jaimathang of Omeo, and the Minjambuta of Mt. Buffalo.

2. It is certain that the Ngunawal of the Southern Tablelands participated as well, probably both at the gatherings on the Snowy Mountains and on the Bogong Range, Tumut. However, they also had Bogong moths available locally on the Namadgi and Tinderry Ranges. On Tindale's map (cf. fig.11) these are shown as being in the territories of the Walgalu and Ngarigo tribes respectively, but the tribal boundaries are less certain than they appear on the map, being based on very late and slight linguistic evidence (Tindale, 1940). The Ngunawal are called the Queanbeyan tribe by Howitt and others, and it seems to me that this Queanbeyan tribe's territory probably included the Tinderry and Namadgi Ranges and the part of the Murrumbidgee valley lying between
them because:

(a) Eyre's evidence shows that moths on the Tinderry Range were exploited from the Molonglo plains to the north.

(b) McDonald's evidence shows that Aborigines at Uriarra, near Canberra, were collecting moths on Mt. Coree and the Brindabella Range.

(c) Moving the boundary of the Ngunawal southwards would put the tribal centre away from the very edge of the tribal territory.

(d) Adjacent to the Tinderry mountains a natural geographic boundary occurs at Michelago. This is the present northern boundary of County Beresford of Monaro (cf. Hancock, 1972:8), and is the place where the black-backed magpies of the Canberra region give way to the white-backed magpies of Monaro (Quodling in Cooma-Monaro Express, 19 June 1959 supported by Hancock's and my own observations).

3. It seems likely that the Duduroa tribe south of the Murray River between Albury and Jingellic also participated, because they were on friendly terms with the other mountain tribes (Helms, 1895:388), although their territory did not include moth aestivation sites, occupying the lower part of the Mitta Mitta and Kiewa Rivers (Mathews, 1909:278 and see fig.5).

4. The territories of three clans of the Kurnai of Gippsland, the Krauatungalung, Barabralung, and Baraikaualung, all extended northwards up to the crest of the Dividing Range where moths would have been found. It is thus possible that they exploited them, although there is no ethnographic evidence of such exploitation, and it seems that they were on inimical terms with the mountain tribes at the time of first European contact (see evidence quoted below).

5. There is some late evidence that coastal tribes of southern New South Wales participated in the Bogong
moth feasts, at least from the 1860's (Appendix 3C: 13, 14, 28). Before this, they would appear to have been on unfriendly terms with the mountain people (for evidence see below).

Coastal-inland relations: Howitt's accounts (Appendix 3C:19-26) suggest a great deal of friendly intercourse and cooperation regarding initiation ceremonies and marriage between the tribes of the coast and tablelands of southern New South Wales. However, this evidence is largely drawn from the ceremonies Howitt himself arranged, as a 'tribal elder' in 1883 (cf. Mulvaney, 1970:205-17) when relations between the tribes had certainly changed from pre-European days. Howitt himself bears witness to these changes in quoting Bundawal of the Kurnai regarding a feud of 1855:-

'At last we went to Manero to get the Brajerak [men] to come and help us. By this time the white men had brought so many Brajerak from Manero and Omeo with them into Gippsland that we and they had become friendly' (Howitt, 1904:348).

This evidence implies that before European contact the Kurnai and the mountain tribes had been on unfriendly terms, and on the south coast of New South Wales Robinson's observations at Bega in 1844 (ed. Mack:335) suggests a similar enmity between coastal and tableland people there.

All references to friendly intercourse between the people of the Southern Uplands and the coast derive from late writers, whereas earlier evidence suggests some enmity existed. It may be, of course, that relations varied considerably in prehistoric times as well.

Ethnographic evidence from the Sydney region and northern New South Wales suggests that there was both movement along the coast and movement inland in winter when fish were scarce, but the inland movement extended only up the river valleys or coastal scarp, and not onto the tablelands. In the Sydney region these inland forays did not extend very far into the Mountains because of the cold (according to Governor Phillip, letter 9.7.1771:155).
And in New England movement from the coast to the immediate hinterland for hunting in winter and back again for fishing in summer is well-documented (e.g. Dawson, 1935:25), but this did not extend up to the tablelands.

No evidence has been found in the detailed studies of the ethnography of the south coast of New South Wales by Poiner (1971) or that of the north coast by McBryde (1966b), Belshaw (1966) and others, of the seasonal migration of whole inland tribes into the territory of coastal tribes or vice versa. Rather movement seems to have taken place within the coast tribe's own territory, which 'included the fall from the coast range to the sea' according to Howitt (1904:81).

In the Southern Uplands there is likewise no evidence of upland tribes 'wintering' on the coast, and this is most unlikely in view of the well-documented winter scarcity of fish, the main food of marine tribes. However, it seems that, at least in the second half of the nineteenth century, (i.e. after 30 years of local European settlement), the Aborigines of southern coastal New South Wales were visiting the Snowy Mountains for moth-hunting and that perhaps the upland tribes were paying reciprocal visits to the coast for fishing. Whether this represents a traditional situation, or reflects changes in Aboriginal life wrought by European settlement, including the burying of traditional animosities, it is very difficult to say.

Trade: It seems likely that a great deal of barter was associated with the Bogong moth feasts, as it was with Brewarrina fish feasts in New England (Mathews, 1903:153), and with the Bunya Bunya nut festival in southern Queensland (Petrie, 1902). However, there is no ethnographic evidence to this effect.

The only ethnographic evidence regarding trade in the Uplands region is Howitt's observation on the 'market' which took place at the end of the initiation ceremonies at Bega in 1883. These were attended by 'people from a district included by Shoalhaven River, Braidwood, the southern part
of the Monaro, and Twofold Bay' [Eden] (1904:718-9). This region is shown by McCarthy on his map of barter and exchange in south-east Australia as the Yuin trading group (1939:407).

At this market only complete sets of articles were traded, and these included ten fighting boomerangs (warangun); ten grass-tree spears (gumma); one shield for stopping spears (bemata) and one for club-fighting (millidu); one club (gujerung or bundi) and one spear-thrower (meara); or one belt of possum-fur string (ngulia) plus four men's kilts (burrain) plus a bone nose-peg (gumbrun), plus a complete set of corroboree ornaments. The women also engaged in barter, trading opossum rugs, baskets, bags, digging-sticks (tuáli) and so on.

Howitt also tells us (1904:719-20) "an ancient shield had been brought from the upper waters of the Murrumbidgee River and was greatly valued because, as my informant said, it had 'won many fights'. Yet it was exchanged, and carried away on its farther travels".

Another item which was probably traded is stone. Bluett (1951:5) records traditions that the Canberra Aborigines went to the Shoalhaven for sandstone. This would have been their closest source for a suitable rock for sharpening axes, and such whetstones have been found on Aboriginal sites near Canberra and in the Tidbinbilla valley. Bluett also says that they went to the Monaro for basalt and other volcanic rocks suitable for manufacturing into ground-edge axes.

I would also suggest that ochre might have been traded, for there are large supplies of this in the Canberra region.

The main items of trade in the Southern Uplands would undoubtedly have been the possum-skin products such as rugs and belts, wooden weapons and implements, and perhaps stone and ochre. An idea of the value of one possum-skin rug (which may have been made up of 50-80 pelts) is given by one of Howitt's informants, Barak, who witnessed at the Mt. William diabase axe quarry north of Melbourne three axe blanks being given to the donor of one possum-skin rug (Howitt's papers, quoted by Mulvaney, 1961:87).
Aboriginal Routes: Ethnographic records supply some evidence on the routes used by Aborigines in the highland region. Thus from the accounts of moth-hunting we can be sure that the valleys of the Tumut and Snowy Rivers and the upper Murrumbidgee and Murray all provided routes to the mountains. These valleys were linked by a series of passes, such as that at Kiandra-Yarrangobilly between the headwaters of the Murrumbidgee and Tumut Rivers. There is strong ethnographic evidence that in the Victorian High Plains the route from Beechworth to Omeo via the Bogong High Plains was a traditional Aboriginal route (Carr, 1962:286), and also the route taken by the present Omeo Highway to Bruthen and south Gippsland (McMillan, 1853). Angus McMillan, a rugged Scotsman born in the shadow of the jagged peaks of the black Cuillin on the Isle of Skye, was the first European to discover Gippsland, when he made his way, in the company of "Jemmy Gibber, the chief of the Maneroo tribe" five days journey south-west from Currawang [nr. Dalgety] till he reached a high hill near Buchan and obtained a view of the sea. On the sixth day Jemmy Gibber became so frightened of the Gippsland 'Warrigals', or wild blacks, that he tried to kill McMillan in order to return to Monaro. However, murder was prevented, and they journeyed on for four days from Buchan to Omeo (McMillan, 1853). A photograph of Angus McMillan and Jemmy Gibber hangs in the Maffra Shire Hall, and is reproduced by Massola (1969:148).

This is interesting evidence of the enmity existing between the Monaro and Gippsland tribes at the time of first European contact, and also suggests that there were Aboriginal routes between the Monaro and Buchan, and Buchan and Omeo. Earlier, in 1835, George McKillop had journeyed from the southern Monaro directly across to the Omeo Plains, along the Deddick River and thence via Limestone Creek and Benambra to Omeo. In March 1834, John Lhotsky had obtained some information about the Omeo Plain "from the only man of the Monaro tribe who had been once at this plain" (Sydney Gazette, 15 April, 1834). According to his informant the plain contained a lake larger than Lake George and
was a four or five days journey from Delegate. He does not appear to have had an Aboriginal guide, but cites Aboriginal names on his journey down the Dedrick River to its junction with the Snowy River. Lhotsky's evidence shows that the Monaro tribe did not often, if ever, visit the Omeo tribe, but were on friendly terms and only five days journey apart.

On the basis of the ethnographic evidence it is clear that the physiography of the highlands was the main factor articulating Aboriginal routes. There appear to have been two main crossing places of the mountain ranges, the Omeo gap followed by the modern Omeo highway, and the Kiandra gap, followed by the Alpine Way. Otherwise the Aboriginal routes seem to have followed the river valleys, or crossed the lower tablelands at some distance from the Snowy Mountains. In this sense the mountain ranges did serve as a dividing force for much of the year, but they also acted as a magnet each summer, drawing the surrounding tribes to meet on the summits.

Burial customs: In mode of burial the Southern Uplanders appear to have been more similar to the coastal tribes than to those of the western plains. Of those on the lower Murrumbidgee (downstream from the Lachlan River junction) Sturt remarked "if these inland tribes differ in anything from those on the coast, it is in the mode of burying their dead" (1833, II:55). Later he described the mounds which were raised over the dead as tombs (ibid: 74), and Mitchell also gives several descriptions of these tumuli (1836, II:51, 52, 70, 105, 113).

No large mounds or huts raised over graves have been recorded in the Southern Uplands, but several other modes of burial were:

1Lhotsky did not reach Omeo, but it is possible that he was the first to climb Mt. Kosciusko, on the evidence of recently discovered manuscript notes and map analysed by Jeans and Gilfillan (1969:1-17).
1) The body was tied up in a ball, cut open, and the kidney fat distributed. Then the body was placed in a grave 1.5 - 1.8m. (5 - 6 ft.) below the surface of a rocky hill, by means of a tunnel about 2m. (6 ft.) long. With the body was buried "his spears (broken in half), his shield, nulla nulla, boomerang, tomahawk, opossum rug, and other effects. Then the hole was filled in with stones and earth" (eye-witness account from his boyhood by Davis-Wright, 1923:57).

A similar method of burial is indicated by the grave which Richard Helms excavated near Jindabyne in the Monaro, although apparently no grave goods were found there (Helms, 1895:404-6 and fig. XXX). Other known, but unopened, graves in the high country appear to be similar, but are heaped with large rocks to keep off the dingoes (cf. Bluett, 1954:12).

2) The body of a great warrior might be laid outstretched in a cave, with arms crossed over the chest, and a wall of large stones laid around the body (Bluett, 1954:13). Burials in caves have been recorded on Mt. Tennant and on Blackfellows Creek in the Namadgi Ranges (Gale, 1927:70; Bluett, 1954:13), at London Bridge on the upper Queanbeyan River (Brennan, 1907:208), and at Bungonia and Yarrangobilly Caves (Etheridge, 1893:128-32; Mowle, Evening News, 30th March, 1891).

3) The corpse might be placed in a hollow tree; if it could be dropped down from the top (Helms, 1895:399).

4) Secondary burial was also apparently practised, the body being placed on a platform in a tree, and the bones buried a year or more later (Brennan, 1907:207; Bluett, 1954:12).

Language and culture zones: Information on the languages of the Southern Uplands region is scanty, and dates from the period when the tribes had almost disappeared. Some vocabulary lists are given in Curr (1887, III, xvii) but he says himself in the preface:
'Long prior to this work being commenced our civilisation had brought together, and into familiar intercourse in this portion of the continent, tribes which had previously lived in a state of chronic hostility, and that their languages have, as the result, become very much fused. Hence the time has passed when a vocabulary of any of these languages free from foreign words could be obtained'.

Moreover, when two or more vocabulary lists exist for the same tribe, there tend to be strong differences between them. For instance for the Monaro tribe five vocabularies are extant, that of John Lhotsky collected in 1834, those of Charles du Ve and John Bulmer presented in Curr's 1887 'Australian Race', that of R.H. Mathews, "collected personally among the remnant of the Ngarrugu natives in the Monaro district, New South Wales" (1908:336), and the fragments recorded more recently by Hercus (see below). There are strong differences between these for such basic words as mother, father, the numerals, parts of the body etc. Curr dismisses Lhotsky's list as "incorrect in many particulars", and suggests that Bulmer's is likely to be the most reliable.

Vocabularies from Queanbeyan and Yass, compiled by the bench of magistrates, are found in Curr (1887, III:nos. 195 and 196), and from Omeo, the Monaro and from the Snowy River, compiled by John Bulmer, the manager of the Lake Tyers Aboriginal station in Gippsland (ibid:nos. 197, 211, and 212). The Queanbeyan vocabulary was almost certainly supplied by 'Queen Nellie', the last of the Ngunawal, for the police magistrate informed Curr that "only one person of this tribe, an old woman, remains".

R.H. Mathews suggests particularly close affinities in grammatical structure and vocabulary between the Ngunawal of the Southern Tablelands and the Ngarigo of the Monaro (1908:335-6).

Recent work by Hercus (1969:198-208) has borne out the similarity between the published Ngunawal and Ngarigo noticed by Mathews. Hercus was able to record fragments of a southern form of Ngarigo as spoken on the Snowy River
around Delegate, and to the south towards Orbost. She found little phonetic or phonemic resemblance between this southern Ngarigo and the Ganai [=Kurnai] languages of Gippsland, although there were some, possibly recent, links in vocabulary. The language of the intervening tribe, the Bidawal, contained elements of both.

A broad linguistic division was made by Mathews (1902:49) between the Wiradjuri of the western plains of southern New South Wales, and the aggregate of tablelands and coastal tribes spanning the territory from Sydney to Cape Howe. This aggregate has been further sub-divided into two main linguistic groups, the 'Inland Yuin tribes' and the 'Coastal Yuin', by Schmidt (1919:93-6, 112-21). His main criteria for this division are vocabulary differences such as the words for man, head, possum and tree, some of which may reflect post-European changes, but his subdivision has been accepted by later workers such as Hercus (1969:6-7). In fact, Schmidt makes a further subdivision of both Coastal and Inland Yuin into a northern and southern group. His 'southern, inland Yuin' comprises the Ngunawal, Ngarigo and Omeo tribes, and is based on evidence additional to that of Curr and Mathews.

Schmidt's evidence suggests that the languages of the Southern Uplands are similar to, but differentiated from, the languages of the Coastal Yuin. Unfortunately the data are insufficient to estimate how long it would have taken to achieve this degree of differentiation.

The broad linguistic division into westerners and easterners in southern New South Wales is reflected in cultural differences, according to Mathews (1896:327), one particular manifestation being the difference in initiation ceremonies. In the western Wiradjuri region the ceremony is known as the Burbung (described by Mathews, 1897:111-153) whilst in the eastern sector the Bunang takes place or its abbreviated version, the Kuringal or Kudsha (cf. Mathews, 1896, 1900A and B).

Howitt, however, makes only a broader division into an eastern type, found eastward of a line extending from
the mouth of the Murray River to the head of the Gulf of Carpentaria, and a westward type of initiation found among those who practise circumcision west of this line (1884; 1904:512).

The little data that exist on social organisation in the Southern Uplands support Mathew's broad division between the great nation of the Wiradjuri to the west and the other tribes to the east. According to Howitt the Wiradjuri together with the Kamilaroi to their north, had four sub-classes with female descent, whereas the Ngarigo, Walgalu, and Yaitmathang of Omeo had the two-class system with female descent (Howitt, 1904:58, 101-3, 106, 196-7). There is no information on the Ngunawal, and on the coast the class system had early become decadent (ibid:133).

These slim strands of evidence all suggest that the upland tribes of southern New South Wales were culturally more similar to the coastal tribes to their east than to the tribes of the inland plains to the west. Within this broad cultural area, however, there appears to have been a traditional enmity and perhaps a dichotomy between the upland and coastal tribes. Both were self-sufficient, fish and vegetable foods being the main foods on the coast, and possums, tubers, kangaroos, fish, and above all Bogong moths the staples in the Uplands. In both zones tribal territories were orientated at right angles to ecological zones. On the south coast of New South Wales this meant that the tribal territories extended some 40 kilometres (25 miles) inland to the edge of the tablelands, providing a variety of ecological zones which could be exploited when fish was scarce in winter. In the Southern Uplands mountain chains take the place of the coast, in the sense that they contain the outstanding resource, Bogong moths, so that tribal territories extend at right angles to them in order that each tribe may have its share. There was thus no need for tribes to cross each other's territory to have access to a moth supply, but this happened, presumably in order to hold corroborees and initiation ceremonies, to barter goods, and perhaps to profit from a particularly
large supply of moths in one range. Tribes from the coast also participated, at least in the last years of moth-hunting, travelling over 160 kilometres (100 miles) to reach the mountains.

Summary of Ethnographic and Environmental Evidence

Population: The Southern Uplands appear to have been much less densely populated than the coast or western riverine plains of southern New South Wales. The population stayed in the Uplands the whole year round, but an annual seasonal transhumance took place, at least for the male hunters, involving movement each spring from the tablelands and montane valleys some 1200 metres (4000 ft.) up to the subalpine and alpine tracts containing the moth aestivation sites. Except at the season of moth feasting, the valleys were more densely populated than the mountain ranges.

There is little evidence on the size of groups, but in the Canberra area Davis Wright, from personal memory speaks of "small camps of from twenty to thirty" (1923:58). Analysis of the size of groups observed in the region by early explorers, surveyors and visitors shows that seventy percent of groups seen numbered less than ten people. Eighty percent of these observations were made in the summer-autumn period, twenty percent in spring, and none at all in winter. The only occasions on which large gatherings were observed were in summer for ceremonial purposes and to exploit seasonally abundant food resources such as Bogong moths.

From this ethnographic evidence I suggest that the settlement pattern will comprise a few large lowland camps reflecting ceremonial gatherings, some very small high-level camps of the male moth-hunters, and a large number of medium to small size camps of nomadic bands or smaller family groups.
Subsistence pattern: The two most important items in the diet were probably possums, because they were readily available at all seasons, and Bogong moths, which provided an abundant source of protein for 3-4 months each spring-summer. Other important seasonal foods were fish, crayfish, shellfish, and daisy yams, the tubers of *Microseris scapigera*. Available all the year round were mammals such as kangaroos, wallabies and wombats, birds including the emu and large Plain Turkey (*Eupodotis australis*), eels and reptiles. Vegetable foods were also exploited, but those which formed staple foods in other regions were absent or of very restricted distribution in the Southern Uplands. Nevertheless the economy can be said to have been based primarily on gathering, rather than on hunting of large mammals or fishing, if the term 'gathering' is used in the broad sense to include not only plants, but insects and small mammals such as possums.

Material culture: The Uplanders' equipment seems to have been more restricted in range, quantity and complexity than that of the tribes of the coast or western plains of New South Wales, perhaps reflecting the need for greater mobility in the highlands. The usual male complement of equipment was a stone axe for chopping steps in possum-hunting or for heavy wood-working, a number of weapons and spears, including stone-barbed death spears for hunting and combat, and a possum skin cloak to ward off the cold.

Cultural affiliations: The social organisation and modes of burial of the Southern Uplands appear to have been more similar to those of the coast than of the western plains of New South Wales, although all belonged to a broadly similar culture area, with similar initiation ceremonies etc., at the time of European contact. Only in terms of linguistics have the tribes of the Southern Uplands been differentiated (as 'Inland Yuin') from the coastal tribes, (the 'Coastal Yuin') of southern New South Wales.
Environment: The climate is cold compared with the rest of Australia, and would have had a considerable influence in the location of winter camp-sites, although human occupation of the tablelands would have been possible at all seasons during the Recent Period. In the Pleistocene, however, the mountains would have been in the grip of glacial conditions, and the tablelands probably cold, windy and treeless. This suggests that Pleistocene occupation of the tablelands is unlikely.

Ethnographic Models

The study of ethnographic records in the Southern Uplands has built up a jigsaw picture of the local modus vivendi, but still many pieces are missing. This is particularly the case with regard to settlement patterns.

It seemed possible that these missing data might be able to be inferred from other ethnographic models from similar environments in other parts of the world. The models I examined all involved seasonal transhumance in mountain regions and included that of the Ainu of Japan (Watanabe, 1968), the Mono Paiute of the western Great Basin of California at the foot of the Sierra Nevada (Merriam, 1955:71-6; Davis, 1963:202-11), and the Porno of California (Stewart, 1943:29-62; Steward, 1938).

On examination, all these ethnographic models seemed too different environmentally from the Southern Uplands to provide a valid model for settlement patterns. In particular, all involved a high degree of sedentarism in winter, depending on the storage of food, both of which concepts appear foreign to the south-eastern highlands of Australia. They will therefore be utilized only for comparative purposes.

Hypotheses to be tested.

1. That there is a correlation between increased elevation above sea level and lower population. This will
be reflected within the Southern Uplands region in the occurrence of the most and probably the largest campsites at the lowest elevations.

2. That moth-hunting camps will be found near moth aestivation sites, and that these camps will generally be smaller than those in the valleys, since they probably reflect the presence of only male hunters for a short period.

3. That the rivers, lakes, forests and alpine summits were the zones most productive of food, and therefore that camp-sites cluster in these zones, and not on the treeless plains.

4. That caves were not utilized for occupation, but only for burial, as recorded at the time of first European contact.

5. That if Pleistocene sites exist within the Southern Uplands, they will be found below the Pleistocene tree-line, which means only in the lowest river valleys below about 600m. (2000 ft.), or on the coastal ranges where the effect of the sea would moderate the glacial climate.

6. That where culture traits such as art styles are distinguishable, they will tend to be more similar to those of the coast than of the western plains of New South Wales.

7. That the activities of hunting, fighting, manufacturing wooden implements and processing skins are likely to have been carried on since the beginning of occupation in the Southern Uplands, and hence artifact types are likely to show considerable continuity from the earliest to latest occupation.

8. That internal changes in the same artifact type will be in the direction of increased efficiency.
9. That the only feature of prehistoric culture unique to the Southern Uplanders was their exploitation of the Bogong moth.
SECTION III

FIELD EVIDENCE

Attention will now be turned to the visible traces which the life style portrayed in the ethnographic record has left on the ground. Firstly, in chapter 9, material remains which have cultural importance, such as art sites, will be described. Then in chapters 10 and 11, settlement patterns in the Southern Uplands will be studied by a locational analysis of camp-sites, with a particular focus on those in the Canberra region, the Bogong Range, and the Monaro. Finally, in chapter 12, the stone assemblages of the open sites will be examined and artifactual variation explained in terms of location, function, time and culture.
Chapter 9.

Rock Art and Bora Grounds of the Southern Uplands

Three art sites are recorded here, two at Gudgenby, a montane valley in the Namadgi Ranges south of Canberra, and one at the northern end of the Southern Tablelands at Bigga, north of Crookwell. Some other sites are known in sandstone rock-shelters on top of the coastal ranges, at Nerriga, Caoura, Tallong and Bundanoon, but these await publication in a study of coastal art by Peter Binden, and thus will not be treated here.

Rendezvous Creek, Gudgenby, A.C.T.

Map ref: 973896, 1:50,000 Series (Sheet 8626-1) Bimberi
Elevation: 1128m. (3700 ft.)

The paintings occur on the dry, sheltered interior walls of a deep shelter eroded out of the side of an enormous granite boulder (see plate 9). They are well protected from the elements, and are in excellent condition, apart from a certain amount of rubbing of the lower ones by sheep which occupied the shelter before the present fence was erected.

Occupying only a small part of the available wall-area, the paintings are scattered at intervals around the eastern and southern side of the shelter. Curiously, in spite of all the space available, one superimposition occurs. The figures are all painted with wet pigment, and no stencils or imprints occur. They are entirely mono-chrome, the colours used being red, white and black. All figures are silhouette, except for the one involved in the superimposition which is white outline with two chevrons inside. They were recorded by scale-drawings, tracing and photography, and are shown to scale in figure 12.
FIGURE 12: The paintings at Rendezvous Creek, A.C.T. (The insets fit in on the left and right hand ends of the frieze).
Readily recognisable are four kangaroos or wallabies, (F, I, J, R) and a goanna (P). There are also two figures (E and H) which look like tortoises, but are more probably echidnas (*Tachyglossus aculeatus*), since the echidna is more common in the stony sort of country where these paintings are situated than anywhere else, and echidnas are regarded by Aborigines as excellent food (Calaby, pers. comm. and cf. plates in Breedon, 1972:96 and 97). At the right of the paintings are two large red birds, whose shape is suggestive of tall birds such as the Brolga, *Crus rubicounda* (compare Frith, 1969:pl.X). The sloping backs of the birds are characteristic of Brolgas, but alternative explanations are that they are emus, or possibly the Plains Turkey (*Eupodotis australis*), although the necks appear too short for the latter. The trace of pigment below the feet of the right-hand bird might possibly be interpreted as an egg.

The other figures are more problematic, but I would hazard guesses that A and B represent a man (in the lizard stylisation, cf. McCarthy, 1962:42) chasing an emu, (note the rounder back and prominent beady eye typical of emus) and that D and M represent men on horseback. McCarthy has found similar 'horseman' figures in the Cobar district (pers. comm.), and parallels for the depiction of white men are many, including one in Victoria.

The freshness of the paint and the large amount of the rock wall left unpainted lend support to the hypothesis that this is a late art site, at least some of which post-dates first European settlement. The earth floor of the shelter bore some signs of Aboriginal presence in the form of stone manuports, and excavation (detailed in Appendix X) showed slight Aboriginal occupation. No radiocarbon dates were obtained but the industry post-dated the "backed blade period", which at the neighbouring Yankee Hat Shelter 2 ended about 750 years ago.
Yankee Hat Shelter I, Gudgenby, A.C.T.

Map ref: 175855, 1:50,000 Series (Sheet 8626-1) Bimberi

Elevation: 1067m. (3600 ft.).

This granite rock-shelter lies about 4 kilometres away from the Rendezvous Creek site, and likewise has both paintings and an occupation deposit. Here the paintings are positioned on a dry overhanging wall and form a frieze some 7 metres long by 2 metres high. They are considerably more numerous and complex than those of Rendezvous Creek, and the more exposed position has caused considerable fading. There are many superimpositions and faded red figures which can barely be discerned. The white figures stand out most clearly, and in three cases are superimposed on red figures.

The paintings are reproduced in figure 13, where all clear traces of pigment have been recorded, and in plate 9. The techniques used are the same as at Rendezvous Creek, but here red and white were the only pigments used. One superimposition of white on to red (H and L) can be clearly seen.

A composite scene occurs at the left of the frieze, where two dingoes are seen chasing a kangaroo. Elsewhere can be seen a goanna (C), a snake (E), a figure (I) of an echidna (Tachyglossus aculeatus) or possibly a long-necked tortoise (Chelodonia longicollis), a goanna (L) with a head like one of the bearded dragon species (Amphibolurus barbatus), a tall bird (P) of the same type as at Rendezvous Creek, a boomerang (K), three stylized human figures S, T (a female), U, and, on the extreme right, what is possibly a dingo (V), or a stylized macropod. It is without a tail, but the granite is prone to exfoliation so the original tail may have fallen off. The rather greater length of the hind than the fore feet, and comparison with Fig.12 F supports identification of this figure as a stylized kangaroo or wallaby.
FIGURE 13: The paintings at Yankee Hat Shelter F, A.C.F.
Other motifs are visible, but it is difficult to tell what they represent. Nevertheless, I feel it is justified to make the attempt, when dealing with an art style which is so clearly figurative, rather than abstract. Some designs are probably abstract, such as the series of circles (D and Q). These are reminiscent of linear designs I have seen at Wuttagoona and Mt. Grenfell in the Cobar district of central western New South Wales (cf. McCarthy, 1962: frontispiece).

Two motifs at Yankee Hat are particularly puzzling. They are M, N and O which are very similar to each other. They are all clear, single red figures, and not part of something else which has faded. Since the emphasis in these Gudgenby paintings is on fauna, I suggest that N and O are crayfish, and M a Bogong moth. I have no corroborative evidence for the former identification, but the latter is supported by similar figures clearly representing butterflies or moths found in paintings at Bathurst Head, Queensland (McCarthy, 1962: Fig. 26).

The faunal list from these two Gudgenby sites is therefore as follows:-

1 Kangaroo (distinguished by size) 2 ?Crayfish
5 Kangaroos or wallabies 1+ Snakes
4 Tall birds (Brolga or Emu) 1 Emu
4+ Lizards 1 ?Bogong moth
3 Echidnas (or Long necked Tortoises) 2 Dingoes/Dogs

Human figures appear more numerous at Yankee Hat although still outnumbered by the fauna. Three white ones stand out fairly clearly towards the right-hand side of the frieze, and a very large dark red figure is discernible behind them.

A brief description of these two art sites was given by Charles Daley in the Victorian Naturalist in 1933 (p. 65-6), and they have been protected against stock by fences. They will shortly come into the area of the Gudgenby National Park.
This art site is located under an overhang on the northeast side of a large granite boulder overlooking the upper reaches of Sandy Creek. The site is reached from the Reid's Flat Road, and lies about half a kilometre east of the road in the first group of large granite boulders encountered when approaching from the village of Bigga.

The paintings lie on a dry, sheltered wall 6 metres long and 1-3 metres high, the dimensions of the decorated areas being 4.5m. x 1.8m. (15 ft. x 6 ft.). The art is well-preserved on the whole, but there has been some defacement by chalk outlines and initials in black charcoal. They are illustrated in plate 5.

The main colours used are white and light red (Munsell hue 2.54R. 5/8), with some black and dark red (Munsell hue 7.5R. 3/2). Superimpositions are few and difficult to determine, but in a few instances white seems to be superimposed on light red, and light red on dark red. All figures are silhouette, except one kangaroo in black outline.

The estimated number of figures is 45, of which 30 are men, seven emus, and the rest comprise kangaroos, lizards, boomerangs and a club. Through the centre of the figures winds a broad red line. There is a tradition amongst the Picker family (established in the Bigga District since the 1840's) that the scene is a 'map' of the Lachlan River, and this interpretation is supported by the irregular winding, and the presence of what look like tributaries on the river. The 'river' also changes in width, being widest on the bends. The windings bear a marked resemblance to those of the Lachlan River (in grid square 2079 of the Goulburn map - Sheet S1-55-12), and the 'creek' which leaves the river on the lower side (at the right of plate 5) could be Sandy Creek, which reaches to just
The paintings near Bigga, on the Southern Tablelands of New South Wales. (Almost the full extent of the paintings is shown, except for the extreme right-hand end.)
below the paintings site. If this interpretation is
correct, this map would be unique in Australian rock art,
but that is no reason for rejecting the hypothesis and
terming the river a most unnatural snake.

At the lower right hand end of the frieze is a series
of red figures in what appears to be a "corroboree" scene,
reminiscent of the dancing scenes at Gundabooka, in central-
western New South Wales. Then in the centre are some
very realistic emus. The emphasis on the emu here, on
the fringe of the tablelands, is interesting, contrasting
with the depiction of what appear to be wading birds in the
montane valley sites at Gudgenby. It seems that rock art,
at least to a certain extent, reflects the local fauna.
This has been well demonstrated in the Sydney region by
McM寡 (1965:40), who found that fish comprise 34% of all
subjects at art sites within 8km. (5 miles) of the coast,
but only 4% on sites more than 32km. (20 miles) from the
sea.

On the upper part of the frieze in the centre are two
striking white human figures, one with what seems to be a
club beside it, and one with some curious small red circles
on the shoulders and thighs, which perhaps represent
"corroboree" decoration. Towards the extreme left are
some small stick figures of men. These are also found,
alongside the rounder variety, in central-western New South
Wales, and also occur in north-east Victoria at the Conic
Range granite shelter (Tugby, 1953:446-50).

The floor area sheltered by the overhang is only some
5 metres long x 2 metres wide, but according to the local
people, it is one of the few dry spots in the whole dis-
trict, so might well have been utilized by Aborigines.
Traces of occupation, however, were very meagre. A
trench 1.5m. x 0.5m. was put at the foot of the wall
bearing the paintings in April 1971, but yielded only 3
pieces of chert, 1 quartz chip, some sheep bone and char-
coal, and the deposit became completely sterile at a
depth of 40cms. Another trench 1m. x 0.5m. was placed
at a distance of 1 metre from the wall and showed slightly
more signs of occupation, yielding 7 pieces of chert, 6 of quartz, 4 of basalt, some charcoal, bone and a few pieces of light red ochre. There were no signs of occupation below 25cms.

Several other very small rock shelters in the area were explored, and yielded a number of pieces of chert and quartz, including one retouched chert flake from near the 'tunnel cave' between the painted site and Gardiner's rocks, and a grinding stone flaked on the upper surface from the 'dolmen shelter' below Gardiner's rocks.

Traces of occupation in the Bigga paintings area are thus very meagre, suggesting occasional visits rather than use as a campsite. However the paintings are interesting and important, since they are at present the only rock art known from the Southern Tablelands.

Art styles:

The number of superimpositions, the degree of fading, and the absence of European subjects all suggest that the Bigga paintings are older than those at Gudgenby. Stylistically, they seem closer to those of central-western New South Wales (Mt. Grenfell, Gundabooka etc.) than to those on the coast, where the figures tend to be larger, with more outline drawings, a greater use of dry pigment and charcoal, and a great number of stencils (McCarthy, 1964: 38-9).

Comparison between the Southern Uplands sites and those on the Northern Tablelands of New South Wales is interesting. Common characteristics are the exclusive use of wet pigment, the total absence of stencils, the predominance of small human and animal figures, action scenes and dancing figures. Differences are the larger range of colours used in the Southern Uplands sites, although red predominates at Bigga just as it does so markedly in the Northern Tablelands art, and their lack of many motifs, in particular the lines of strokes, or 'tally marks' and the bird tracks found so widely in New England (McBryde, 1966b:160-176).
As in the Southern Uplands, the art of the Northern Tablelands differs widely from that of the coastal regions. The twenty rock art sites described by McBryde are on the western edge of the tablelands, and appear to have more affinities with the art of central-western New South Wales than with the coast, although certain mainly coastal elements, such as the 'tally marks' are present also. These are also found at sites on the top of the coastal scarp in the Southern Uplands, such as Caoura, north of Sassafras. The use of dry pigment occurs in a similar location at Bundanoon (Thorpe, 1909:325-8).

McCarthy has characterized art styles in New South Wales as being 'eastern' or 'western', and according to his criteria (1962:42-5) the rock art of both the Northern and Southern Tablelands has more affinity with the west than with the east. He also suggests that stencils in eastern Australia are sufficiently prehistoric for eighteenth century Aborigines not to have been able to explain them (ibid:43). If this is correct, their absence from the tablelands, despite their presence both on the coast and in western New South Wales, may indicate that art came late to the tablelands. It is remarkable that so few art sites are so far known in the 100,000km² of tablelands and highlands which comprise the Southern Uplands region. Although more may still be found, it is clear that they are very scarce compared with northern or coastal New South Wales. The difference from the latter might be attributed to the lack of sandstone rock shelters in the Uplands, but on the granite of the New England Tablelands, an area of approximately 21,000km², more than twenty painted sites have been found (McBryde, 1966b:160-76). The Southern Uplands are well furnished with suitable large granite boulders, yet in an area of 100,000km² only 3 art sites have been found. In other words more than six times as many art sites have been found on the New England Tablelands although they cover less than a quarter of the area of the Southern Uplands. It is difficult to attribute this great difference in frequency to differential discovery of sites or to lack of suitable rock in the Southern Uplands.
This same dearth of rock art is found in Victoria, where only "a dozen or so" sites were known in 1964 (McCarthy, 1964:39), one of which depicts white men. There too red ochre strongly predominates, and the affinities of this Victorian cave art, according to McCarthy, are with the paintings of central-western New South Wales. As well as this lack of paintings, the Southern Uplands also totally lacks engravings (petroglyphs). Since petroglyphs are found on granite, schistose shale and aeolianite (Tasmania), basalt (W. Australia), slate (S. Australia) and limestone (Port Hedland, N.W. Australia) as well as the more usual sandstone, their absence from the Southern Uplands is significant, and not merely due to lack of suitable rock formations.

It seems that the extreme south-east of the continent, represented by the Southern Uplands and Victoria, was isolated from the main artistic developments of Australia, and that the few art sites which do exist are probably young, and have closer affinities with the art of central-western New South Wales than with that of the eastern coast.

Caddigat Shelter, Monaro, N.S.W.

Map ref: a) 713104,1:100,000 series (Sheet 8625) Berridale
b) 194553,1:250,000 series (Sheet SJ-55-4) Bega

Elevation: 1000m. (3280 ft.)

This is a small shale cave on the edge of the treeless plains of the Monaro, at the headwaters of the Murrumbidgee River. Some seven red hand imprints were found on the inside walls of the cave. The handprints were done in wet red pigment (Munsell hue 10.R. 3/6), and pieces of ochre were found both on the scree slope below the cave, and in the occupation deposit. These hand imprints are the only sign of rock art found in the Monaro as yet.
Cooleman Caves

No sign of rock art has been found in these or other limestone caves in the Southern Uplands region, but paintings were reported at Cooleman by Martin Brennan (1907) who said that in 1874:

'while on duty at Coolamon, sixty miles [96 km.] from Queanbeyan, I visited the famous limestone caves of the place, where I discovered on the smooth surface of one wall traces of many paintings, representing kangaroos, dingoes, spears, boomerangs and wommerahs. These were partly covered with fantastic-shaped stalactites hanging in lustrous profusion from the high roof. Since then, however, vandalism had set in, and many of those beautiful carbonate of lime cylinders have been carted in drays to adorn the walks and gardens of many settlers'.

Ceremonial Grounds, Stone Arrangements and Carved Trees

Like rock art sites, stone arrangements and ceremonial grounds are few in the Southern Uplands, compared with the large numbers recorded on the Northern Tablelands (cf. McBryde, 1966b:50-94). Since the environment, conditions of preservation, and likelihood of discovery are similar in these two regions, I think the great difference in numbers is culturally significant.

Stone-Built Bora Grounds: I utilize the Kamilaroi word 'Bora' to signify initiation ground in accordance with normal usage in Eastern Australia, even though it was not the correct name for the ceremonies in the Southern Uplands, which were called 'Bunan', 'Kurung-gal' or 'Kudsha' according to Mathews (1896; 1900A and B). The ceremonies appear to have involved the use of two circles, a short distance apart and connected by a path. These circles or ovals were constructed of earth or stones, and in the 'Bunan' a figure was constructed in the centre of the smaller circle. This represented 'Daramulun', the supernatural anthromorphic 'All-Father' who lived in the sky and watched over the actions of men, according to the beliefs of tribes of south-east Australia (Howitt, 1904: 488-508).
Plate 6

A. The Bora Ground on Mt. Endrick, Budawang Range, New South Wales.

B. The descent into Hidden Valley from the Bora Ground on Sturgiss Mountain, Budawang Range, New South Wales.

C. Axe-grinding grooves on the sandstone slabs above the rock-shelter of Sassafras I, New South Wales.
FIGURE 14: Bora Grounds.

Above: The Rings on the Bogong Range, Tumut.

Below: The stone-built Bora Ground on Mt. Sturgiss, Budawangs Range.
Examples of this figure may perhaps be represented in a line down the centre of the Bora ground on the top of Mt. Endrick in the Budawang Range, south of Sassafras. The line of stones does not look particularly anthromorphic, but I can find no other example of a Bora ground of this form, except for its slight resemblance to Mathews' illustration of the 'Bunan' ground with the figure of 'Darumulun' recorded at Camden, south of Sydney (1896:fig.4).

The Mt. Endrick Bora ground is very well-preserved as can be seen in plate 6. It was fully published by C.C. Towle in 1932, so will not be further described here. However, in the same range, on nearby Mt. Sturgiss (see figs. 14 and 30), there is another stone arrangement which has not been previously recorded. (Map ref. - Endrick Bora Ground 32096538; Sturgiss Bora Ground 32026499, 1:50,000 series (Sheet 8927 - IV) Nerriga). This is situated at 793m. (2600 ft.) on the top of Mt. Sturgiss, an isolated rock bastion with precipitous cliffs on all sides. The only approach is by scrambling up rock ledges and chimneys from Hidden Valley, and the ascent is sufficiently steep to warrant the use of rock-pitons by modern bush-walkers (see plate 6). The Bora ground lies on flat rock slabs near the summit of this isolated windswept mountain. The form of the stone circle was sufficiently well-preserved to be recognised as a Bora ground in the early years of this century by Jim Sturgiss, after whom the mountain was named. Now, however, the elements have taken their toll, for at times I have seen the winds rolling small boulders across the bare rock-slabs. It is possible, however, to distinguish the original form of the stone circle, which appears to resemble that on Mt. Endrick.

Earth Bora Grounds: These are extremely difficult to find since they so easily disappear without trace, and are not visible on aerial photographs. The memory of one on the Bogong Range, Tumut, which is recorded below, was preserved by the name of 'Rings Creek' and I am grateful to Jack Bridle of the Tumut Historical Society and to the Rangers of the Kosciusko National Park for indicating its exact location to me.
This Bora ground lies on the southern end of the Bogong Range, south of Bogong Mountain, 1418m. (4650 ft.), as shown on figure 22 (Map ref. 29391954, S.M.A. 1 mile to the inch series, Batlow Sheet). The Rings occupy grassy flats which are naturally open because of the cold air drainage from the surrounding peaks which impedes tree-growth. This is the only open place on the whole of the forested Bogong Range except for the 1500m. (5000 ft.) Bogong Peaks, as can be seen in air photographs (see plate 7).

It comprises two circles set about 300 metres apart (see figure 14). The circles, or rather ovals, consist of a flat area surrounded by a continuous earth bank, now about 1 metre wide and 20cm. high. Two features of the Bora ground are particularly interesting. Firstly, the Rings are of almost identical dimensions, and secondly they both have their longer axis on the same east-west alignment, although they are not intervisible, since they lie approximately 300 metres apart with a small rise blocking the view from one to the other.

More Bora rings are said to exist on Big Plain below the Big Plain Peak and Bogong Peak, but intensive searching has failed so far to reveal them. However, an Aboriginal camp-site has been found there and another on Rings Creek, only 400 metres from the Bora ground. These are described in chapter 11.

Another locality which is said to have had initiation circles is the peak of Tidbinbilla, near Canberra. Local tradition (Davis Wright, 1923:61) says the name Tidbinbilla (Jedbinbilla) means 'the Place of Initiation', and that young men were taken up to the rocky peak "to be made men" in a ceremony involving tooth avulsion, but I have not yet found any trace of a Bora ground on the mountain.

Stone Arrangements: One definite stone arrangement has been found in the north of the Monaro at the head of the Bredbo River, on the property of Green Hills (Map Ref: 248557, 1:250,000 series, Sheet S1-55-16 Canberra). This is a series of stone cairns arranged
in a slightly curved row. It has been fully recorded by McCarthy for his forthcoming publication on stone arrangements, so will not be described here.

Another stone arrangement has recently been found by Dr. A. Costin and Dr. J. Jennings on an unnamed peak of almost 1830m. (6000 ft.) close to Mt. Kelly, at the southern end of the Namadgi Ranges. It consists of long curved lines of stones laid on open rock slabs and is very similar to a stone arrangement found in a similar situation on an isolated rocky summit near Cannon Hill in Arnhem Land, which has significance for local Aborigines and is thought to be connected with initiation ceremonies (R. Edwards, pers. comm.).

**Carved Trees:**

In the Southern Uplands carved trees are also extremely rare, compared with the hundreds recorded in northern New South Wales or the Bathurst region. In his *Dendroglyphs of New South Wales* (1918) Etheridge records only one teleteglyph, or 'initiation tree', and four tapoglyphs, or 'grave trees', in the south of New South Wales, and none in Victoria, out of a total of 160 instances of their occurrence.

Of these five carved trees in the Southern Uplands, none are found south of Goulburn except one on the coast at Ulladulla. However Jardine makes a vague reference to carved trees at Jindabyne as a result of his 1845 visit to the Monaro. He described the local mode of burial as placing the corpse in a hollow tree, but 'when deceased was a man of note in the tribe, a sandy or soft place was chosen for the burial, and the trees around marked in a peculiar manner' (1901:53).

There is also a late, but detailed and therefore probably authentic, description of the use of tapoglyphs in the Canberra region.

'In many cases, but not all, the grave would be dug at the foot of a tree. A piece of bark, some 2 or 3 foot [60-90cm.] square would be removed from the tree, overlooking the grave, from about 3 ft. up. On the bared wood, curves and angles, short lines
'and dots would be cut about half an inch [12mm.] deep with their stone axes. These were, to the natives, hieroglyphics which informed members of the tribe that one of their number was buried at the foot.' (Bluett, 1954:11-12).

All of the carved trees on the Southern Tablelands reported by Etheridge have now been destroyed, and my enquiries have not brought forth any other definite instances.

**Conclusions:** The Southern Uplands, like Victoria, is a decidedly impoverished region with regard to rock art, carved trees and stone arrangements, in comparison with the Northern Tablelands, coast and inland regions of eastern New South Wales, and indeed with most of the rest of Australia. The few art sites which do exist exhibit an animated, colourful naturalistic style which compares closely with the art of the Cobar district in central-western New South Wales, whilst contrasting strongly with the styles of the east coast. There are various grounds for believing the Southern Uplands' art to be fairly recent, with an antiquity of not more than a few hundred years, so it may reflect some late influences from central-western New South Wales.

The ceremonial grounds, on the other hand, are similar both to those on the coast and in the inland territory of the Wiradjuri and Kamilaroi tribes, suggesting that initiation ceremonies took a similar form right across eastern New South Wales.

As a result of this field examination of culture traits, we must reject the hypothesis (proposed in chapter 8) that culture traits such as art styles in the Southern Uplands will tend to be more similar to those of the coast than of the western plains of New South Wales.

Instead, it emerges that the Southern Uplands are most similar to eastern Victoria in their general lack of rock paintings, engravings, carved trees, and stone
arrangements, and that the little rock art which is found resembles that of central-western New South Wales more closely than that of the east coast.
Chapter 10

Settlement Patterns in the Southern Uplands:

I. The Canberra Region

The scarcity of rock-shelters in the Southern Uplands means that the great majority of Aboriginal occupation sites are open camp-sites. To study settlement patterns, therefore, in the various ecological zones of the region, it was necessary to undertake a locational analysis of the open sites. By 'locational analysis' I mean the examination of determinants on the distribution, location and nature of camp-sites (cf. Haggett, 1965:12 ff.). Few such area studies have yet been undertaken in Australia, but the 1970's have commenced with a move out of the caves into the open. Projects framed in terms of regions rather than sites, including the systematic search of a wide area for open camp-sites, have been strongly advocated by Peterson, on the grounds that:

'This would greatly refine understanding of human adaptation to the environment as reflected in residence and diet variation, the effect of the major climatic changes on these patterns, the coincidence of cultural and natural areas, correlations between sites and activities as reflected in tool use, the regional dispersal of materials from quarries, and trade routes and natural lines of movement' (1971:246).

Inspired by these ideals, I commenced an analysis of open prehistoric camps in the Southern Uplands. The main problem was to find sites under the close grass cover of the modern paddocks. However, some tableland sites have been revealed by erosion, ploughing, or construction works, and on the mountain ranges the sparse ground cover in the sclerophyll forests means that stone implements can be found still lying on the surface. The study therefore was difficult but not impossible.
It was necessary firstly to make a choice between either an intensive study of a small area to discover and analyse the location of all Aboriginal sites within it, or a locational analysis of known sites over a much wider area. The problems involved in a micro-region study were:

(a) That to obtain a transect across the various ecological zones, the minimum area would still be impractically large, involving a great deal of reconnaissance to find perhaps only a very few sites. (My intensive reconnaissance of a few small areas in the Uplands had already revealed that stone tools and other traces of Aborigines were not nearly as abundant as in the coastal or western region of New South Wales, and sites tended to be spaced at intervals of several kilometres. The average yield of one weekend's bushwalking was the discovery of one Aboriginal camp-site).

(b) It would be extremely difficult to find even a micro-region where one could be absolutely sure that no site had been destroyed, or alternatively, discovered and the assemblage depleted.

(c) A micro-region study might well result in too small a number of sites and artifacts to make a valid statistical sample for comparison with other regions.

For these reasons I decided, for this first regional survey, on locational analysis of sites from a wide area, namely the Australian Capital Territory and the Monaro region.

Methodology of Open-site Survey

Two main methods of finding sites were employed, that of verbal enquiry and that of personal search on foot. In the Canberra region the majority of sites described below had been discovered before the survey started, and verbal enquiry and press publicity brought forth their location. Particularly helpful in locating sites were members of the
Canberra Archaeological Society, Canberra Historical Society, and local botanists, zoologists, geologists, shooters, fishermen and foresters with a particular interest in the A.C.T.

Further away from Canberra, very few sites were known, and it was necessary to survey the region in person. This was done as follows:-

a) Transects: In two cases (the Thredbo Valley and the Bogong Range) narrow transects (about 3km wide) were taken from the valley floor to the top of the ranges up the easiest walking routes, the whole region being examined for camp-sites.

b) Prediction from aerial photographs: From the initial examination of known sites in the Canberra region it was noted that, in heavily timbered country, the Aborigines had a predilection for open localities. Such naturally open places were therefore plotted from aerial photographs, and later examined on foot. Such examination involved traversing a certain amount of the surrounding country, but in all cases artifacts were found in the open location and not in the intervening bush. When time and the type of country allowed, a large area was covered on foot, for example the top of the whole Bogong Range and of the northern Brindabella Range.

c) Prediction from availability of water and shelter: In the tableland tract the same criteria were employed as modern bush-walkers would use in siteing their camps. Thus a search was made around lakes, by rivers and creeks, particularly in sheltered places, and on natural lines of movement.

These various methods produced, without an enormous input of time, sufficient camp-sites to give a general picture of settlement patterns in the Canberra and Monaro regions. However, to try and substantiate further the impressions gained from this first site survey the next step must be an in-depth study of a micro-region, in which every square metre of ground will be searched.
Factors responsible for the location of camp-sites

1. Water: All sites are within one kilometre, and most within 100 metres, of a river, creek, lake or spring. However, no sites are located right at the water’s edge for three good reasons:

(a) The ground would often be damp, whereas dry ground could be found a little further away;
(b) flash floods in mountain rivers are not uncommon;
(c) in winter cold air tends to drain into the river channels and in summer the mosquitoes gather there;

2. Defence: No camp is unduly vulnerable to attack. All have a reasonably good view of the approaches, and none is in a cul-de-sac position. The montane camps tend to be situated on spurs or in naturally open flats perhaps partly for this reason.

3. Shelter: All sites are situated on well-drained ground, and sand-hills are utilized where available. Most sites are located in savannah woodland or dry sclerophyll forest, often on the top of a low spur or slight rise. Where sites occur on the side of a mountain range or valley, their aspect is always east or north, thus obtaining shelter from the prevailing westerly winds. An eastern aspect would also receive the welcome early morning sun, and a northerly aspect the maximum sunshine during the day, which in turn would warm up the ground for the night. Several sites are located on the lee side of a saddle, and the high level sites are generally high on the lee side of the mountain ridge. As well as desired proximity to moth supplies, a factor responsible for the elevation of these camps might be the ease of walking along the open ridge top rather than through the thicker scrub lower down.

4. Firewood: This was just as much a necessity of life as water and food, for most of the food in the Upland region appears to have been roasted, and fire would also play a part in combating the low winter temperatures
and frosts. In only two ecological zones in the Southern Uplands are there no trees, the treeless plains of the Southern Tablelands and Monaro and in the alpine zone above 1830m. (6000 ft.). It may therefore be significant that no Aboriginal camp-sites have been found in these zones in the Canberra region, but this question will be further pursued in the following chapter on the Monaro.

5. Food and Other Resources: In most of the Canberra region, defensible, dry, and reasonably sheltered situations with water and firewood readily available, are abundant. The location of food or other special resources therefore is likely to be the governing factor here in the selection of a camp-site. If food resources were equally distributed over the whole region it would be very difficult to predict the location of any camp-site, but fortunately they are not. Some zones are much richer in food resources than others. These different ecological zones cannot generally be exploited from a single camp-site since distances and differences in elevation are too great. Local ethnographic evidence suggests that the people, both men and women, moved camp fairly frequently, and there is no suggestion that any groups were restricted to a single ecological zone. In other words, the ethnography points to seasonal movement of one tribe over a wide hunting range, rather than to different tribes or clans inhabiting different ecological zones. This evidence is supported by the necessarily seasonal character of the highest camps.

Although there is insufficient data to draw a detailed resource map of the area, it was suggested in chapter 7 that the main food staples of the Uplanders would probably have come from three zones:

(a) riverine foods from the larger rivers;

(b) mammals and vegetable foods from the mountain slopes, especially the wet sclerophyll forests; and

(c) Bogong moths and 'yams' (the tubers of *Microseris scapigera*) from the subalpine zone in summer.
The distribution of camp-sites within the region supports this hypothesis. Apart from sites associated with stone-quarrying, the camps divide into three broad groups - those close to aquatic food resources, those adjacent to wet sclerophyll forest, and high level camps close to Bogong moth habitats. Some artifactual variation correlates with difference in camp location and this will be described in chapter 12.

**Locational Analysis**

There are insufficient sites at present and too many unknown factors to attempt a detailed locational analysis of the type developed by human geographers (e.g. Haggett, 1965) and utilized by archaeologists such as Vita Finzi and Higgs (1970) in Palestine and Cassells (1972) in New Zealand. However, whilst the large number of undiscovered or destroyed sites prevents a general study of the inter-relationship between one site and another, it is possible to suggest the relative importance both of different foods at the various sites, and, by examining the clustering of sites, of the different resource zones.

'*Lex Parsimoniae*': What foods were exploited from each site? To answer this question, it is necessary to determine the 'field' or food catchment area of each site, and this in turn necessitates an efficiency hypothesis. It is necessary to propose that a group would expend a minimum, or at least, a not excessive amount of energy in exploiting their environment. In other words they would exploit it in a reasonably efficient manner. This 'law of minimum effort' is well established in human geography (Losch, 1954:184, Haggett, 1965: 32 ff) and in the social sciences, in particular from Zipf's *Human behaviour and the principle of least effort* (1949).

Hunter-gatherers' main expenditure of effort is caused by the distance covered in the food quest, which includes both search and capture time.
The factor of 'Lex Parsimoniae' leads to three propositions:

(a) That "the resource zone in or around which the majority of sites are found is likely to be the most important" (Cassells, 1972:215).

(b) The food resources closest to an individual camp will probably form the main part of the diet for the group at that camp.

(c) Since it is an inefficient use of energy to walk more than a certain distance each day to obtain food, the food catchment area around each site will have a maximum efficiency radius. When this field has been worked out, camp will be moved to another locality, with a new unexploited field, or more probably, a replenished one.

How far was this 'certain distance'? There is no ethnographic evidence regarding the distance that Aborigines in this area would be prepared to cover in search of food, so our only guide must be common sense and analogy. Amongst the Bushmen Lee found that 'a day's round trip of 19km. (twelve miles) served to define a "core" area 9.5km. (six miles) in radius surrounding each water point. By fanning out in all directions from their well, the members of a camp can gain access to the food resources of well over 160km² (100 square miles) of territory within a two hour hike' (Lee, 1968:35). The distance regularly covered by the Hadza women of Tanzania was found to be rather less, vegetable food being found usually within an hour's walk of camp, although the men might go considerably further to hunt big game (Woodburn, 1968:51). In inland New Zealand few sites were found to be as much as 6.5km. (four miles) apart, so the maximum 'field' of a site was considered as a radius of 3km. (two miles) from the site (Cassells, 1972:215). During his field-work in Arnhem Land, Peterson found that the women were 'only prepared to regularly walk for a maximum of an hour to an hour and a half away from base camp on the food quest...Because the
men are prepared to regularly cover greater distances than the women, it is the women who set the limit for staying in one place'. He assessed a reasonable average speed for women gatherers as 4.8km. (3 miles) per hour (Peterson, 1972:6).

In mountain country distance must be assessed in terms of time rather than horizontal measurement, and for this purpose I have utilized Naismith's formula of allowing one hour for each 4.8km. (3 miles) plus one hour for every 610m. (2000 ft.) of ascent (Blackshaw, 1965:40). This has been found to be the average speed of a reasonably fit European mountaineer carrying not more than 5kg. and would therefore seem applicable to Aborigines, although women pausing to collect and gather and accompanied by children probably move more slowly. On this basis I drew concentric radii round a sample of sites at a distance of approximately one hour and 1.5 hours from each camp. The results are described below in the relevant sections.

The Canberra Region

The Australian Capital Territory contains the whole spectrum of upland ecological zones within a small compass, and has the additional advantages that about a dozen sites were already known, including several in the tableland zone discovered during the development of Canberra as the National Capital. The Lake George area was also included, as possibly providing a focus for Aboriginal occupation of the Southern Tablelands, and a few sites discovered west of the Australian Capital Territory have also been included in this analysis.

Since most of the surface camp-sites discovered and five of the nine excavated rock-shelters fall within the Australian Capital Territory, for those unfamiliar with the region a full description is given in Appendix 5. This is based on Griffith Taylor's 1910 paper on the physiography of the proposed Federal Territory, the 1923 Pan-Pacific Handbook, the 1954 ANZAAS Handbook, Canberra, edited by

Basically there are three kinds of country in the Australian Capital Territory, lowlands, mountain slopes, and mountain ridges. Within these broad divisions many sub-divisions can be made, and boundaries between the different zones are not sharp but gradual. The physiography of the territory is shown in fig. 15, the vegetation zones and rainfall isohyets in fig. 16, and the location of camps in fig. 17, the numbers corresponding to those on Table 10:1. The details of camp location are given in Appendix VI:A, and the stone assemblages are tabulated in Table 12:1.

The settlement pattern which I tentatively suggest exists is shown in Table 10:1 and can be described as follows:-

A. **Large Lowland Bases**

These are open camp-sites extending over 2 or 3 square kilometres which have yielded 1500 or more stone artifacts and manuports. Two such sites known in the Southern Tablelands are at Nardoo on Lake George and on the banks of the Molonglo River at Pialligo. Their location is shown on figures XI:A and 18 respectively. Both camps are situated on sand hills, and both are presumably associated with fishing and the catching of aquatic birds. Veins of a high quality quartz outcrop at Nardoo, and the Pialligo site is close to the Fyshwick gravel deposits, so the exploitation of these materials could have provided an added attraction.

**Reidsdale:** The ochre and chert quarrying site of Reidsdale (fig. 17 no.18) also comes into this size category, but was a special purpose site, devoted to the exploitation of the abundant supply of ochre and chert available locally. The stone implements and waste material at Reidsdale are found on a series of low rises close to two springs. The ochre occurs on the site, and the chert about 1km. away.
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<thead>
<tr>
<th>Name of site</th>
<th>Figure number or appendix</th>
<th>Elevation (a)</th>
<th>Location</th>
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<th>Size rating (1-5)</th>
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<td><strong>A. LARGE LOWLAND CAMPS</strong></td>
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<td>Nardoo</td>
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<td>Sand hills</td>
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<td>3 5</td>
<td>?</td>
<td>Savannah woodland</td>
<td>Lake George (c. 30 mins.)</td>
<td>Quartz available</td>
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<tr>
<td>Pialligo</td>
<td>17:13</td>
<td>564</td>
<td>Sand hills</td>
<td>-1</td>
<td>1 5</td>
<td>?</td>
<td>Tableland</td>
<td>River Molonglo (2 mins.)</td>
<td>Rock from Fyshwick</td>
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<tr>
<td>Reidale</td>
<td>17:18</td>
<td>686</td>
<td>Low rises</td>
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<td>Tableland</td>
<td>Ochre and Chert</td>
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<td><strong>B. MEDIUM SIZE LOWLAND CAMPS</strong></td>
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<td>Winderadeen</td>
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<td>Tableland</td>
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<td>Mc Ainslie</td>
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<td>640</td>
<td>Low spur</td>
<td>-3</td>
<td>3 4</td>
<td>? Dry sclerophyll</td>
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<td>River Molonglo (c. 15 mins.)</td>
<td>Volcanic rock</td>
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<tr>
<td>Black Mountain</td>
<td>17:11</td>
<td>564</td>
<td>Sandy spur</td>
<td>-3</td>
<td>3 3</td>
<td>? Dry sclerophyll</td>
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<td>River Molonglo (2 mins.)</td>
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<tr>
<td>Cotter Junction</td>
<td>17:10</td>
<td>472</td>
<td>Sandy spur</td>
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<td>? Cypress pine</td>
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<td>River Murrumbidgee (1 mins.)</td>
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<td>Wee Jasper</td>
<td>VIA:24</td>
<td>381</td>
<td>Low spur</td>
<td>E 4</td>
<td>2 2</td>
<td>? Dry sclerophyll</td>
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<td>River Goodraddibee (c. 15 mins.)</td>
<td>Ford and junction</td>
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<td>Brindabella</td>
<td>VIA:22</td>
<td>823</td>
<td>Spur</td>
<td>N 3</td>
<td>2 2</td>
<td>? Dry sclerophyll</td>
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<td>River Goodraddibee (c. 5 mins.)</td>
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<td>17:14</td>
<td>655</td>
<td>Lee of saddle</td>
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<td>? Dry sclerophyll</td>
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<td><strong>C. MONTANE CAMPS</strong></td>
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<td>777</td>
<td>Low spur</td>
<td>E 4</td>
<td>3 3</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. food; moths (c. 1½ hr.)</td>
<td>Creek; chert;</td>
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<td>Rock shelter</td>
<td>-5</td>
<td>5 5</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. food; moths (c. 1½ hr.)</td>
<td>Mammals; quartzite; quartz</td>
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<td>Yankee Hat</td>
<td>17:C</td>
<td>1097</td>
<td>Rock shelter</td>
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<td>5 5</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. food; moths (c. 1 hr.)</td>
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<td>Rock shelter</td>
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<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. food; moths (c. 1 hr.)</td>
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<td>Open flats</td>
<td>-4</td>
<td>3 3</td>
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<td>Mammals; veg. food; moths (c. 2 hr.)</td>
<td>Creek</td>
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<td>Orroral</td>
<td>17:5</td>
<td>960</td>
<td>Above river</td>
<td>-4</td>
<td>2 2</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. food; moths (c. 1½ hr.)</td>
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<td>17:17</td>
<td>1021</td>
<td>Flats by creek</td>
<td>-4</td>
<td>3 3</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. foods.</td>
<td>By large waterfall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lees Creek</td>
<td>17:21</td>
<td>701</td>
<td>Flats by creek</td>
<td>-4</td>
<td>2 2</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. foods.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>D. HIGH CAMPS</strong></td>
<td></td>
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<tr>
<td>Bogong Shelter</td>
<td>17:B</td>
<td>1433</td>
<td>Rock shelter</td>
<td>-5</td>
<td>5 5</td>
<td>? Dry and wet sclerophyll</td>
<td>Mammals; veg. food; moths (c. 1½ hr.)</td>
<td>Moths (2 mins.); swamp (10 mins.)</td>
<td>Creek and saddle</td>
<td></td>
</tr>
<tr>
<td>Smokers Gap</td>
<td>17:8</td>
<td>1220</td>
<td>Lee of saddle</td>
<td>E 3</td>
<td>3 3</td>
<td>? Wet sclerophyll</td>
<td></td>
<td>Mammals; veg. food; moths (c. 40 mins.)</td>
<td>Creek and saddle</td>
<td></td>
</tr>
<tr>
<td>Mc Corrie</td>
<td>17:5</td>
<td>1174</td>
<td>Hollow by spring</td>
<td>-3</td>
<td>3 3</td>
<td>? Wet sclerophyll</td>
<td></td>
<td>Moths (20 mins.); wet sclerophyll (15 mins.)</td>
<td>Spring</td>
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<td>Lees Springs</td>
<td>17:6</td>
<td>1235</td>
<td>Lee of saddle</td>
<td>NE 3</td>
<td>4 4</td>
<td>? Wet sclerophyll</td>
<td></td>
<td>Moths (c. 60 mins.); wet sclerophyll (10 min.) Spring; saddle</td>
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<td></td>
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<td><strong>E. CAMPS ABOVE WINTER SNOW-LINE</strong></td>
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<tr>
<td>Mt Gingera</td>
<td>17:1</td>
<td>1647</td>
<td>Lee of ridge</td>
<td>NE 2</td>
<td>2 2</td>
<td>? Subalpine</td>
<td></td>
<td>Moths (20 mins.); yams</td>
<td>Creek</td>
<td></td>
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<tr>
<td>Brumbly Flats</td>
<td>17:2</td>
<td>1738</td>
<td>Open flats</td>
<td>-1</td>
<td>1 1</td>
<td>? Subalpine</td>
<td></td>
<td>Moths (5 mins.); yams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackfellows Gap</td>
<td>17:3</td>
<td>1525</td>
<td>Lee of ridge</td>
<td>E 1</td>
<td>1 1</td>
<td>? Subalpine</td>
<td></td>
<td>Moths (15 mins.); yams</td>
<td>Saddle</td>
<td></td>
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<tr>
<td>Little Ginini</td>
<td>17:4</td>
<td>1647</td>
<td>Lee of ridge</td>
<td>E 2</td>
<td>2 2</td>
<td>? Subalpine</td>
<td></td>
<td>Moths (15 mins.); yams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binberi</td>
<td>17:19</td>
<td>1891</td>
<td>Lee of ridge</td>
<td>N 2</td>
<td>2 1</td>
<td>? Subalpine</td>
<td></td>
<td>Moths (5 mins.); yams</td>
<td>At side of swamp</td>
<td></td>
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</table>
FIGURE 15: The Physiography of the Australian Capital Territory.
FIGURE 16: Vegetation and Rainfall of the Australian Capital Territory (after Pryor 1954).
FIGURE 17: Location of camp sites and moth aestivation sites in the Australian Capital Territory.
Pialligo: There is some ethnographic evidence that Pialligo was the centre of the 'Canberra tribe', and sources quoted in chapter 4 suggest that at the time of European settlement in the 1820s-30s there were quite often 500 Aborigines in Canberra, particularly when "corroborees" or inter-tribal battles were taking place. Pialligo appears to have been the largest local site (followed by the Black Mountain peninsula), so its size may reflect tribal gatherings of the type described ethnographically.

Alternatively, of course the larger size of the Pialligo and Nardoo sites could reflect a much longer period of occupation, or a strong preference for camping on sand. The latter is very possible, but the former is rather unlikely in view of the close similarity in stone assemblages with the smaller sites, and their common possession of backed blades (see chapter 12).

My interpretation of the Pialligo site is of a fishing camp, occupied at a time of plenty when social gatherings such as "corroborees" could be held. In winter it would be one of the coldest places on the Southern Tablelands since the Canberra basin receives an average of 77 frosts per year (Bureau of Meteorology, 1928:21-5). Figures are from the Forestry School Station, but the Stations at Duntroon and the Aerodrome (near Pialligo) are said to be little different from them. Nearby Queanbeyan has an average of 102 frosts per year).

Nardoo: The site of Nardoo lies on the east side of Lake George, five kilometres distant from the normal modern lake shore. The lake shore is unlikely to have been any closer to the site than this within the last 5000 years (cf. Coventry, 1973:214-7), but a local water

1The site of Nardoo is described in detail in Appendix XI and XII and discussion of its stone assemblage and chronology is included in chapters 12-14.
supply is provided by Taylors Creek. The attractions of the site for Aborigines would have been the extensive sand-hills, providing a warm and soft habitat, and the occurrence of veins of a high quality quartz with good fracturing properties and sharp cutting edges. There thus appear to have been three main factors in the location of a camp site at Nardoo, the attraction of sand-hills, the availability of quartz, and proximity to Lake George, with its abundant bird and aquatic resources.

B. Medium size Lowland Camps

The exploitation of riverine resources imposes a lineal pattern on occupation sites on the tablelands. This is exemplified on the Molonglo River in the Canberra region, as seen in fig. 18. Approximate location of camps are shown by names in heavy type and by stars. The majority of these camps were found by H.P. Moss (1939), and the collections together with that from Pialligo have recently been classified by Bindon (1973). The large number of sites along the Molonglo River within the boundaries of Canberra is more probably due to the spotlight on the National Capital and resulting interest in its prehistoric relics than from a particularly dense Aboriginal occupation in this region. In other words, the pattern of camp-sites in Canberra is likely to be fairly typical of other tableland riverine areas. On some rivers, such as the Yass River, isolated stone implements are found scattered along the banks, rather than any specific camp-sites (P.Bindon, pers.comm.). The situation along the Murrumbidgee may be similar, but little material apart from ploughed-up axes has so far come to light along its banks because of the grass-covered paddocks or dense bush which line it in most of the Canberra region.

The more sheltered and low-lying of these sites may well be winter retreats, as long as they do not lie in frost hollows. The vegetation is an excellent indicator of the incidence of frost, the frost-sensitive Cypress pine Callitris endlicheri indicating good winter habitats for
FIGURE 18: Aboriginal camp-sites in Canberra are indicated by stars and heavy type. The artificial Lake Burley Griffin is delineated by grey shading. (After Bindon 1973).
Aborigines. In the Canberra region it is common along the Murrumbidgee River and in the Molonglo Gorge. I would suggest that in the cold months the Aborigines would have moved out of the frost plains either onto slightly higher ground, such as the camps on Mt. Ainslie, Black Mountain, or Mt. Stromlo, or into the low mountain valleys such as Tidbinbilla where game would be plentiful, but most probably into the sheltered parts of the Murrumbidgee or Molonglo valleys, which only receive an average of 16 frosts a year.

The riverine sites on the Molonglo River shown in fig. 18 were much less than two hours' walk from one another. The greater frequency and generally larger size of the riverine camps compared with those higher up can be interpreted in several ways:

(a) That the riverine camps represent a longer time span than the higher camps. In other words, that the early settlement of the region was along the table-land rivers, and that the montane zones were not exploited till a later period.

(b) That a larger proportion of each year was spent at the riverine camps than in the other ecological zones.

(c) That the riverine camps formed home bases at which the women and children stayed during much of the year, and that the smaller high level camps reflect all-male hunting or moth-collecting expeditions. This situation would be comparable to that obtaining among the Ainu of Japan, who inhabited narrow river valleys with a variety of ecological zones. The women and children occupied permanent settlements on the river terraces nearly all the year round, but the men moved up to high-level deer and bear-hunting huts twice a year for about one month on each occasion (Watanabe, 1968:72). It has been suggested in chapter 6 that Bogong moth-hunting was also a male activity, probably because of the difficult terrain to be traversed, and
it is possible that women were left at a lower base camp whilst men went off moth-hunting. However, the lack of vegetable food along rivers such as the Molonglo and Yass Rivers suggests that the women are unlikely to have camped there for very long periods, and there is also ethnographic evidence that they moved at least as far as the foot of the mountain ranges, for example to Uriarra homestead below Mt. Coree.

(d) That movement tended to linear, along the river banks, rather than at right angles to the rivers, across the ecological zones.

These explanations are not mutually exclusive. There was probably both movement along the rivers and into the hinterland at right-angles to the rivers. However, the ethnographic evidence quoted in Section 2 of this thesis suggests that there was considerable movement of the whole group rather than just the male hunters, so in this respect I would suggest that the women were considerably more nomadic than the Ainu women.

C. Montane Valley Camps

These sites lie between about 745m. and 1160m. (2450-3800 ft.) in montane valleys, associated with creeks or fast-flowing mountain rivers which can have provided little in the way of regular food supplies. To their number must be added the occupied rock-shelters in the Gudgenby, Rendezvous Creek and Tidbinbilla valleys (shown on fig.19, and as C, D and A respectively on fig.17). The features which are characteristic of the montane valley camps are their location in or near dry and wet sclerophyll forest, and their position at the foot of Bogong moth peaks. In this sense they could be regarded as summer base camps similar to the high summer camps of Group D, but located in montane valleys at rather lower altitudes.
FIGURE 19: Location of Aboriginal sites in the Gudgenby valley, Australian Capital Territory. Y.H. = Yankee Hat I and II rock-shelters. R.C. = Rendezvous Creek rock-shelter. F.P. = Front Paddock rock-shelter. The 1500m. contour delineates the winter snow line, and the 1350m. contour the approximate lower limit of moth aestivation sites.
From them the plentiful arboreal and other mammals and vegetable foods of the wet sclerophyll forests would easily be available, and they would also serve as base camps for summer hunting of Bogong moths on the mountain peaks above. In some cases, such as in the Gudgenby valley, the base camp lay only 305m. (1000 ft.) below the nearest supply of Bogong moths, and in this case they could be exploited on day expeditions, but where vertical or horizontal differences were greater, it was probably necessary to use a higher camp as well.

The montane site of Blundells Flat (fig. 17 no.7) situated at 746m. (2450 ft.) lies 673m. (2210 ft.) below the peak of Mt. Coree, a regular habitat of the Bogong moths. The Blundells Flat site is remarkable for its size, and the large number of implements found there. This suggests occupation by a larger group than one confined to the male moth-hunters, but the camps of the latter are reflected in higher sites described below.

The Blundells Flat site is also distinguished by being the only camp so far in wet sclerophyll forest, all the other montane sites being situated in dry sclerophyll, although often at the edge of the wet sclerophyll (e.g. Lees Creek, Fig.17:21). J.H. Calaby, who discovered the Blundells Flat site, thinks that the open flats it occupied had been kept open artificially by firing (pers.comm.). This seems very likely, but it has been impossible so far to prove that Aborigines were responsible, and not merely Europeans, in the form of Count Blundell who had a shack there from the 1840s.

The montane camps and rock-shelters may also have been utilized in winter, since they lie below the snow-line but above the frost plains, and so would not be excessively cold, although the rainfall would be considerably higher than on the tablelands. The winter snow would also drive the game downwards, so there would be a supply of macropodids and other marsupials in the montane valleys.
D. High Summer Camps

Three camps can be classed as high summer camps, probably associated with the exploitation of the Bogong moth, but not indisputably seasonal since they would only occasionally be snow-covered in winter. The Mt. Coree site (fig.17:5) would seem certainly to have been a moth-hunting site, but the other two, Lees Springs and Smokers Gap (fig. 17:6 & 8), lie just below saddles across the ranges, and therefore could also have been transit camps. From all three sites it would have been possible to exploit both Bogong moths and the resources of the nearby wet sclerophyll forest. The two camps of Mt. Coree and Lees Springs lie at around 1220m. (4000 ft.). Both have sheltered positions with permanent water, and are considerably more extensive sites than the small subalpine sites at 1525m. (5000 ft.) or more on the Brindabella Range. They could be interpreted as advanced base camps, from which the women gathered vegetable foods and the men hunted arboreal and other mammals, interspersed with Bogong moth expeditions. The latter would be reflected in the small high-level camps of Group E. The larger size of the Lees Springs site probably results from its position as half-way post on the journey from the Cotter - Murrumbidgee Rivers to the valley of the Goodradigbee, forming the lowest crossing place on the 40km. (24 mile) long Brindabella Range. It also seems likely that it was a tool-manufacturing site, since quartzite and silcrete are available locally and a large number of cores were found on the site.

E. Camps above Winter Snow-Line

These five camp-sites lie above 1525m. (5000 ft.) which is approximately the winter snow-line, and must therefore be seasonal. They are all alike in the small quantity of material found, and four lie high on the lee side of the highest crest of the Namadgi Ranges. The other lies in a sheltered position a little way down the western side of the range. All lie within twenty minutes' walk of a good supply of moths, and are surrounded by an abundance of
*Microseris soapygera*, the yellow daisy whose tubers are known as the 'Blackfellow's yam'.

The linear pattern of the moth localities along the top of the mountains imposes a similar linear pattern on the moth-hunting camps. These high-level sites were also characterised by the very small quantity of their stone implements. This bears out the impression given in the ethnographic accounts of mobile moth-hunters whose equipment was largely confined to items of wood and net, which would of course leave no trace in open camp-sites.

**Two Transects**

In some parts of the Australian Capital Territory, such as the Tidbinbilla valley and the country between the Cotter - Murrumbidgee junction and Mt. Coree, a series of sites has been found transecting the ecological zones. Circles drawn at the radius of an estimated hour's walk from the Cotter camp and Blundells Flat (fig.17:10 & 7) almost met; an estimated hour's walk from Blundells Flat and Lees Springs (no.6) overlapped by about 0.8km. (0.5 miles). (This could mean that the additional allowance of half an hour for each 305m. (1000 ft.) of ascent is too generous.) From each of these three sites forest resources would be exploited. The Cotter site would also of course have the riverine resources, and the Lees Springs site would not be more than an hour away from the nearest Bogong moths, although further from the main moth habitats. From Blundells Flat it would take about two hours including about 610m. (2000 ft.) of steep ascent to reach the moth localities on Mt. Coree, and it is probably for this reason that a high-level camp (fig.17:5) was established close to the summit of the mountain.

In the Tidbinbilla valley an analogous situation appertains. The relative location of sites is shown in fig. 17 and in the block diagram (fig.20). Bogong moths are found about two hours' walk above the valley floor. A small camp (the Bogong shelter (B) described in Appendix X)
Figure 20. The Tidbinbilla Valley from the east, showing the location of Aboriginal camps. (adapted from block diagram by B.M.R.)
is found associated with the moth locality, and one large camp (no. 9), several smaller ones, and a rock-shelter (A) bearing prehistoric occupation, in the valley below. There is also a lowland camp on the Murrumbidgee River at Pine Island (fig.17 no.27) 16km. (10 miles) away amongst the open tablelands. The fields of these two camps would meet at a radius of about 1.5 hours' walk, but in this case I suggest that each exploits an entirely different ecological zone, rather than contiguous areas of the same zone.

This intensive use of the Tidbinbilla valley in contrast to the apparently slight occupation of the montane valleys of Gudgenby and Orroral, stems I think from three factors. The first is its much more extensive zone of wet sclerophyll forest than that of Gudgenby and Orroral, the second its very sheltered position, and the third, the availability of stone supplies such as chert, quartzite and quartz for making tools.

Conclusion

I believe that the most economic interpretation of the evidence from these camp-sites is that the same tribe or band exploited three principal ecological zones during the year, the large rivers, the montane valleys and the moth localities. The first two zones were visited by the whole group, but high-level moth-hunting was an all-male activity, although some of the spoils would be carried back to the women, children and old people in their camp below. The high-level camps must be seasonal as they would be snow-covered in winter, but in montane valleys rich in mammal and vegetable food, the rock-shelters and open camps might have been occupied in winter or summer. The best fishing occurs from October till April so the riverine camps would presumably be occupied during some of this period.

On the basis of these findings I decided, rather than carry out further work in the ranges of the Australian
Capital Territory, to attempt to predict the location of camp-sites in other Bogong moth localities. For this purpose I selected the two ranges in which ethnographic observations had been made, the Bogong Range south-east of Tumut, and the Kosciusko region.
Chapter 11

Settlement Patterns in the Australian Alps

Prediction of Camp-Sites in the Bogong Range, Tumut

In the highest, southern part of the Bogong Range it was possible to predict three Aboriginal camp-sites from aerial photographs (see Plate 7). These were all open flats in otherwise heavily timbered country. The lowest, lying at 1098m. (3600 ft.) on Bull's Flat Creek, (site 3 on fig. 22), made an obvious starting off point for the Bogong peaks towering above (see plate 4); Big Plain swamp (site 2), which proved to have dry ground round its edge, would have provided an admirable base camp for exploiting the moths on the surrounding peaks; and the other flat on Rings Creek (site 1) seemed the only one on top of the range with water readily available and was also adjacent to a large granite outcrop likely to be inhabited by moths.

All these predictions proved correct. A narrow transect (c.3km. wide) between the valley bottom and the highest peaks was examined on foot and artifacts were found at, but not in between, the predicted camp-sites. Moreover, the top of the range was traversed on foot for 16km. (10 miles) but no further camps were found. Two things not visible on the aerial photographs were also found - a rock shelter on the Big Bogong Peak at 1677m. (5500 ft.) containing a few artifacts including a backed blade, and two circles enclosed by earth banks on the Rings Creek site. The memory of these had been preserved in the name 'Rings Creek', and they are described above in chapter 9.

The Rings are some 400 metres distant from the camp-site, so it is possible that women and children also went up there to camp, but were prevented from going beyond
PLATE 7: Aerial photograph of the Bogong Range, New South Wales. (No. 1 = Rings Creek Camp; 2 = Big Plain Swamp; 3 = Bulls Flat camp).
FIGURE 22: The Bogong Range and region.
the camp towards the ceremonies. However, the extreme remoteness and ruggedness of the place is reminiscent of the initiation grounds in the Budawang Range (see chapter 9), where there were no high level camps associated with the sites. I would therefore think it more probable that the Rings site reflects two all-male activities, initiation ceremonies and Bogong moth-hunting.

The sites were similar to the high-level sites in the Namadgi Ranges in the small amount of artifacts discovered, in contrast to the larger camp-sites in the main valleys. One of these was found near the Yarrangobilly River at the head of a small open valley at the southern end of the Bogong Range (site 4 on fig. 22). Yarrangobilly lies on the natural direct route between the lower Tumut valley and the Monaro Tablelands, followed by the modern Alpine Highway, passing between the Bogong Range to the east and the gorge country of the Upper Tumut River to the west. From Yarrangobilly the route continues south-eastwards via Kiandra, Connor's Hill, and Adaminaby, at all of which Aboriginal traces have been found (nos. 6, 9, and 10 respectively on fig. 22). Locational analysis of all these sites can be seen in Table 11:1, and they are also listed in Appendix VI:B.

In the central and lower Tumut valleys Aboriginal camp-sites are known to have existed near the modern town of Tumut, at Lacmalac on the lower Goobragandra River, and on Yellowin Creek at 366m. (1200 ft.), the latter being a very large site (no.5 on fig. 22) now unfortunately covered by the waters of the Blowering Reservoir. A number of axes and grinding stones have also been found in the Tumut valley, at Blowering and Yarrangobilly, private collections being held by Mr. J. Bridle of the Caravan Park, Talbingo and Mr. Fowler of the Wynyard Hotel, Tumut.

As on the Southern Tablelands, it is likely that many more camp-sites lie below the grassy pastures of the fertile and sheltered lower Tumut and Goobragandra valleys. Hume and Hovell found many traces of Aborigines in both valleys and Sturt described the Tumut valley as "better peopled"
<table>
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<tr>
<th>Site</th>
<th>No. on figure</th>
<th>Elevation (m)</th>
<th>Zone</th>
<th>Location</th>
<th>Winter climate</th>
<th>Size</th>
<th>Food resources</th>
<th>Other factors</th>
</tr>
</thead>
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<tr>
<td>Rings Creek</td>
<td>22:1</td>
<td>1189</td>
<td>Subalpine</td>
<td>By creek</td>
<td>Occasional snow</td>
<td>3</td>
<td>Moths (40 min.). Wet sclerophyll (10 min.).</td>
<td>Initiation ground.</td>
</tr>
<tr>
<td>Big Plain</td>
<td>22:2</td>
<td>1403</td>
<td>Subalpine</td>
<td>Around swamp</td>
<td>Snow-covered</td>
<td>1</td>
<td>Moths (10 min.). Wet sclerophyll (20 min.).</td>
<td>? Initiation ground.</td>
</tr>
<tr>
<td>Bulls Flat</td>
<td>22:3</td>
<td>1098</td>
<td>Montane valley</td>
<td>Natural open flat</td>
<td>Frosty, cold</td>
<td>2</td>
<td>Wet sclerophyll; River Goobragandra (30 min.).</td>
<td>At base of Bogong Range.</td>
</tr>
<tr>
<td>Yarrangobilly</td>
<td>22:4</td>
<td>1098</td>
<td>Montane valley</td>
<td>On low hill</td>
<td>Cold</td>
<td>2</td>
<td>Wet sclerophyll; River Yarrangobilly (15 min.).</td>
<td>En route to mountains from Tumut valley.</td>
</tr>
<tr>
<td>Micalong</td>
<td>22:59</td>
<td>991</td>
<td>Montane forest</td>
<td>Around swamp</td>
<td>Cold</td>
<td>3</td>
<td>Swamp; dry and wet sclerophyll forest.</td>
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<tr>
<td>Daners Gap</td>
<td>25:38</td>
<td>1600</td>
<td>Montane forest</td>
<td>In lee of saddle</td>
<td>Snow-covered</td>
<td>2</td>
<td>Wet sclerophyll.</td>
<td>En route to moth habitats.</td>
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<tr>
<td>C. TABLELAND CAMPS</td>
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<tr>
<td>Jindabyne I</td>
<td>25:25</td>
<td>880</td>
<td>Dry tableland</td>
<td>Above Snowy River</td>
<td>Cold, frosty</td>
<td>3</td>
<td>Snowy River - eels, fish. Wet and dry sclerophyll.</td>
<td>a) En route to moth habitats. b) Pebble tool factory.</td>
</tr>
<tr>
<td>Cooma</td>
<td>24:12</td>
<td>811</td>
<td>Dry tableland</td>
<td>On slope by creek</td>
<td>Cold, windy</td>
<td>4</td>
<td>Creek. Dry sclerophyll woodland.</td>
<td>Stone tool factory.</td>
</tr>
<tr>
<td>Rock Flat</td>
<td>24:13</td>
<td>900</td>
<td>Treeless plains</td>
<td>By creek on low hill</td>
<td>Cold, windy</td>
<td>3</td>
<td>Creek.</td>
<td>Source of quartzite.</td>
</tr>
<tr>
<td>Lake Maffra</td>
<td>24:14</td>
<td>900</td>
<td>Treeless plains</td>
<td>On low hill</td>
<td>Cold, windy</td>
<td>1</td>
<td>Ducks etc. on lake.</td>
<td>Transit?</td>
</tr>
<tr>
<td>Cathcart</td>
<td>24:16</td>
<td>701</td>
<td>Moist tableland</td>
<td>By swamp</td>
<td>Sheltered, cold.</td>
<td>-</td>
<td>Ducks etc. from swamp. Dry and wet sclerophyll.</td>
<td></td>
</tr>
<tr>
<td>Michelago</td>
<td>-:58</td>
<td>762</td>
<td>Tableland valley</td>
<td>On hill</td>
<td>Sheltered, cold.</td>
<td>2</td>
<td>Murrumbidgee River (15 min.). Moths (2 hours).</td>
<td></td>
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<tr>
<td>Tombong</td>
<td>24:23</td>
<td>750</td>
<td>Low tableland</td>
<td>On slope near creek</td>
<td>Cold, frosty</td>
<td>3</td>
<td>Snowy River (30 min.).</td>
<td>Sandstone for axe-grinding.</td>
</tr>
<tr>
<td>Site</td>
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<td>Elevation Zone</td>
<td>Location</td>
<td>Winter climate</td>
<td>Size</td>
<td>Food resources</td>
<td>Other factors</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>----------</td>
<td>----------------</td>
<td>------</td>
<td>----------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>D. LOWER SNOWY RIVER</td>
<td>24:24</td>
<td>520</td>
<td>Cypress Pine</td>
<td>Above river on slope, ground</td>
<td>Few frosts, mild</td>
<td>2</td>
<td>Snowy River - eels etc.</td>
<td>Dry and wet sclerophyll forest.</td>
</tr>
<tr>
<td>Curtowang</td>
<td>23:40,41,42</td>
<td>280</td>
<td>Cypress Pine</td>
<td>Above river on slope, ground</td>
<td>Few frosts, mild</td>
<td>2</td>
<td>Snowy River - eels etc.</td>
<td>Dry and wet sclerophyll forest.</td>
</tr>
<tr>
<td>Jacobs River</td>
<td>25,44,45</td>
<td>280</td>
<td>Cypress Pine</td>
<td>Above river on slope, ground</td>
<td>Few frosts, mild</td>
<td>2</td>
<td>Snowy River - eels etc.</td>
<td>Dry and wet sclerophyll forest.</td>
</tr>
<tr>
<td>Pitch River</td>
<td>50,51,52</td>
<td>200</td>
<td>Cypress Pine</td>
<td>Above river on slope, ground</td>
<td>Few frosts, mild</td>
<td>2</td>
<td>Snowy River - eels etc.</td>
<td>Dry and wet sclerophyll forest.</td>
</tr>
<tr>
<td>Victorian</td>
<td>53,54,55</td>
<td>200</td>
<td>Cypress Pine</td>
<td>Above river on slope, ground</td>
<td>Few frosts, mild</td>
<td>2</td>
<td>Snowy River - eels etc.</td>
<td>Dry and wet sclerophyll forest.</td>
</tr>
<tr>
<td>Dedrick River</td>
<td>56</td>
<td>c.200</td>
<td>Cypress Pine</td>
<td>Above river on slope, ground</td>
<td>Few frosts, mild</td>
<td>2</td>
<td>Snowy River - eels etc.</td>
<td>Dry and wet sclerophyll forest.</td>
</tr>
</tbody>
</table>
than the banks of the Murrumbidgee at that point (1833, II: 25). Even without this evidence, the equable climate and abundant riverine and montane food resources would suggest that Aboriginal occupation would be dense. A vivid picture of life in this region in the early days of settlement is given in a series of novels by Miles Franklin, in which she often contrasts the mildness of the Tumut valley with the rigours of the Monaro Tablelands.

Caves: Groups of limestone caves occur at Yarrangobilly, some 11km. (7 miles) south of the Yarrangobilly camp (22:4) and on the Cooleman Plain about 19km. (12 miles) to the north-east. Both these groups were investigated in search of Aboriginal occupation sites or paintings, but without success. It is possible, however, that both groups were known and utilised by the Aborigines. Most of the caves are small and damp and have rocky floors, so would be unlikely occupation sites. However, a cluster of stone tools has been found on open flats by the river in the Blue Waterhole area, near the caves.

At Yarrangobilly some much larger caves exist with earth floors. One in particular, the Glory Arch, is reminiscent of Le Moustier in the French Dordogne. Test pits were put into the North and South Glory Caves and into the nearby Castle Cave, but no trace of Aboriginal presence was found. The factor prohibiting occupation here could well have been the cold, for even in mid-summer the caves are cold as soon as one leaves the sunshine outside, and in winter the cave entrances are festooned with icicles. Another group of rock-shelters on a flat by the river about 1.5km. upstream was also investigated, but these proved damp, and would be inundated at times. No surface finds of Aboriginal artifacts have been made in the vicinity of the caves, and the only record of Aboriginal presence there is of a burial, found by Terence Aubrey Murray and Stewart Mowle in November 1839:

'In one of them [the caves] I found many human bones, and I brought away a skull' (S.M. Mowle in the Evening News 30 March 1891).
This use of limestone caves as burial places seems fairly widespread in the Southern Uplands, but in any case the situation of the Yarrangobilly caves in a narrow, damp and rather sunless gorge makes their use as occupation sites unlikely. However, Aborigines probably used the Upper Tumut River at least as a route to the mountains and tablelands, for one unifacially worked pebble tool has been found at the junction of the Tumut and Yarrangobilly Rivers at Lob's Hole.

Camps on the Monaro Tablelands

The location of camp-sites and find spots on the Monaro Tablelands can be seen in figures 21, 22, 24 and 25. It will be seen that the camp-sites concentrate on the tablelands rather than in the higher country, and particularly by the Snowy River. There are few sites, however, on the treeless parts of the tablelands. This treelessness, as discussed in chapter 2, seems more probably due to natural climax vegetation than to Aboriginal use of the fire-stick, and treeless plains are, in fact, an unfavourable environment for Aborigines.

Only on one of the numerous small Monaro lakes have Aboriginal traces been found, and this was a very small camp-site on Maffra Lake, where some trees do occur on the edge of an outcrop (no.14 on fig. 24). Two other sites have been found on the treeless plains, Rock Flat associated with a quartzite deposit, a creek and mineral spring, and a camp on the East Cooma Creek in the sheltered Vale of Cooma. The latter contains a high percentage (39%) of cores like the stone factory sites in the Canberra region. Both assemblages contain backed blades so are presumably not post-European, but the sites seem intended to exploit local raw materials such as quartzite and basalt, and could also be in the nature of transit camps.

Sites so far discovered in the north-west of the Monaro lie on the natural pass (followed by the modern Alpine Way) between the Snowy Mountains and the high Namadgi Ranges. South of Kiandra where the Alpine Way deviates
MONARO
AVERAGE ANNUAL RAINFALL

Rainfall Isohyet

Three Counties' Boundary

Main Watershed

FIGURE 23
FIGURE 21: The Northern end of the Monaro Tablelands and Upper Murrumbidgee River, showing the location of Caddigat rock-shelter.
FIGURE 24: The Monaro Tablelands.
from the natural direct route for someone on foot, the latter was followed, to be rewarded by the find of scattered stone implements on a saddle at 1494m. (4900 ft.) (Fig.22 no.8).

Other sites in the north of the Monaro lie along the Murrumbidgee River (see fig. 21 and appendix 6B), which from the vicinity of Adaminaby downstream would have provided the same sort of fish as in the Canberra region. I would therefore expect that these rich riverine resources would attract far more camp-sites than the meagre few so far known, but little reconnaissance has been done in this area as yet.

The Bombala district in the south-east of the Monaro contains a number of camp-sites, probably due to its low elevation (705m. : 2313 ft.) resulting in a comparatively mild climate. Vegetable food would be abundant in the nearby wet sclerophyll forests of the coastal ranges to the east and of east Gippsland to the south.

The camps at Bombala and Tombong (no. 15 and 23 on fig. 24) have a low percentage of pebble tools in contrast with the Snowy River sites, but a high percentage of ground-edge axes. The latter may be due partly to the availability in the Tombong district of slabs of soft sandstone for grinding the axes, sandstone being extremely rare in the Monaro. Some whetstones (sandstone slabs bearing sharpening grooves) were found at Tombong, and several axe blanks.

Low-elevation Camps in the Snowy River Valley

The two main concentrations of Aboriginal sites in the Monaro are in the vicinity of Jindabyne and on the lower Snowy River. The latter, which extends from the McLaughlin River to the Victorian border and beyond, probably stems from two main factors, the rich food resources and the warmer climate found in the valley, which lies below 610m. (2000 ft.) from the McLaughlin Snowy River junction, and below 300m. (c.1000 ft.) from the large northwards loop above the Jacobs River junction. The comparatively frost-
FIGURE 25: The Snowy Mountains: Mt Kosciusko region and the Lower Snowy Valley.
free climate is indicated by the presence of white Cypress pine (*Callitris glauca*) along the Snowy River and its tributaries, such as the McLaughlin, Delegate and Deddick Rivers.

*Callitris glauca* has proved to be an excellent indicator of Aboriginal sites, so it is worth looking at its distribution and climatic range in some detail. It is found on the western slopes and plains of New South Wales (Beadle 1948) and on the Murray River in Victoria (Patton, 1943). In the Monaro the *Eucalyptus albens*-*Callitris glauca* (white box - white Cypress pine) alliance is confined to the lowest, warmest sub-humid areas of the tableland tract, on the steep well-drained sides of the valley of the lower Snowy River (Costin, 1954:164-5, 350-60). It forms an excellent climatic indicator, in that it only flourishes where snow-falls and severe frosts are rare, the mean temperature of the coldest month is not less than 7.2° (46°F), the mean temperature of the hottest month is not less than 21.1°C (70°F), and the mean annual rainfall fairly low, in the range of 16 to 27 inches (De Beuzeville, 1943:16; Costin, 1954:350).

In the Snowy Valley this alliance exists in sub-optimum climatic conditions, which Costin interprets as indicating that it was once much more widespread during milder, warmer conditions at the time of the last glacial recession. This warm sub-humid period must have given way to cooler conditions, perhaps in the mid-Recent, leaving the alliance as a relict found only in the lowest, warmest valley in the Monaro.

If this explanation of the disjunct distribution of the *E. albens*-*C. glauca* alliance is correct, it has important implications for human occupation in the Monaro. If the post-glacial Monaro climate (between about 10,000 and 4000 years ago) was at least as warm and frost-free as the lower Snowy Valley is now, there is no reason why Aborigines should not have occupied it seasonally or even all year round.
All the Snowy River sites lie slightly above the river, with wooded country immediately behind. Thus the inhabitants would have had at their disposal all the game resources of the hinterland forest, together with the foods provided by the river. The steep relief of the valley sides means that a great variety of ecological zones are present within a short horizontal distance, including *Xanthorrhoea australis*, which was a staple food in some other regions. In the more open woodland of the lower regions emus are still encountered today, as well as many kangaroos, and higher up, possums and other small and large game, together with vegetable foods would be plentiful in the dry and wet sclerophyll forest. In the river itself, one outstanding resource would be the large eels, *Anguilla australis*, not found in the Murrumbidgee-Murray system, but common in the east and south flowing rivers of New South Wales and Victoria, and growing up to a metre long.

A detailed survey of Aboriginal sites on the lower Snowy River in the south of the Kosciusko National Park was made by Ranger Kalev Margus in 1970. He discovered 17 camp-sites on the west side of the Snowy River in the 20 kilometres between Jacob's River and the Victorian border, the sites being relatively evenly spaced at short intervals along the permanent watercourses, the longest distance between them being 6km. (3.8 miles). The east side has not been reconnoitred. The size and assemblages of the various sites are very similar, the largest sites occurring at river junctions. Whilst not maintaining that they were all occupied concurrently, I would suggest that the density of sites reflects a comparatively high population enjoying rich food resources and a mild climate in an otherwise harsh environment.

I examined a number of these sites with Margus in 1970, and found that they tended to have certain common characteristics:

(a) They were all set 50-100 metres, or occasionally more, from the water's edge, well above the flood level, and away from the flies and mosquitoes of the river banks.
They were all located on well-drained and sometimes steeply-sloping ground rather than on the damper alluvial flats nearer the river.

Most sites had a northerly or easterly aspect. This would afford protection from the westerly and southerly winds, and suggests that the camps were occupied in winter, since in winter southerly winds prevail in the valley.

Sites tended to cluster, and the largest camps to occur, at the junction of two rivers.

On the basis of these observations it was possible to predict the location of other sites, and two further sites were thus discovered on the Snowy River, one at Currowang (no.24 on fig. 24) at a natural crossing place above a long gorge, and one much further south at the junction of the Deddick River with the Snowy (fig.25:56 and plate 1C). The resource zones within an hour to an hour and a half's walk from each camp would be firstly, the river foods such as eels, platypus, crayfish and other fish, secondly the dry sclerophyll forest with emus and macropodids, and finally the wet sclerophyll forest with plentiful possums, other mammals, birds and vegetable foods. Higher still, above about 1525m. (5000 ft.), a zone of subalpine vegetation occurs and Bogong moths would be available in summer on the granite tors, but the exploitation of this zone would necessitate one or more higher camps (see fig. 25).

Camps Associated with Moth-Feasts

The other concentration of valley camp-sites is around Jindabyne, which also lies in the rain-shadow of the Alps, and has a rainfall of only 25 inches a year (see rainfall map - fig. 23). It lies at 915m. (3000 ft.) and thus is considerably colder than the lower Snowy valley, especially in winter when snowfalls occasionally occur. I would suggest therefore that the Jindabyne sites were summer camps utilised for three functions -
They lie at the foot of the open Perisher Valley, the Ramshead Range, and other long gentle spurs which provide easy access routes from the east to the Bogong moth localities of the Snowy Mountains.

Jindabyne also lies on the direct north-south route from the Tumut valley to that of the Snowy River, by way of Kiandra and the Eucumbene River. It would thus tend to form a major meeting place of tribes from the north, south and east.

The Snowy River provides a good supply of large pebbles of a particularly good quality stone for making pebble tools. This was pointed out by Richard Helms in 1895 and from the following description I was able to locate both the pebble tool factory and the accompanying camp-site (no.25 on fig. 25).

'Not far below Jindabyne, where the valley of the Snowy River somewhat narrows between rather rugged hills, used to be in olden times a favourite camping place of the natives who assembled here (even within the knowledge of some settlers) in considerable numbers, mainly for the purpose of making stone implements. A shingle bed near one of the bends in the river furnished excellent and abundant material for tomahawks amongst the flattish and more or less oval pebbles.

Many half finished tomahawks and pebbles, the shaping of which had just been commenced, have from time to time been picked up near this locality, and some may still be found there. The blacks were not likely to encumber themselves with too much weight, and therefore only the finished articles were carried away, the unfinished being left behind to be taken in hand again on the next return to the place' (Helms, 1895:403).

Camp-sites and find-spots in the Jindabyne valley are located along about 8km. (5 miles) of the Snowy River, but unfortunately much of the valley is now covered by the Jindabyne Reservoir. The sites comprise the pebble tool 'factory' described above, a series of pebble choppers found between Jindabyne and the old junction of the Wollondibby River with the Snowy River, and, at the junction of the two rivers, a ceremonial ground and axe grooves on two
rocks, according to a report in the Australian Museum index. This accords with the evidence of settlers recorded by Payten (n.d.:2) that:

'A series of groups ultimately met at the foot of "Old Man Crackenback" [= the Ramshead Range], a noted landmark. It was here on this corroboree ground that pitched battles were fought'.

Payten also recounts that "corroborees" were held at Kalkite, which is very near the Waste Point camp (no.26 on fig. 25).

'Different groups from the coast were known to have met at Kalkite', he says, 'and after a corroboree there travelled together to Snowy Plain where a further corroboree celebrated the meeting of another group from Braidwood'.

The large quantity of material found in the Jindabyne valley compared with the small camps in the Perisher valley and the few isolated finds found higher up cannot be wholly explained by the greater difficulty of discovering camps in the snow-grass of the moth localities, but another reason is suggested by the early settlers -

'The pilgrimage halted on these corroboree grounds at the foot of the main range for which were probably two very good reasons. The exchange of greetings and ensuing social ceremonies. Secondly because they were not permitted by tribal laws to proceed to the tops until a certain rite had been performed... On completion of the rite a smoke signal was put up and only then, never before, the tribes assembled on the corroboree grounds broke up into their separate groups and proceeded independently to the tops' (Payten, n.d.:3).

This suggests that the groups might have to wait some time at the foot of the mountains until the smoke signal announced that the moths were present and that they could proceed, hence the large valley camps. Secondly, when they did go up to the moth peaks, it appears that it was in separate groups. Payten believes this was the case:

'Eventually reaching the tops some groups camped there, others built their mia mias lower down in more sheltered positions making a daily excursion to gather the moths. There is some evidence to
'show that the groups did not wander over the tops indiscriminately, but that each group may have had its own pitch. A chief known as "Dicky Cooper" brought his group to the same place year after year. This locality came to be known as Dicky Cooper's Bogong'.

Dicky Cooper's Bogong is still marked on the map (grid ref. 2382 Kosciusko 1:100,000 and see fig. 25), as is Paddy Rush's Bogong south of Thredbo (1828 Jacob's River 1:100,000 map), but a search of these localities has not yet revealed any traces of Aborigines. Further evidence that these two names do relate to moth-hunting is provided by the occurrence of Paddy Rush's Gap (grid ref. 2226 and marked on fig. 25) near Pinch River, on a natural route from the Snowy River up to the moth haunts. Since it is likely that few stone tools were carried up, and that the people moved in fairly small groups, there is probably not a great deal of material evidence to find, and the thick clumps of snow-grass found in the subalpine and alpine zones make the search very difficult.

So far in the Snowy Mountains the highest camp-site found lies just below the saddle of Perisher Gap at 1830m. (no. 37 on fig. 25). It is the culmination of a trail of camp-sites (nos. 27, 28, 38 and 39) from Jindabyne right up the open frost plains of Perisher valley, which provide an easy route to the moth localities on Mt. Kosciusko and the surrounding peaks. It is noteworthy that no traces of Aboriginal presence have been found in the dense bush of the Thredbo valley, which would have been a much more difficult route to the moth peaks than the open Perisher valley. Above that the only traces of Aborigines found have been isolated stone axes or other implements. The find-spots are plotted on fig. 25 and listed in Appendix VI.B. Amongst these finds pebble tools are more common than ground-edge axes, only three occurrences of the latter being recorded, all on the western side of the main range of the Snowy Mountains.
Locational analysis of camp-sites

An examination of Table 11:1 reveals a similar distribution of camp-sites to that found in the Canberra region. High up, above the winter snowline, small camps are found close to moth localities. Lower down, in the montane zone, other summer camps are found, and lower still, in the warm valleys, are the base camps.

Climate appears to be a factor of greater importance in the location of camp-sites in these cold Monaro regions than it was on the Southern Tablelands. Thus there is a great concentration of camps on the Lower Snowy River, which has a much more equable temperature regime than the rest of the region, except the lower Tumut valley which was also well-peopled. The majority of sites in both valleys lie below about 400m. (c.1300 ft.).

The tablelands of the Monaro, especially the treeless plains, are often windy and cold, even in summer, and were not an environment rich in food resources. The camps that have been recorded on these open tablelands are few and generally small, except for those on which stone resources were exploited. It is noteworthy that camps are not found on the Snowy River on its passage across the treeless plains, but above at Jindabyne, and below from about Delegate downwards.

Analysis of food resources in chapter 7 suggested that on the Monaro the most important foods would have been Bogong moths, fish in the Murrumbidgee River, eels in the Snowy River, and mammals and vegetable foods from the montane zone, particularly the wet sclerophyll forest. On Table 11:1 the high camps clearly reflect moth-hunting, and the Snowy River camps the exploitation of riverine foods and the sclerophyll forest. The montane camps also reflect the exploitation of wet sclerophyll forest resources, and those in the south-east corner of the Monaro (see fig. 24) probably were also orientated to the food resources of the forests. Few camps have been found along the Upper Murrumbidgee but an intensive search has not yet been made of this area.
The three factors which seem of greatest importance in the location of camp-sites in the Monaro region are a mild temperature regime, food and stone resources. The great concentration of sites in the Lower Snowy valley may result from the combination there of all these three features.

Seasonality of camps

All ground above 1525m. (5000 ft.) is snow-covered for at least some of the winter months, so that the camps in the Perisher valley (now a winter ski resort) must be seasonal. The snow sometimes extends down to Jindabyne at 915m. (3000 ft.) and since this is a cold locality in any case in winter, I would think that the Jindabyne camps would also be utilized in the summer only.

The warmest and most sheltered part of the Alpine region is undoubtedly the valley of the Lower Snowy River. This would provide a suitable winter habitat for the Aborigines of the Monaro tribe, the Ngarigo. On the western side of the Snowy Mountains extensive camp-sites around Corryong on the River Murray probably reflect the winter habitat of the Djilamatang tribe (cf. fig. 5). To their south the Jaimathang were probably centred on Lake Omeo and the Mitta Mitta River, where again winters are mild. At the northern end of the Australian Alps the Walgalu tribe had the low and fairly frost-free Tumut valley as their winter quarters.

In winter and early spring, vegetable foods would be scarce but possums and other game would be available, and some riverine foods such as eels. However, winter must have been a fairly lean time. The moths do not generally arrive till the beginning of November, but their arrival would provide a guaranteed supply of high protein food for between three and five months. When the remaining moths departed again in February or March for their breeding grounds on the western plains, more vegetable food would be available and riverine food such as the Australian grayling, and food would probably be reasonably plentiful till the following winter.
Conclusions

The pattern of seasonal transhumance suggested in the ethnographic record has left recognisable traces, in the form of a series of camps reaching from the lowest valleys, below 300m. (c.1000 ft.) to the alpine tree-line zone at 1830m. (6000 ft.).

Camp-sites were found in all the ecological zones, except above the tree-line in the alpine tract and on the treeless tablelands, where only special purpose sites for stone and ochre quarrying occurred.

The two main factors influencing the location of camps were found to be climate and food resources. The influence of climate is particularly noticeable in the Monaro, where winter camps were concentrated in the lowest valley along the lower Snowy River. In the Canberra region it is less easy to distinguish summer from winter camps, since the relief and temperature regime are less extreme and therefore not so strong a determinant on camp location. However, further research may show that winter camps cluster along the lower parts of the Murrumbidgee River in the same way as along the lower Snowy River.

The location of camp-sites in the Southern Uplands suggests that two food resources were of particular importance, Bogong moths and riverine foods. In both cases camps follow the alignment of the resource zones, forming a linear pattern along rivers such as the Molonglo and Snowy, and along the crests of the mountain ranges such as the Brindabellas. Other camps in the montane valleys indicate the exploitation of the food resources of the dry, but particularly the wet sclerophyll forests. These resources would comprise vegetable food, birds, and land and arboreal mammals. Some, but not all, of these sites are also linked with the utilization of stone resources.

On the basis of this locational analysis of camp-sites, I suggest the settlement pattern in the Southern Uplands to be a nomadic way of life involving seasonal transhumance,
but in the four winter months semi-nomadism, with movement, at least in the Snowy Mountains region, probably confined to the immediate environs of a low, comparatively frost-free valley.
Chapter 12

The Stone Assemblages of the Open Camp-Sites

I. Correlation between size and location of camps

The size of sites can only be estimated in the most general way, but there appear to be broad correlations (a) between the smallest sites and the highest elevations above sea level, and (b) between the largest sites and lower elevations. The size of camps has been assessed only from the number of implements present, the manufacturing waste flakes and non-utilized cores having been excluded. A larger sample of sites, particularly high-level ones, will have to be discovered and analysed to substantiate impressions gained from this first field survey, but I tentatively suggest that the size pattern is as follows:

i) Use areas above the tree-line (c.1830m. = 6000 ft.) denoted by lack of camps but finds of isolated tools;

ii) Small moth-hunting camps characterised by their small amount of artifacts and the occasional occurrence of the moth pestles described below. These camps are close to moth aestivation sites and probably reflect the presence of male moth-hunters for a short period only each summer.

iii) Larger camps below about 1220m. (4000 ft.) which include some 'stone factory' sites.

iv) A few very large sites on the Southern Tablelands such as Pialligo on the Molonglo River and Nardoo on Lake George. Such very large sites have not yet been discovered in the Monaro. I have suggested in chapter 10 that they may reflect the sites of seasonal ceremonial gatherings, the exploitation of special resources, a strong preference for camping on sand, or occupation over a particularly long time period.

v) Many small sites in the lowest, frost-free valleys, reflecting winter dispersal of the population, in
order to maximise the scarce winter food resources. This category of camps has only been found in the Lower Snowy Valley in the Monaro as yet, but it may exist in similar locations in the Southern Tablelands region as well.

Size of camp (judged by the number of implements present) is plotted against elevation in figure 26. Given all the problems of assessing camp size because of differential loss rate and length of occupation etc., the sites in the Canberra region show a remarkably regular curve from very large lowland camps, to medium size lowland and montane camps, to small moth-hunting camps. However, in the Monaro the 23 sites plotted show a different pattern. There are no really large lowland camps, and the lowest elevations are characterised by a large number of small sites, rather than a few very large sites.

The reason for this is, I think, that there are no particular topographic determinants or special resources in the Lower Snowy Valley to make one camp-site much more attractive than another, whereas on the Southern Tablelands the largest camps are located on sand hills, or associated with the exploitation of stone and ochre resources. It also seems certain that the Lower Snowy sites were primarily winter camps. Population dispersal in small groups in winter has been ethnographically recorded in the Murray and Darling River basins (cf. Allen, 1972:60-4), and such dispersal would result in a large number of small camps, as found in the lowest part of the Monaro. I would propose, as a hypothesis for future testing, that a similar pattern of many small winter camps will be found at low elevations along the central stretches of the Murrumbidgee River and its tributaries below Canberra.

II. Artifactual variation and the function of sites:

Tool manufacturing sites

A certain amount of tool manufacturing probably took place at most camp-sites, as Gould observed in the Western Desert (1968), but there were also specialised 'factory'
FIGURE 26: Size of camps in the Southern Uplands plotted against elevation above sea level.

**KEY:**
- X — Camp sites in the Monaro region.
- O — Camp sites in the Canberra region.
sites. These factory sites can be distinguished from other camps by their situation close to a source of stone suitable for tool-making, and by a high percentage of cores and a low implement to waste flake ratio.

Differences in percentages of the various tool types can only be studied on sites where it is known that the site was basically untouched before collection, and that the collection included all manuports (i.e. stone foreign to the locality) and was not selective. On table 12:1 and 12:2 the starred sites conform to these criteria; on the unstarred sites there is some reason to doubt the validity of the sample. The results show that tool-manufacturing sites can generally be readily distinguished from non-manufacturing sites. For some of these factory sites, the availability of a stone source would have been the main factor in their location, but for others it would have probably been only one among several factors, as suggested in tables 10:1 and 11:1.

It is interesting how few hammer and anvil stones occurred on all sites, and that a few were found on non-manufacturing sites. They were equally rare in the rock-shelters where stone-tools were manufactured. This is normal, for hammerstones are usually rare even on manufacturing sites (cf. Appendix XIII). Their presence on non-manufacturing sites may indicate that they were used for other purposes such as pounding of hard seeds and fruits.

III. Extractive Tools

a) Moth pestles: Smooth stones were used by the Aborigines to grind Bogong moths up into a paste, according to the eye-witness account of Vyner (cf. Scott, 1869). Smooth river pebbles, which would be suitable for such a purpose, have been found in the Aboriginal camp-site at 1830m. (6000 ft.) at Perisher Gap, and as isolated finds well above the tree-line in the Mt. Kosciusko area (see figure 25, nos. 29-36).
### TABLE 12:1 Analysis of assemblages of selected open sites in the Canberra region.

<table>
<thead>
<tr>
<th>Name of site</th>
<th>Implements</th>
<th>Waste flakes</th>
<th>Total</th>
<th>Ratio of implements/waste</th>
<th>Cores No.</th>
<th>Scrapers No.</th>
<th>Number of hammers</th>
<th>Number of anvils</th>
<th>Stone supply available locally</th>
<th>Factory site</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Reidsdale</em></td>
<td>232</td>
<td>3150</td>
<td>3382</td>
<td>0.06</td>
<td>102 44%</td>
<td>116 50%</td>
<td>0</td>
<td>0</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Long Gully</td>
<td>27</td>
<td>68+</td>
<td>95</td>
<td>(0.28)</td>
<td>14 32%</td>
<td>11 41%</td>
<td>0</td>
<td>0</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lees Springs</td>
<td>112</td>
<td>195+</td>
<td>307</td>
<td>(0.36)</td>
<td>49 44%</td>
<td>48 43%</td>
<td>0</td>
<td>0</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><em>Tidbinbilla II</em></td>
<td>38</td>
<td>172</td>
<td>210</td>
<td>0.18</td>
<td>22 58%</td>
<td>12 31%</td>
<td>0</td>
<td>0</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><em>Nardoo</em></td>
<td>232</td>
<td>1269</td>
<td>1501</td>
<td>0.15</td>
<td>70 30%</td>
<td>96 41%</td>
<td>2</td>
<td>5</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><em>Ainslie</em></td>
<td>170</td>
<td>125+</td>
<td>295</td>
<td>0.26</td>
<td>22 13%</td>
<td>99 58%</td>
<td>2</td>
<td>2H Volcanics available</td>
<td>✓ 2H</td>
<td></td>
</tr>
<tr>
<td><em>Mt Coree</em></td>
<td>24</td>
<td>68</td>
<td>92</td>
<td>1.00</td>
<td>6 10%</td>
<td>18 30%</td>
<td>2</td>
<td>0</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Blundells Flat</td>
<td>60</td>
<td>0</td>
<td>60</td>
<td>1.00</td>
<td>6 10%</td>
<td>6 10%</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Mt Gingera</em></td>
<td>16</td>
<td>36</td>
<td>52</td>
<td>0.30</td>
<td>2 12%</td>
<td>7 44%</td>
<td>0</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### TABLE 12:2 Analysis of assemblages of selected open sites in the Monaro.

<table>
<thead>
<tr>
<th>Name of site</th>
<th>Implements</th>
<th>Waste flakes</th>
<th>Total</th>
<th>Ratio of implements/waste</th>
<th>Cores No.</th>
<th>Scrapers No.</th>
<th>Number of hammers</th>
<th>Number of anvils</th>
<th>Pebble tools</th>
<th>Ground-edge axes</th>
<th>Stone supply available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooma</td>
<td>95</td>
<td>218</td>
<td>313</td>
<td>0.30</td>
<td>55 58%</td>
<td>23 24%</td>
<td>1</td>
<td>+</td>
<td>1</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td><em>Micalong Swamp</em></td>
<td>59</td>
<td>39</td>
<td>98</td>
<td>0.60</td>
<td>19 32%</td>
<td>28 47%</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td><em>Rings Creek</em></td>
<td>24</td>
<td>104</td>
<td>128</td>
<td>0.18</td>
<td>10 41%</td>
<td>7 29%</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4%</td>
<td>0</td>
</tr>
<tr>
<td><em>Tombong</em></td>
<td>69</td>
<td>31+</td>
<td>100</td>
<td>0.69</td>
<td>4 5%</td>
<td>21 30%</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td><em>Jacobs River</em></td>
<td>64</td>
<td>216</td>
<td>280</td>
<td>0.22</td>
<td>17 26%</td>
<td>14 22%</td>
<td>0</td>
<td>2</td>
<td>21</td>
<td>33%</td>
<td>1%</td>
</tr>
<tr>
<td><em>Lower Snowy River</em></td>
<td>60</td>
<td>115</td>
<td>175</td>
<td>0.34</td>
<td>13 21%</td>
<td>14 23%</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>50%</td>
<td>2%</td>
</tr>
</tbody>
</table>

**KEY:**  
* Most reliable data.  
+ Not all waste flakes were collected.
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<table>
<thead>
<tr>
<th>Table 12: Stone assemblage of open camp sites in the Monto region.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POINTS ETC.</strong></td>
</tr>
<tr>
<td>Stone Plaques</td>
</tr>
<tr>
<td>Hypostatous Plaques</td>
</tr>
<tr>
<td>Primary Polaxes</td>
</tr>
<tr>
<td>Retouched Polaxes</td>
</tr>
<tr>
<td><strong>CORES</strong></td>
</tr>
<tr>
<td>Total Core Tools</td>
</tr>
<tr>
<td>Large Core Scrapers</td>
</tr>
<tr>
<td>High-backed Scrapers</td>
</tr>
<tr>
<td>Discoid Scrapers</td>
</tr>
<tr>
<td>Nosed and Concave Scrapers</td>
</tr>
<tr>
<td>Grounded Scrapers</td>
</tr>
<tr>
<td>End Scrapers</td>
</tr>
<tr>
<td>Double Side (2 Martins)</td>
</tr>
<tr>
<td>Side (1 Martin)</td>
</tr>
<tr>
<td>Thinned/Scraped</td>
</tr>
<tr>
<td><strong>BACKED BLADES</strong></td>
</tr>
<tr>
<td>Total Backed Blades</td>
</tr>
<tr>
<td>Elongate Microliths</td>
</tr>
<tr>
<td>Geometric Microliths</td>
</tr>
<tr>
<td>Bonded Blades</td>
</tr>
<tr>
<td>Grounded Blades</td>
</tr>
<tr>
<td><strong>LARGE TOOLS</strong></td>
</tr>
<tr>
<td>Microliths</td>
</tr>
<tr>
<td>Grounded Microliths</td>
</tr>
<tr>
<td>Choppers</td>
</tr>
<tr>
<td>Total Microliths</td>
</tr>
<tr>
<td>No. Flake Microliths</td>
</tr>
<tr>
<td>No. Implements?</td>
</tr>
<tr>
<td><strong>CHIPPERS</strong></td>
</tr>
<tr>
<td>Total Micromicroliths</td>
</tr>
<tr>
<td>No. Flake Micromicroliths</td>
</tr>
<tr>
<td>No. Implements?</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
</tr>
<tr>
<td>Total Microliths</td>
</tr>
<tr>
<td>No. Flake Microliths</td>
</tr>
<tr>
<td>No. Implements?</td>
</tr>
</tbody>
</table>

---

1 Excluding simple flakes and cores, but including scaled pieces.

Note: B = Bogong Mott Pavet, D = Double, P = Made on a Pebble, Q = Quartz.
<table>
<thead>
<tr>
<th>Site</th>
<th>Figure Reference</th>
<th>No. Implements1</th>
<th>No. Flake Manuports</th>
<th>Total Manuports</th>
<th>Choppers</th>
<th>Large Tools</th>
<th>Backed Blades</th>
<th>Scrapers</th>
<th>Core Tools</th>
<th>Points Etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOWER SNOWY RIVER CAMPS</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Jacobs River</td>
<td>25:41</td>
<td>35 167 212</td>
<td>1P 1 10</td>
<td>-</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Jacobs River NJR</td>
<td>25:42</td>
<td>19 49 68</td>
<td>- 3 7</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td>Pinch River I.</td>
<td>25:47</td>
<td>11 59 70</td>
<td>1 10 1</td>
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<tr>
<td>Victorian Border LSFI 25:50</td>
<td>18 36 57</td>
<td>1 1 10</td>
<td>- 1 1</td>
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</tr>
<tr>
<td>Victorian Border LS25:53</td>
<td>2 10 14</td>
<td>- 1 10</td>
<td>- 1 1</td>
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<tr>
<td>Victorian Border LS25:52</td>
<td>5 - 5</td>
<td>- 1 10</td>
<td>- 1 1</td>
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</tr>
<tr>
<td>Victorian Border LSV 25:51</td>
<td>5 - 5</td>
<td>- 3 2</td>
<td>- 1 1</td>
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<tr>
<td>Diddick River Junction 25:54</td>
<td>18 36 46</td>
<td>1P - 7</td>
<td>- 1 1</td>
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</tr>
<tr>
<td>TOTAL CAMPS</td>
<td>26</td>
<td>512 1059 1650</td>
<td>4P 20 86 4</td>
<td>3 9 5 3</td>
<td>17 12 2 31</td>
<td>5 4 104 18 12</td>
<td>8 14 18 4 1 183</td>
<td>82 80</td>
<td>5 6 24 331</td>
<td></td>
</tr>
</tbody>
</table>

1 Excluding simple flakes and cores, but including scaled pieces.

KEY: B = Bogong Moth Pestle    D = Double    P = Made on a Pebble    Q = Quartz.
Two have also been found at 1403m. (4600 ft.) near the Bogong Peaks (Big Plain Camp figure 22:2), one on Mt. Bimberi (figure 17:19) and one in an excavated rock shelter (figure 17:B) associated with a moth aestivation site. Charcoal from the horizon containing the pebble gave a date of 1000 ± 60 BP (ANU-1050).

These pebble manuports vary considerably in size and shape, as shown in figure 27. Three characteristics support their identification as moth pestles:-

i) their location on high level camps associated with moth aestivation sites, and their absence from other montane sites;

ii) their smoothness and roundness, and suitability for use as a pestle, as described ethnographically;

iii) traces of protein on their edges, interpreted as the residue of oil from the abdomens of the moths. This was detected by examination with ultra-violet light, under which it fluoresced a white colour. The control in the experiment was a pebble, one end of which I used to grind up the bodies of some lightly-roasted moths. The end which had been used as a moth-pestle fluoresced white under ultra-violet light, whilst the other, non-utilized, end did not.

There is thus strong evidence to support the identification of these river pebbles as pestles, associated with the high-level exploitation of the Bogong moth.

b) Grinding stones: A total of 19 mortars or grinding stones (defined by McCarthy, 1967: 55) occurred on the 56 camp-sites recorded in tables 12:3 and 12:4. This is very few compared with the large numbers found on the inland plains of Central Australia or in Arnhem Land, where Peterson found that 'there will be at least a pestle and mortar for every household and usually a pair for each of a man's wives' (1968:568).
FIGURE 27: Moth pestles (natural size). A, C and D are from the Mt Kosciusko region (and see Pl. 1IC); B is from Bogong Cave.
The mortars in the Southern Uplands are not the very large flat seed-grinding type characteristic of western New South Wales, but are smaller, with a more concave grinding surface. No pestles (=mullers) have been found with these mortars as yet. It might be thought that the 'moth pestles' described above are the missing pestles for these grinding stones, but they occur at camps at completely different elevations, and their distribution does not overlap. The majority of the mortars have been found on tableland sites below 800 metres (c.2620 ft.) only three having been discovered on higher camps, the highest being at 1235m. (4050 ft.) at Lees Springs. I would suggest that the mortars were used for pulping a wide variety of fruits, seeds, and vegetables, and therefore cannot be regarded as necessarily reflecting the exploitation of grass seed. However, their concentration on the tablelands suggests that seed-grinding was probably practised, but to a very much smaller degree than on the inland plains where prehistoric millstones are found in their thousands.

c) Hunting weapons: the death spear: Most of the methods described in chapter 7 for hunting kangaroos, emus and other large game would leave no trace in the archaeological record, the only exception being the stone-barbed death spears which were used both for warfare and for hunting. Ethnographic evidence indicates that in the proto-historic period the barbs were made of unmodified quartz flakes. These, I suggest below in chapter 14, succeeded the use of finely trimmed backed blades as barbs.

The finding of backed blades at all altitudes within the Southern Uplands, from 1830m. (6000 ft.) on the alpine tree-line at Perisher Gap to 220m. (720 ft.) on the Lower Snowy River supports the hypothesis that they belonged to a vital piece of equipment which would be taken everywhere. In the ethnographic record only two such pieces of equipment are mentioned for the warrior - axes and spears. The presence of backed blades therefore cannot be used to distinguish areas where large game was hunted, but they can
give a very broad idea of the antiquity of occupation, as will be seen in the next chapter.

dj) Possum-hunting implements: The women's implement axes and pebble tools was, of course, the wooden digging stick, which has left no trace in the local archaeological context, but one stone tool was used in possum-hunting, an axe to chop steps up trees. However, axes were also used for chopping bark off trees and heavy wood-working tasks, and like spears, were taken everywhere, thus being found at all elevations within the Southern Uplands.

Ground-edge axes are of infrequent occurrence in the Monaro, except in the south-east region at Bombala and Tombong. Tombong (no.23 on figure 24) is a specialised site in my opinion, the very large number of ground-edge axes and axe blanks stemming from the presence there of that very rare commodity in the Southern Uplands, sandstone for grinding and re-sharpening axe blades. There may also be a source of volcanic rock in the region, but this remains to be discovered.

Elsewhere in the Monaro, there are few ground-edge axes, but many pebble tools, particularly on the Snowy River sites. Varieties which occur are those with flaking on one surface only (unifacial), those with flaking on both faces (bifacial), those completely flaked all over one surface (termed 'Sumatraliths' for convenience—cf. Mathews, 1965:119, 1966:6; McCarthy, 1967:19-20), and those made on pebbles but with one edge ground ("Windang axes"—McCarthy, 1967:43). I propose that the function of the pebble tools was basically the same as that of the ground-edge axes since:

i) pebble tools occur in an inverse proportion to ground-edge axes on sites in the Southern Uplands, which is best explained by the use of both for the same purposes;

ii) ninety percent of the pebble tools found in the Monaro come from sites on the Snowy River, where an abundance of suitable pebbles for tools is available but little
or no volcanic rock for ground-edge axes;

iii) local pebble tools are similar in size and weight to ground-edge axes and efficiently perform the same functions as those recorded ethnographically for ground-edge axes, such as 'cutting toeholds, chopping out bees' nests and possums' nests, trenching around sheets of bark for containers and canoes (and huts), and for adzing and cutting wood' (McCarthy, 1967:43). Cooper (1943:348) cut down a small tree, 28cm. (11 inches) in circumference, in 4 minutes with a pebble-chopper weighing 1220 grammes (43 oz), and I have found one of similar weight excellent for cutting toeholds up trees. There was no need to grind the edge of pebble tools, although sometimes this was done;

iv) there are no large tools on many sites other than pebble tools to perform heavy chopping tasks;

v) pebble tools are found at all elevations, and therefore would seem to be an essential, general purpose tool like the ground-edge axe.

On the basis of these arguments, pebble tools are termed choppers and assumed to perform equivalent tasks to ground-edge axes in the functional analysis of assemblages in figure 29. This shows that the great majority of tools were concerned with artifact production or maintenance, and that very few can be deemed 'extractive'. Differences in percentages of chopping tools between the Monaro and Canberra region are probably not significant, but due to the greater amount of collecting, particularly of ground-edge axes, which has taken place in the Canberra region. A ground-edge axe is the one Australian stone tool which everyone knows, whereas pebble choppers tend to remain on sites unrecognized.
Functional Analysis
Scraping, Cutting and Woodwork
Stone manufacture
Spear Barbs (?)
Axes and Choppers
Grindstones

Canberra region

Monaro

Scraping, Cutting and Woodwork
Stone manufacture
Spear Barbs (?)
Axes and Choppers
Grindstones

FIGURE 29: Comparison of stone assemblages from open camps in the Monaro and Canberra region.
### Table 12:5

Comparison of Stone Assemblages from the Monaro and Canberra Region

<table>
<thead>
<tr>
<th></th>
<th>Canberra Region</th>
<th>Monaro</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Side Scrapers</td>
<td>286</td>
<td>22.1</td>
</tr>
<tr>
<td>Cores</td>
<td>175</td>
<td>13.5</td>
</tr>
<tr>
<td>Backed Blades</td>
<td>167</td>
<td>12.9</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>153</td>
<td>11.8</td>
</tr>
<tr>
<td>Nose-concave</td>
<td>87</td>
<td>6.7</td>
</tr>
<tr>
<td>Scrapers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hammer-anvils</td>
<td>73</td>
<td>5.6</td>
</tr>
<tr>
<td>Discoidal &amp; semi-discoidal scrapers</td>
<td>74</td>
<td>5.7</td>
</tr>
<tr>
<td>End Scrapers</td>
<td>64</td>
<td>4.9</td>
</tr>
<tr>
<td>Points</td>
<td>40</td>
<td>3.1</td>
</tr>
<tr>
<td>Double-side</td>
<td>35</td>
<td>2.7</td>
</tr>
<tr>
<td>Scrapers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scaled Pieces</td>
<td>30</td>
<td>2.3</td>
</tr>
<tr>
<td>Ground-edge Axes</td>
<td>32</td>
<td>2.4</td>
</tr>
<tr>
<td>Thumbnail Scrapers</td>
<td>21</td>
<td>1.6</td>
</tr>
<tr>
<td>Pebble Tools</td>
<td>20</td>
<td>1.5</td>
</tr>
<tr>
<td>Grindstones</td>
<td>13</td>
<td>1.0</td>
</tr>
<tr>
<td>High Backed Scrapers</td>
<td>13</td>
<td>1.0</td>
</tr>
<tr>
<td>Large Flake Scrapers</td>
<td>7</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Artifacts</td>
<td>1290</td>
<td></td>
</tr>
</tbody>
</table>
IV. Artifactual variation in terms of culture

The comparison between the stone assemblages of the Monaro and Canberra region shown in Table 12:5 and figure 29 reveals a close similarity between the two regions in the range of tool types present, and the percentage that each forms of the total tool kit, except in two main respects. One is the higher percentage of backed blades found in the Canberra region, and the other the high percentage of pebble tools occurring on the Monaro sites. Reference to the stone assemblages of the Monaro, listed on table 12:4, reveals that these two characteristics, a lack of backed blades and a high percentage of pebble tools, belong particularly to the sites on the Lower Snowy River.

Backed blades: I am certain that the virtual absence of backed blades in the Lower Snowy River region is real and not merely apparent, since there is so little ground cover that very tiny flakes of backed blade dimensions are easily seen. Only one geometric microlith was found on more than 25 sites and no backed blades were present in a number of other Lower Snowy River assemblages (not included on table 12:4) which I have examined. Their virtual absence cannot be explained in terms of the function or location of the sites, but the explanation must lie, I think, in terms of time.

It is difficult to invoke cultural differences to explain this lack of backed blades in the extreme south-west of the Monaro, for backed blades are found not only on the Monaro Tablelands to the north, but also further down the Lower Snowy Valley to the south. At Buchan, 50km. (31 miles) to the south of the southernmost sites shown on figure 25, backed blades were found in the more recent industry, with a predominance of geometric microliths. To the north, on the Monaro Tablelands, backed blades have been found up to 1830m. (6000 ft.), but among these backed blades bondi points (asymmetric backed blades) outnumber geometric microliths (59%:41%). In the Canberra region bondi points likewise predominate, comprising approximately
63% of the backed blades. (The few eloueras which occur have been excluded from the backed blade category in these comparisons).

On the Lower Snowy River sites, dominance of geometric microliths could have been interpreted as influence from the south, or that of bondi points as influence from the 'Bondaian region' to the north, but lack of backed blades can only be interpreted as a function of the time factor, and this will be examined in the next chapter. The alternative explanation that the valley was occupied during the 'Bondaian period', but was isolated from the artifactual trends found all over the rest of south-eastern Australia, is not really tenable, since the valley is not particularly isolated, and forms a natural line of meridional movement.

Pebble tools: The stone assemblages of the Snowy River and the western Monaro are distinguished by a high percentage of pebble tools and a very low percentage or absence of ground-edge axes although two ground-edge pebble tools (=Windang axes) have been found. For two main reasons I believe that whether the predominant chopping tool is a ground-edge axe or a pebble tool depends only on the local material available, and is not a culture marker. (a) The presence of pebble-tools closely correlates with the availability of large river pebbles. (b) In areas where pebbles are available, pebble tools have been used over a very long period of time. At See­lands in northern New South Wales their use spans six millenia, from about 4500 B.C. to 1500 A.D. (McBryde, 1966a: 285-6; 1966b:figure 31). In the south of the Southern Uplands at Buchan they occur in a Pleistocene deposit (see chapter 19), and, at the other end of the scale, their manufacture from pebbles in the Snowy River at Jindabyne was recorded in the nineteenth century (Helms, 1895).

Thus pebble tools are too generalized an artifact form to have chronological or cultural diagnostic value here. However, pebble tools may be a valuable indicator of the use-areas of the Snowy River people, for it is interesting
to note that pebble tools have been found only on the eastern side of the Mt. Kosciusko massif, whereas the ground-edge axes found so far have a western distribution, probably reflecting tribes moving up from the Upper Murray valley.

Conclusions: In summary, the stone assemblages of the open camp-sites analysed are generally very similar throughout the Southern Uplands. Most tools are manufacturing tools or choppers and among the scrapers simple side scrapers with one working edge are most common. The only specialised tool types found are moth pestles, grinding stones and backed blades. The ratio of bondi points to geometric microliths in the Monaro was found to be very similar to that in the Canberra region, but a curious lack of backed blades emerged in the Lower Snowy River valley. An attempt will be made in the following chapter to explain this on chronological grounds. Differences in stone assemblages are most pronounced between manufacturing and non-manufacturing sites, and where they were imposed by the availability of different raw materials, such as the differing distributions of pebble choppers and ground-edge axes.

The location and comparative size of the camp-sites are related to climatic factors and to food and stone resources, and strongly portray the seasonal transhumance related to the food quest.
Four principles which influence the nature of camp-sites are location, function, culture and time. In the previous section the camp-sites have been ordered with regard to the first three of these principles; now an attempt will be made to establish the time placement of open sites, by an examination of the evidence of artifact change through time gained from a series of excavated occupation deposits.

Then, in chapters 14 and 15, the evidence from excavated sites in the Canberra-Monaro region and the coastal ranges will be considered in more detail. The parameters and function of the predominant tool types will be examined, and the cultural sequence set into the context of the prehistory of south-eastern Australia.
Chapter 13

Nine Excavated Sites in the Coastal Ranges and Canberra Region

The sites comprise eight rock-shelters and one open stratified site, Nardoo, to the east of Lake George. Detailed excavation reports on these sites are given in Appendices VII to XII, so this chapter is in the nature of a summary. Two of the rock-shelters are of sandstone, one of shale, and the rest of granite. All the shelters have certain features in common. They are all rather small, the most capacious having room for no more than about a dozen occupants. The occupation deposits are generally shallow, the deepest being only 120 cms. They contain charcoal, a little bone and ochre, but no shell middens. The stratigraphy in the shelters also varies little, generally comprising a shallow soft surface dust overlying a darker and more compact implementiferous horizon, which either rests on bed rock or gives way to a sterile matrix.

The chronology of the occupation deposits likewise proved to be similar. All belong to the 'small-tool phase' of Australian prehistory (cf. Mulvaney, 1969:107-10), termed the 'Bondaian Period' in eastern New South Wales from the presence of bondi points, and there was no sign of the 'pre-Bondaian' industry found on the coast at Burrill Lake (Lampert, 1971b).

Artifact Types

Before describing the results of these excavations it is necessary to introduce the artifact\(^1\) types which predominate in these rock-shelters. These are backed blades,

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\(^1\) I use the term artifact, *sensu stricte* to indicate anything 'made by art', i.e. not natural, but not necessarily utilized as an implement.
bipolar scaled pieces, and a variety of utilized flakes.

Backed blades is a generic term for blades which have a trimmed back, the margin opposite the working edge being deliberately blunted by the removal of small steep flakes. They correspond to the European *lames à bord abattu* (cf. Bordes, 1968:247; Brézillon, 1968:118-20, 257). Three varieties of backed blades are found extensively in southeastern Australia - bondi points, geometric microliths, and eloueras (illustrated in fig. 30).

**Bondi points:** The bondi point (named after the Sydney beach where it was first found) is defined in McCarthy's classification as 'asymmetrical in shape, triangular or flat trapezoid in section, with a thick trimmed back...In shape it includes delicate thin and narrow elongate points to broad, thick and sometimes hooked varieties. These points are trimmed partially or completely along one or both edges of the thick margin and this trimming is combined with a plain, faceted or trimmed butt' (1967:40)... In length it ranges from 1.2 cm. [0.5"] to 6.3cm. [2.5"], in width from 0.4cm. [3/16"] to 2.5cm. [1"], and in thickness from 0.3cm. [1/8"] to 0.6cm. [1/4"] (McCarthy, 1967:40).

**Geometric microliths:** Australian geometric microliths are directly comparable in form with the *microlithes géométriques* of the Occidental Upper Palaeolithic (cf. Brézillon, 1968:272-3). In essence they are very small blades with a trimmed back and a geometric form, triangles, trapezes and crescents being the most common shapes. They are generally less than 3mm. in length, but at the larger end of the scale they can merge into the bondi points. This problem is discussed later in chapter 14, but explains why in the artifact tables bondi points and geometric microliths are both treated separately and grouped together, with the addition of any other varieties, under the generic name of backed blades.
FIGURE 30: Small tools from the Southern Uplands. (Nat. size)
A-G Bipolar scaled pieces (A-quartz bipolar core; B-quartz sliver; C-3 margins scaled; G-broken chert; H-4 margins scaled);
I-K Bondi points (K is of quartz);
L-N Geometric microliths from Yankee Hat II;
O- Elouera; P- Thumbnail scraper; Q- Blade core;
R- Low scraper; S- Retouched point from Yankee Hat I.
Eloueras: The elouera is another type of backed blade, and in south-eastern New South Wales is often less than 3cm. in length. For this reason it has been included in the group of backed blades when it occurs in these Southern Uplands sites, but macrolithic forms found in other parts of the continent such as the Oenpelli examples are very different from small bondi points or geometric microliths and would have to be completely separated from them. The elouera has been defined as 'a segment triangular in section, trimmed along one or both edges of the thick margin, it has either trimming, use-polish or evidence of cutting use on the chord, but this thin margin is often untrimmed and shows no sign of use on many specimens ...On the New South Wales specimens use-polish is present but rare and trimming is more common' [than on the Oenpelli elouera] (McCarthy, 1967:26). Very few eloueras were found in the Southern Uplands sites, where clearly they were unimportant compared with their large numbers at sites such as Lapstone Creek (McCarthy, 1948:11-2) and Curracurrang (Megaw and Wright, 1966).

Bipolar scaled pieces: The salient characteristic of these pieces is the scaling or bruising on opposing margins in the bipolar position. The scaling takes the form of a series of superimposed flake scars, often invading both faces and giving the edge the appearance of bifacial working. The battering also often renders the edges concave. In Britain they have been called 'squamous flakes' (Garrod, 1926:56) and in France pièces esquillées ou écaillees.

In McCarthy's classification (1967:36) they are termed 'fabricators', but the name implies that their function was a manufacturing one. In 1968 J.P. White re-defined them as 'scalar cores', on the basis of ethnographic observation in New Guinea of the manufacturing process that produced them (1968:661). However, not all bipolar scaled artifacts are cores, so I prefer the more general term 'pieces'. I have also not adopted the term 'scalar', as coined by White, followed by Lampert (1971b), but have reverted to
the use of the terms scaled and scaling, for reasons detailed in the next chapter. The function, morphological and metrical parameters of this artifact type will also be analysed in chapter 14, so attention will be focused here only on its distribution in time and space.

Scrapers: The term scraper is employed merely in accordance with normal usage and is not meant to imply necessarily a scraping function for the tool or to exclude the use of these tools for other purposes such as cutting or chiselling. Few scrapers occurred in the sites described below, but the main varieties found were those with one or two working edges, thumbnail, discoidal and concave-nosed types. Definitions of these will be found in the glossary.

Cultural Sequence in the Coastal Ranges

The coastal ranges were not included in the foregoing study of settlement patterns, so a description of the environment and the factors governing the location of prehistoric sites there is given now.

Parallel to the south coast of New South Wales and some 30km. (18 miles) inland lie the coastal ranges, rising to some 900 metres (3000 ft.) (see fig.31). In the central part of this coast at Burrill Lake, a gentle slope extends for 20km. (12 miles) inland up to c. 520m. (1700 ft.), whence a steep monocline rises to the top of the ranges some 10km. further west. These ranges are known as the Budawangs from their highest peak, Mt. Budawang of 1136m. (3727 ft.). At their northern end is a lower area of tableland ranging between 762m. (2500 ft.) and 808m. (2650 ft.). This is called the Sassafras Range from the flowering Sassafras tree (*Atherosperma moschatum*) which is so abundant there. To its north again extends Bulee Ridge, forming the divide between the deep gorges of the Shoalhaven and Ettrema Rivers (cf. Craft, 1931:263, 415).

The Budawangs are formed by horizontal Permian sandstones which are often deeply dissected, and a number of
FIGURE 31: The Budawang Range and Sassafras I and II.
deep meridional gorges provide barriers to movement to and from the coast. It is significant that only one vehicle track crosses the 90 kilometre (56 mile) long range, utilizing a narrow gulch weathered in the 183m. high (600 ft.) sandstone scarp forming the western side of the Sassafras Tableland. The road threads its way along the top of the cliffs between the great ravines carved out by the tributaries of the lower Shoalhaven River flowing to the north and the Clyde River to the south. The latter is bordered by precipitous high cliffs which extend unbroken for 20 kilometres (12 miles) from Sassafras to Holland Gorge and which can only be crossed in one place by modern bush-walkers with the aid of ropes and pitons (cf. Bush-walkers map of Budawang, Elliott, 1960). Thus the routes which Aborigines could have employed in this gorge country would have been strictly limited, and can be predicted with some certainty on physiographic grounds.

The ridge followed by the modern road between Nerriga and the coast, descending the spur north-eastwards towards Wandandian and Nowra, would have provided a natural route across the ranges. In the Sassafras area it is joined by the Bulee Ridge, which provides a comparatively easy route southwards from the lower Shoalhaven valley between a series of meridional gorges. On both the gentle Bulee Ridge and the Sassafras Tablelands therefore one would expect to find traces of Aborigines if they had occupied the coastal ranges.

Signs of occupation are indeed apparent. Stone tools are visible on the floors of many of the numerous sandstone rock-shelters; there are two stone-built initiation grounds on the top of the Budawang Range; rock paintings occur at Nerriga and on the coastal fall; an Aboriginal burial was found at Round Hill, about 10km. (6 miles) north of Sassafras. This was laid out on a possum skin cloak, and showed evidence of a violent death (Etheridge and Thorpe, 1890:22).
Sassafras I and II: Two sandstone rock shelters, 1.5 kilometres (c. 1 mile) apart, were excavated on top of the coastal ranges at an elevation of some 730 metres (2400 ft.), and about 30 kilometres inland from the coast. The larger of the two shelters, Sassafras I, had already been partially excavated by Hume (1965). My excavations in Sassafras I were therefore limited in extent, and orientated particularly towards setting the technological changes demonstrated by Hume into a firm chronological framework.

The results are summarized below, the details being given in Appendix VIII and IX.

Sassafras I: The deepest 1m² pit (J4) of my excavation revealed rather deeper occupation than that found by Hume, thus adding a lower dimension onto his sequence. The artifacts in the basal occupation comprised small scrapers, blade cores, and one geometric microlith, the beginning of occupation of the site being dated to 3770 ± 150 BP (ANU-743). It is unlikely that any part of the site is deeper and hence possibly older than this. Thirty-five centimetres above ANU-743 the date of 3090 ± 95 BP (ANU-742) was obtained on a horizon marking the beginning of the period when backed blades predominated amongst the artifacts.

The whole of this lower part of the deposit must be termed Bondaian, on the basis of the presence of bondi points and other backed blades, but there does appear to be an increase in the popularity of the backed blades between the basal occupation, in which their ratio to other implements is 1:19, and the central levels, where their ratio gradually rises to 1.8:1. The vast majority of backed blades are made from silcrete, and they are associated with thumbnail scrapers, blade cores, and a large number of waste flakes. The majority of these are also of silcrete, suggesting that backed blades were manufactured in the shelter.

The period of backed blade predominance is succeeded by a period in which they are still present but in very
Plate 8

A. The rock-shelter of Sassafras I, seen from the east. (The ranging pole is marked in divisions of 20cm.)

B. Sassafras I, showing the east wall of trench K. The blackness of the lower unit is caused by dampness.

C. The shallow occupation deposit lying on bed rock in Sassafras Shelter II, squares P-Q from the north.

D. Hanging Rock Shelter, Tidbinbilla Valley, A.C.T.

E. Hanging Rock Shelter, squares K and L. The south-west wall of L is in the foreground.

F. Hanging Rock Shelter, square C, south-west wall, showing wombat hole at a depth of one metre.
small numbers, being superseded by an industry based on quartz. The transition is marked but gradual, occurring within 15cm. of deposit. The uppermost quartz industry is characterized by very large numbers of small quartz flakes and the predominant artifacts are bipolar scaled pieces of quartz. (The parameters and probable function of both backed blades and scaled pieces will be discussed in chapter 14). This quartz period had superseded the backed blade industry by 1695 ± 90 BP (ANU-741), although a certain number of backed blades still occurred. This uppermost industry therefore cannot strictly be termed post-Bondaian, for which reason it is described as the 'Quartz Period'.

Two ground-edge axes and one shell scraper were also found in the upper horizon. The shell must have been brought from some distance, probably from the Endrick River 7km. (4 miles) away, and its occurrence suggests that skins were processed in the shelter (cf. chapter 5).

Sassafras II: The occupation in this shelter was shallower and younger than that of Sassafras I, but in the deeper section (pits M and N) exhibited the same change from an industry producing backed blades of silcrete to one in which bipolar scaled pieces of quartz predominated. In the shallower part of the site (pits O, P and Q) quartz flakes and bipolar scaled pieces outnumbered silcrete flakes and backed blades at all levels.

The transition from backed blades to scaled pieces as the dominant artifact was dated here to 2780 ± 115 BP (ANU-744). This is not inconsistent with the date for the same transition at Sassafras I of 1695 ± 90 BP, since the latter actually post-dates the transition, whereas the Sassafras II sample dates the uppermost backed blade horizon. The transition was clearly a gradual one, but for convenience I will refer to the mid-point between these dates, 2000 BP., as its approximate date on the coastal ranges. This agrees closely with the date of 1970 ± 80 BP (ANU-243) for the mid-point of the same technological
change at Curraong I, 58km. distant from Sassafras on the coast (Lampert, 1971b).

The absolute and unequivocal nature of this technological change from an earlier backed blade industry based on silcrete to a later quartz industry with bipolar scaled pieces as the dominant artifact is demonstrated in figures 32 and 33.

The difference in distribution of backed blades and scaled pieces from both Sassafras I and II is accompanied by an equally pronounced change in the raw material of the simple flakes. At Sassafras I all but three of the 172 scaled pieces are of quartz, and all the backed blades are of fine grained silcrete or quartzite, and we find that the percentage distribution of quartz to these other materials (amalgamated for convenience under the generic name 'silcrete') closely mirrors that of scaled pieces to backed blades. These changes reflect not merely an increase in the quantity of quartz from the lower to upper levels, but a decrease in the absolute numbers of silcrete flakes which outnumber the quartz flakes in the lower horizons of Sassafras I and of Sassafras II (pits M and N), as shown on figure 33.

The same industrial change is seen, to a greater or lesser extent, in the rock-shelters of the Namadgi Ranges south of Canberra.

Excavated Rock-Shelters of the Canberra Region

Even today the Gudgenby valley has a remote and lonely atmosphere, with its encircling ring of mountains. To the north the steep gorge of the Gudgenby River drops through dense bush to join the Naas and eventually the Murrumbidgee River, and to the west lies a range of high granite peaks, rising to 1830m. (6000 ft.) and snow-covered for almost half the year (see fig. 19 and plate 9). The valley floor undulates between 915 and 1067m. (3000 and 3500 ft.), and was originally clad in the same dry sclerophyll woodland found on the lower slopes of the mountains today. Higher
FIGURE 32.
SASSAFRAS 1 (J4,K4)
Absolute numbers of unmodified flakes

SASSAFRAS 2 (M,N)
Absolute numbers of unmodified flakes

FIGURE 33.
up is a zone of wet sclerophyll forest, and above about 1350m. (4400 ft.) Bogong moths are found aestivating on the granite tors in summer. In figure 19 possible moth habitats are defined by the 1350 metre contour, and the orographic snow-line by the 1500 metre contour.

Yankee Hat Shelters I and II, A.C.T.: These two granite rock-shelters situated at 1097m. (3600 ft.) in the Gudgenby valley (see fig. 19) exhibit, although less clearly, the same technological change as that found at Sassafras. Backed blades succeed scaled pieces as the predominant artifact and quartz replaces other rock as the dominant raw material. The rest of the stone assemblage is also similar, as shown in figure 34C and Appendix X. In both shelters the occupation deposit is shallow, being less than 50cm. thick.

Only in Shelter II, square A, was a clear transition from backed blades to scaled pieces visible, and a Fisher exact probability test showed the difference in the distribution of the two artifact types to be highly significant. The backed blades are all of chert and the scaled pieces all of quartz, and as at Sassafras I and II, the change in predominant artifact type is accompanied by a change in the raw material of the waste flakes, in this case from a predominance of chert in the lower levels to quartz in the upper levels as shown in figure 34B. This technological change in Yankee Hat II was dated to 770 ± 140 BP (ANU-1051).

The occupation in Yankee Hat I appears to derive mainly from the Quartz Period, quartz flakes always outnumbering chert flakes, and scaled pieces being considerably more numerous than backed blades (see fig.34B and C). However, a Chi squared test on the distribution of backed blades and scaled pieces showed there to be a significant difference between their distribution in the upper and lower horizons of the site.

Thus the Yankee Hat sites show a similar sequence to that found on the coastal ranges, but suggest that the technological change occurred rather more recently.
Plate 9

A. Yankee Hat I, Gudgenby Valley, A.C.T., from the north, showing the overhang which bears the paintings.

B. Yankee Hat II from the South.

C. Yankee Hat I, paintings and excavation, square B (and D on left), with thin black occupation horizon.

D. Detail of paintings. Two dingoes/dogs chasing a kangaroo, and an echidna or tortoise (see Chapter 9).

E. The rock-shelter of Rendezvous Creek, Gudgenby Valley, A.C.T.

F. Stratigraphy of Rendezvous Creek Shelter, showing black occupation layer, (with rabbit burrow in foreground) in the south west corner of square E.
FIGURE 34: Stone assemblages of Yankee Hat 1 and 2.

A - Percentage of quartz flakes to pebbles.

B - Ratio of chert to quartz flakes.

C - Scale — 10 artifacts
A. The Bogong Rocks, A.C.T., containing a moth aestivation site and rock shelters with Aboriginal occupation deposits.

B. Bogong Shelter I, and the narrow entrance to the Bogong Cave.

C. The interior of Caddigat Shelter, N.S.W. The walls bear hand imprints in red ochre.

D. The small shale shelter of Caddigat, near the top of a scree slope above Caddigat Creek.

E. View from Caddigat Shelter north towards the Upper Murrumbidgee River, Monaro, New South Wales.

F. The open camp-site of Nardoo, Lake George, N.S.W., showing the east wall of square D, with the younger 'Taylors Sand overlying a buried soil and the older implementiferous 'Nardoo Sand'.
FIGURE 34: Stone assemblages of Yankee Hat 1 and 2.

A - Percentage of quartz flakes to pebbles.

B - Ratio of chert to quartz flakes.

C - Scale: 10 artifacts
Plate 10

A. The Bogong Rocks, A.C.T., containing a moth aestivation site and rock shelters with Aboriginal occupation deposits.

B. Bogong Shelter I, and the narrow entrance to the Bogong Cave.

C. The interior of Caddigat Shelter, N.S.W. The walls bear hand imprints in red ochre.

D. The small shale shelter of Caddigat, near the top of a scree slope above Caddigat Creek.

E. View from Caddigat Shelter north towards the Upper Murrumbidgee River, Monaro, New South Wales.

F. The open camp-site of Nardoo, Lake George, N.S.W., showing the east wall of square D, with the younger 'Taylors Sand overlying a buried soil and the older implementiferous 'Nardoo Sand'.
Rendezvous Creek Shelter, A.C.T.: This is a capacious shelter, located in an elevated valley at 1128m. (3700 ft.). Possibly as a result of its elevated and remote situation (see fig. 19) the occupation of the shelter proved slight, with only meagre traces of the more recent quartz industry. The same situation was found in the small Front Paddock Shelters in the Gudgenby valley.

Tidbinbilla Hanging-Rock Shelter, A.C.T.: Occupation in this large granite shelter at 823m. (2700 ft.) in the Tidbinbilla valley was also surprisingly slight. Most of the assemblage was of quartz, and bipolar scaled pieces again predominated among the artifacts. A small number of backed blades were present but only in one small area was a transition from backed blades to scaled pieces demonstrable.

Charcoal from a basal layer at 50cm., associated with backed blades, gave a date of 370 ± 60 BP (ANU-1047). The chronology of these sites will be discussed further in chapter 15; suffice it to point out here that the backed blade period appears to have lasted until very recent times in the Southern Uplands.

Caddigat Shelter, Monaro: This shale shelter (see fig. 21) lies further south than those described above, at an elevation of 1000m. (3280 ft.) on the edge of the treeless plains of the Monaro. The occupation is similarly shallow and slight, artifacts including two backed blades, one thumbnail scraper, and eleven bipolar scaled pieces. Most of the scaled pieces were stratified above the backed blades. Charcoal from the base of the deposit associated with a backed blade was dated to 1600 ± 60 BP (ANU-1049).

Bogong Shelter, A.C.T.: This was the highest site excavated, lying at 1433m. (4700 ft.) south of the Tidbinbilla valley (fig. 17:B).
It consisted of a cave containing debris from aestivating moths, and two rock shelters. In the larger of these, shelter II, one backed blade was found, a number of stone manuports, and, at the base of the deposit, a river pebble which was also foreign to the locality, and therefore must have been deliberately brought to the site. On the basis of its association with a moth habitat, and ethnographic evidence of the use of 'a smooth stone' to grind up moths into a paste, this pebble has been termed a moth pestle. In shape and size it bears a marked resemblance to modern pestles.

Charcoal associated with this moth pestle gave an age of 1000 ± 60 BP (ANU-1050), which is important presumptive evidence that the exploitation of the Bogong moth has an antiquity of at least one millennium.

Manufacturing sites?

The assemblages of the main sites described above are summarized and compared on Table 13:1. All these sites (Sassafras I and II, Yankee Hat I and II and Tidbinbilla I) appear to be stone tool manufacturing sites, since the assemblages contain a large quantity of waste flakes, a low implement to waste ratio, and a high percentage of cores among the modified material. If bipolar scaled pieces are accepted as the core component of the quartz industry, as proposed in the next chapter, I would therefore designate all these sites as manufacturing sites. Quartz-working appears to predominate at Sassafras II and in the upper levels of Yankee Hat I and II and of Sassafras I, and silcrete or quartzite knapping in the lower levels of Sassafras I and Yankee Hat II. At the Tidbinbilla shelter quartz, chert and quartzite all appear to have been worked concurrently.

A comparison was made between the assemblage of the open site of Tidbinbilla II and that of the shelter of Hanging-Rock, Tidbinbilla I, 1.5km. (1 mile) apart in the same valley (cf. data on Table 12:1 with 13:1). It
| TABLE 13:1 The assemblages of some rock-shelters in the Southern Tablelands region. |
|----------------------------------|--------------------------------------------------|--------------------------------|---------------------------------|----------------------------------|
|                                  | Bondi points | Geometric microliths | Elliptics | Total backed blades | Bipolar scaled pieces | Thumbnai scrapers | Core tools | Core use | Polished | Miscellaneous retouch | Points | Waste flakes | Waste flakes silcrete | Quartz flakes | Cores: A flakes | Bipolar scaled: B flakes | Implement to 'waste' |
| Sassafras 1                      |              |                      |           |                   |                    |                 |           |          |          |                        |        |             |                  |                  |               |                      |                      |
| Upper levels (1 - 5)             | 20           | 1                    | 2         | 23                | 146                | 4                | 11         | 2         | 4         | 2                        | 4      | 805          | 3241              | (20%)            | 1-23              | 1:20               |                      |
| Lower levels (7 - 11)            | 115          | 12                   | -         | 127               | 15                 | 3                | 12         | 25        | 2         | 17                       | 10     | 1409         | 473                | (75%)            | 1:28              | 1:31               | 1:8                 |
| Sassafras 2                      |              |                      |           |                   |                    |                 |           |          |          |                        |        | 1301         | 2181              | (37%)            | 1:108             | 1:31               | 1:24               |
| Total Assemblage                 | 30           | 1                    | 1         | 31                | 78                 | 9                | 4          | 8         | 6         | 6                        |        | 1310         | 2181              | (37%)            |                  |                    |                      |
| Yankee Hat 1                     |              |                      |           |                   |                    |                 |           |          |          |                        |        |             |                  |                  |                  |                      |                      |
| Upper levels (0 - 20 cm)         | 5            | 2                    | 7         | 40                | 40                 | 3                | 9          | 90        | 50        | 13                       | 13     | 313          | 1102              | (22%)            | 1:24              | 1:25               | 1:14               |
| Lower levels (20 - 50 cm)        | 2            | 1                    | 3         | 4                 | 4                  | 4                | 2          | 9         | 8         | 3                        | 3      | 194          | 694               | (22%)            |                  |                    |                      |
| Yankee Hat 2                     |              |                      |           |                   |                    |                 |           |          |          |                        |        |             |                  |                  |                  |                      |                      |
| Upper levels (0 - 20 cm)         | -            | -                    | -         | -                 | -                  | -                | -          | -         | -         | -                        | -      | 47           | 166               | (22%)            | 1:21              | 1:19               | 1:13               |
| Lower levels (20 - 50 cm)        | 4            | 4                    | 8         | -                 | -                  | -                | 8          | 7         | 2         | 2                        | 2      | 186          | 52                | (78%)            |                  |                    |                      |
| Tidbinbilla 1                    |              |                      |           |                   |                    |                 |           |          |          |                        |        | 1661         | 1120              | (60%)            | 1:21              | 1:19               | 1:13               |
| Total Assemblage                 | 8            | 0                    | 3         | 11                | 69                 | 3                | 7          | 3         | 72        | 8                        | 25     | 1661         | 1120              | (60%)            |                  |                    |                      |

203A.
FIGURE 34(ii): Location of archaeological sites in eastern N.S.W.
emerged that on both sites there is a high percentage of cores, but that on the open site there is a much higher percentage of modified to unmodified material, and a considerably higher percentage of quartzite cores to flakes (13%) than in the rock-shelter. However, only one of these cores shows signs of secondary utilization as a core-tool, so I think that they did derive from stone-knapping, and that the open site reflects stone-manufacturing like the rock-shelter. Chert and quartzite were worked there, but careful search has failed to reveal any sign of scaled pieces, and very few quartz flakes have been found on this open site. The distance from quartz reefs from these two sites is similar, but the absence of quartz-working at the open site could perhaps mean that it belongs to the Bondaian rather than to the Quartz Period.

Summary: From the excavated sites two industrial periods can be distinguished. The earlier is the backed blade phase, known as the 'Bondaian Period' and characterized by the presence of bondi points and geometric microliths, made of silcrete, chert and other fine-grained rock. The later phase in the Southern Uplands I have termed 'The Quartz Period', since quartz is the dominant raw material exploited, and bipolar scaled pieces of quartz the dominant artifact. The only other criterion on which the assemblages of the two periods differ is that the Bondaian contains a higher percentage of secondarily retouched implements, such finely retouched pieces as the thumbnail scrapers being particularly associated with the backed blades.

Bone Analysis

Very little bone was found in any of the excavated sites, so the data has been brought together in Table 13:2 below. Identifications were made by Dr. J. Hope.

Sassafras I contained a considerable amount of bone in the uppermost 15-20cm. of the deposit, but almost all was
too fragmentary to be identifiable. Some of the bone was burnt, and these burnt pieces were generally of larger bones, of the size to belong to wallabies or kangaroos. In the granite rock-shelters of the Canberra region there was extremely little bone, and much of this belonged to modern introductions such as rabbits and sheep.

One cannot be sure whether the faunal finds in the shelters relate to Aboriginal diet, but they do reflect the woodland environment of the sites, and will later be compared with the fauna from Cloggs Cave, Buchan.

Table 13:2 Bone from excavated sites in the Canberra region.

<table>
<thead>
<tr>
<th>Name</th>
<th>No.</th>
<th>Site</th>
<th>Spit</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Trichosurus vulpecula</em></td>
<td>1</td>
<td>Tidbinbilla</td>
<td>K-4N</td>
</tr>
<tr>
<td>(Brush-tailed possum)</td>
<td></td>
<td>&quot;</td>
<td>K-5E</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>&quot;</td>
<td>L-4</td>
</tr>
<tr>
<td><em>Pseudocheirus</em></td>
<td>?1</td>
<td>&quot;</td>
<td>C-12N</td>
</tr>
<tr>
<td>(Ring-tailed possum)</td>
<td></td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td><em>Potorous sp.</em></td>
<td>1</td>
<td>&quot;</td>
<td>L-4</td>
</tr>
<tr>
<td>(Potoroo)</td>
<td></td>
<td>Sassafras I</td>
<td>K2-2</td>
</tr>
<tr>
<td><em>Perameles sp.</em></td>
<td>1</td>
<td>Tidbinbilla</td>
<td>K-5E</td>
</tr>
<tr>
<td>(Bandicoot)</td>
<td></td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td><em>Antechinus</em></td>
<td>1</td>
<td>&quot;</td>
<td>M-7</td>
</tr>
<tr>
<td>(Small marsupial mouse)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Wallabia bicolor</em></td>
<td>?1</td>
<td>Rend. Creek</td>
<td>Z-1</td>
</tr>
<tr>
<td>(Swamp wallaby)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot; (sp.?)</td>
<td>1</td>
<td>Y. Hat II</td>
<td>C-1</td>
</tr>
<tr>
<td><em>Macropus (giganteus)</em></td>
<td>1</td>
<td>Y. Hat II</td>
<td>Surface</td>
</tr>
<tr>
<td>(Kangaroo)</td>
<td></td>
<td>Sassafras I</td>
<td>K2-3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>&quot;</td>
<td>K4-3</td>
</tr>
</tbody>
</table>
Chronology of the Open Camp-Sites

In attempting to extract the time element from these excavation data in order to set open sites into a chronological order, one encounters several problems:

(1) Small numbers of backed blades occur in the recent levels and scaled pieces in the Bondaian levels at sites such as Sassafras I, so the two artifact types overlap.

(2) The Bondaian Period is of extremely long duration, lasting in the Southern Uplands from at least 3770 BP (at Sassafras I) until after 370 BP (at Tidbinbilla I). There are no criteria on which to order assemblages within the Bondaian Period, since no changes within the parameters of the backed blades or other artifact types, or in their ratio to one another, were discernible. There was a slight suggestion that among the backed blades geometric microliths tended to belong to the earlier Bondaian levels and eloueras to the later, but the samples were too small for statistical tests to check the validity of this impression.

(3) The rock-shelters tend either to contain a very small amount of occupational material, or to be stone tool manufacturing sites. In other words, all the excavated rock-shelters which contain an adequate sample of stone tools for comparative purposes were manufacturing sites, and therefore may be too specialized for comparison with non-manufacturing open sites. The one stratified open site of Nardoo at Lake George (see Appendix XI and XII) also appears to have been a stone tool manufacturing site, but it has the advantage that its large assemblage contains a wider range of tool types than do the rock-shelters. An upper horizon containing backed blades was dated to 760 ± 110 BP (ANU-1060), and the whole site appears to belong to the Bondaian period.
It seems, therefore, that it will be impossible to establish the chronology of the open sites except perhaps in the very broadest terms of 'Bondaian' (spanning some 4000 years), 'pre-Bondaian' or possibly 'post-Bondaian'. The latter term was coined but later rejected by Lampert (1971b:68), who replaced it by Phase III, Phase I in Australian prehistory being the 'pre-Bondaian', and Phase II the 'Bondaian'. However, this nomenclature also poses problems, since it does not allow for the inclusion of any industries antedating Phase I which may be discovered, and it implies that the three phases are of similar chronological standing, whereas Phase I spans some 15,000 years, but Phase III only some 2000-3000 years or less. I am therefore adopting the term 'Proto-historic Period' to distinguish the most recent phase of Australian prehistory from the earlier ones. The latter will be designated as (a) 'Bondaian', or 'microlithic' when geometric microliths rather than bondi points predominate among the small tools; (b) 'pre-Bondaian', or 'the Australian core tool and scraper tradition' (cf. Jones and Allen in Bowler et al., 1970:52), when the term pre-Bondaian is not applicable.

Pre-Bondaian sites: There is no sign among more than 2000 implements from 56 camp-sites of any of the horsehoof cores, steep-edge scrapers, or dented saws which occur in the early levels of the Burrill Lake deposit (Lampert, 1971b:18) and other pre-Bondaian industries. Eight high-backed scrapers were found on open sites (see Tables 12:3 and 4) but none had the step-flaking, overhanging edge, retouched circumference and domed shape which are the salient characteristics of horsehoof cores. The scrapers which occur on the open sites are generally small and low-backed, and very similar to those found in Bondaian horizons in the excavated rock-shelters.

Sites in the Lower Snowy Valley: The only possible candidates for pre-Bondaian status among the open sites in the Southern Uplands are
those in the Lower Snowy Valley, for they lack backed blades (the one geometric microlith found on over 25 sites is not sufficient to designate them 'Bondaian'), but possess pebble tools, which are found in some pre-Bondaian industries. However, pebble tools are also found in Bondaian and later contexts so cannot be used as a chronological marker. Moreover, three ground-edge pebble tools occur on the Lower Snowy River sites. These are termed 'Windang axes' by McCarthy (1967:43), and described as 'uniface pebble implements, apparently in common use at the time of the introduction of the ground-edge into eastern Australia, converted into simple axes by the grinding of the blade'. Ground-edge axes were found in northern Australia and edge-grinding techniques in New Guinea in Pleistocene or near-Pleistocene contexts respectively (White, C, 1967b; White, J.P. 1967) but at all other Australian sites the antiquity of edge-ground axes has not yet been found to exceed 6000 years. It should be noted that at Seelands in northern New South Wales the appearance of edge-ground axes occurred about 3000 years ago, post-dating the appearance of geometric microliths and of pebble tools. The latter occurred throughout the 6000 year time span of the site (McBryde, 1966b:fig.31).

The scrapers on the Lower Snowy sites do not belong to the heavy core-tool and scraper tradition of pre-Bondaian industries, but appear very similar morphologically and metrically to those occurring during the last four millenia in the excavated sites described above.

Thus it is difficult to prove that the Lower Snowy sites are not pre-Bondaian, but the artifactual evidence does not support a very early date for these sites. Moreover, if they should be designated pre-Bondaian, it is extremely hard to understand why this well-endowed low valley was not used during the two millennia or more of the Bondaian period. An alternative explanation for the lack of backed blades in the Lower Snowy Valley is that the sites are basically post-Bondaian. This interpretation fits the
Plate 11

A. Unifacially-worked pebble tools from Cloggs Cave, Buchan, Victoria.

- **top.** left - Pit G Spit 7B
- centre - Pit T Spit 6 (burnished)
- right - scree slope

- **bottom.** left - Pit Y Spit 9 (carbonated)
- right - Pit Y Spit 3 (carbonated)

B. Unifacially - worked pebble tools from Jindabyne on the Snowy River, Monaro, N.S.W.

C. Three 'moth-pestles', photographed in Ultra-Violet light (with no other light source) showing traces protein on the edges of the pebbles fluorescing.
artificial evidence better, but again raises the problem of why this favourable valley was not occupied, when bondi point users were moving round the tableland zone and moth-hunting in the highlands.

**First movement into the Monaro:** There is one hypothesis which fits all the evidence, namely that the first movement into the Canberra region and the Monaro was from the east coast during the Bondaian period, not more than about 6000 years ago. The first occupiers exploited the Bogong moth but did not winter in the Monaro, so did not frequent the Lower Snowy Valley, but possibly returned to the coast in winter. After the waning of the Bondaian period, some 2000 years ago or less, the Monaro moth-hunters began to spend the winter in the Lower Snowy Valley, since in winter it has the richest food resources and most equable climate in the region.

Two other strands of evidence support this hypothesis. Firstly, the linguistic evidence shows that the Southern Uplands belong to the Yuin group of languages, but that an Inland Yuin group were differentiated from the Coastal Yuin by vocabulary differences. Secondly, backed blades are much more numerous on camp-sites in the Canberra region than in the Monaro. On no camp-site in the Monaro have more than 5 backed blades been found, whereas at sites such as Nardoo, Blundells Flat, and Pialligo in the Canberra region, the number found was between 20 and 60. The presence of large numbers of backed blades at Nardoo and Pialligo correlates with camps of extensive area, which suggests that their assemblages may derive from a long period of occupation, as well as the attraction of camping on sand and their proximity to riverine and lacustrine food resources.

The existence of these very large tableland camps with a high number of backed blades in the Canberra region, but their absence from the Monaro, may be interpreted as indicating that the Canberra region was occupied rather earlier than the Monaro. The particularly close links between the languages of the Ngunawal and Ngarigo may indicate that movement onto the Monaro Tablelands was by way of the Southern Tablelands and the Upper Murrumbidgee valley.
Proto-historic: None of the open sites yielded large numbers of bipolar scaled pieces, but some appear to be fairly recent sites on other criteria, such as absence or very small numbers of backed blades, thumbnail scrapers, and other finely-retouched implements. Such a site is Reidsdale, where backed blades comprise only 2% of the implements, in contrast to 21% at Pialligo, and 50% at Blundells Flat.

The unimportance of scaled pieces on the open sites is noticeable, in comparison with the large numbers found in the upper horizons of Sassafras I and II, Yankee Hat I and II and Tidbinbilla I. I am certain that their virtual absence is real on sites such as Tidbinbilla II and Nardoo, since I have made a particularly careful search for them there.

Their virtual absence at Nardoo I interpret as suggesting that the site is Bondaian, and was not occupied in the proto-historic period (see next chapter). Elsewhere it may be that open sites, like the rock-shelters, were the scene for the production of large numbers of small quartz flakes and the resulting bipolar scaled pieces, but that the restricted area of rock-shelters has concentrated these remains, whereas on open sites they are so scattered that very few bipolars have been found, and the quartz flakes have been regarded as occurring naturally on the site.
Chapter 14

Bipolar Scaled Pieces and Backed Blades

I. Bipolar Scaled Pieces

This artifact type, also known as 'fabricator', 'scalar core', or *outil écaillé*, is characterised by its scaled or bruised margins in the bipolar position. It has been

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The term 'scaled pieces' is a direct translation of the French *pièces écaillées*. The latter is the term used in Europe and Africa by both French and English writers to describe what appear to be identical artifacts (cf. Bardon and Bouyssonie, 1906; Clark, 1958:149). Previous terms used for these artifacts in Australia are unsatisfactory. The name 'fabricator' must be abandoned because of its controversial functional connotation, and the term 'scalar core', coined by White (1968) and followed by Lampert (1971b) is also unsuitable because (a) some bipolar artifacts are flakes and not cores, as shown below (b) the term 'scalar' (derived from the Latin *scala*) is defined by the O.E.D. as 'resembling a ladder'. Likewise 'scalari-form' is said to be 'characterised by ladder-like formation, as cells or vessels of plants having the walls thickened so that they form transverse ridges'. However the flakes on an *outil écaillé* are not ladder-like transverse ridges, for they do not extend across the whole working edge, but are small, slightly curved, and resemble scales on a fish (cf. fig. 30).

The term 'scaled' on the other hand is a translation of *écaillé* (past participle of *écailler* - to scale off, peel off, flake off), and is itself the past participle of the verb to scale ("O.E.D.") defined as 'to have the surface removed in scales'. Likewise synonyms for the old-fashioned adjective 'squamous', which has also been applied to these artifacts, are 'covered with scales, laminated' etc.

I therefore justify my use of the term 'scaled pieces' on the grounds that it is a more accurate description of the artifacts than 'scalar cores', and that it is a direct translation or synonym for the terms used in the rest of the world, whereas the word 'scalar' introduces, without justification, a totally new concept. An easy solution, of course, to the problem would be to use the French term, but this causes some inconvenience in a predominantly non-French-speaking country. I have discussed this question of nomenclature at some length because Lampert (pers. comm.) objects to 'scaled' and wishes to continue with the term 'scalar'.

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defined by D. de Sonneville-Bordes as 'pièce généralement rectangulaire ou carrée présentant sur les deux bouts, plus rarement sur les quatre côtés, des esquillements parfois bifaciaux obtenus par percussion violente' (1956: 552). This is an excellent definition in that it describes the rectangular shape and bipolar scaling, whilst avoiding calling the pieces either cores or flakes, tools or waste material, or making any assumptions about their function.

Parameters: Firstly a sample of 100 scaled pieces from Sassafras I will be analysed, and then comparisons will be made between this sample and the scaled pieces from other upland sites.

All scaled pieces from spits 1-3, squares J4 and K4, of Sassafras I were analysed, the sample size being made up to 100 by a random sample from spit 4. No selection was made, and all pieces bearing one or more scaled edges were included, whether they were of quartz or other material. Varieties found to occur were:

a) Bipolar scaled pebbles: Seven scaled quartz pebbles which are indisputably cores were present. All except one broken example show battering marks at opposed ends, ranging from a small amount of bruising on a round pebble to ones with almost all the cortex removed. Before modification commences the pebbles are generally egg-shaped, and at Sassafras I range in size from 2cm. long to one large example 5cm. long, but the average length is about 2.5cm.

b) Bipolar scaled artifacts: This group have scaling on two opposed edges in the bipolar position, but some are more easily classified as flakes than cores. It will be seen in table 14:1A that they are smaller and thinner than the bipolar scaled pebbles. Moreover two specimens have cortex on one surface, clearly demonstrating that they have been struck off a parent core. The differing size and degree of chunkiness of these bipolar artifacts suggests a process of manufacture whereby the original quartz pebble is gradually reduced in size as
flakes are detached. However, some of the pieces bearing bipolar scaling are so tiny and thin that they must be described as flakes and not cores. They could have acquired the bipolar scaling whilst still attached to the parent core, or from subsequent splitting of a wide flake.

No bimodal distribution was visible when plotting the lengths or thicknesses, which might have helped divide them into cores and flakes, so no subdivisions have been made in this large group. All except one of these 53 bipolar artifacts have the scaling at opposed ends of the longer axis, the average breadth/length ratio being 0.69.

Included in this group of quartz bipolar artifacts are one with three and one with all four margins scaled. The four non-quartz examples have been kept separate, and constitute group B2 on table 14:1A, but their dimensions are very similar to the quartz specimens.

c) **Pointed scaled pieces or slivers:** These correspond with Lampert's group C of the bipolar artifacts found at Currarong (1971b:43). Sixteen percent of the Sassafras sample fall into this category, being narrower and slightly longer on average than the other bipolar artifacts, and often having a pointed end or ends and rather indefinite scaling or bruising. Some have a definite appearance of being slivers from bipolar cores.

d) **Broken scaled pieces:** Fourteen broken quartz bipolar artifacts occur and one of quartzite. They are recognisable by a break opposite the one scaled edge. Lampert suggests (1971b:43) that they are scalar cores which snapped transversely during flaking, and compares them with White's ethnographic examples from New Guinea (1968:661), but if this is so one would expect them to be considerably shorter than complete scaled pieces. At Sassafras this is not the case. The average length of the broken examples is less than 1 millimetre shorter than the intact artifacts. The one broken specimen of silcrete, however, measures 14mm. x 14mm. x 6mm., which is both shorter
and squarer than the usual dimensions of these bipolar artifacts, and thus fits Lampert's interpretation. On the quartz pieces the breaks are more irregular and splinter-like than the clean transverse snapping typical of silcrete, chert and quartzite.

e) Scaled pieces with a core platform: Six examples of this variety occur, four of quartz and two of silcrete. They have one edge scaled and one in the bipolar position which resembles a core platform. Their numbers are small but it may be significant that this type forms only 4% of the quartz scaled pieces but 28% of those in silcrete. Core platforms are typical of the manufacture of silcrete but not of quartz.

It is noteworthy that Lampert's class D of small bipolar cores with striking platforms at opposing ends exhibiting scaling and splintering are entirely absent from Sassafras although they comprise 12% of the Curarrong bipolar artifacts. At Curarrong only 37% of the 126 bipolar artifacts from shelter I are of quartz (Lampert 1971:44) whereas at Sassafras the figure is 93%. I suggest, therefore, that these differences between the Sassafras and Curarrong bipolar artifacts are due to the difference in the predominant raw material, and that, when dealing with a bipolar industry, quartz should be treated separately from other raw materials since its fracturing qualities are so different.

The scaled pieces from Sassafras II are extremely similar both metrically and morphologically to those from Sassafras I, but a comparison is made in table 14:1 between the Sassafras examples and those from sites in the Canberra region. The Tidbinbilla sample includes all scaled pieces which occurred in the Hanging-Rock shelter, thirteen being of chert and fifty-seven of quartz. The sample from Gudgenby comprises all those found at Yankee Hat I and II, together with all chert examples (4) from the other Gudgenby sites of Rendezvous Creek and Front Paddock.
### TABLE 14:1A Dimensions of 100 scaled artifacts from Saasafras I.

<table>
<thead>
<tr>
<th>Group</th>
<th>N.</th>
<th>Material</th>
<th>Mean Length (mm)</th>
<th>Mean Breadth (mm)</th>
<th>Mean Thickness (mm)</th>
<th>Mean B/L ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pebbles</td>
<td>A</td>
<td>6 Quartz</td>
<td>24.3 18-30</td>
<td>19.6 15-30</td>
<td>13.0 10-18</td>
<td>0.80</td>
</tr>
<tr>
<td>Bipolars</td>
<td>B1</td>
<td>53 Quartz</td>
<td>17.9 10-12</td>
<td>12.4 7-21</td>
<td>6.4 3-11</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>4 Other</td>
<td>18.2 13-23</td>
<td>11.5 10-15</td>
<td>6.6 4-8</td>
<td>0.63</td>
</tr>
<tr>
<td>Slivers</td>
<td>C1</td>
<td>16 Quartz</td>
<td>19.3 14-28</td>
<td>8.3 5-13</td>
<td>6.1 4-10</td>
<td>0.42</td>
</tr>
<tr>
<td>Broken</td>
<td>D1</td>
<td>14 Quartz</td>
<td>17.5 11-25</td>
<td>12.5 10-18</td>
<td>6.8 4-10</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>D2</td>
<td>1 Other</td>
<td>14.0</td>
<td>14.0</td>
<td>6.0</td>
<td>0</td>
</tr>
<tr>
<td>Core</td>
<td>E1</td>
<td>4 Quartz</td>
<td>21.5 14-33</td>
<td>15.2 8-24</td>
<td>8.7 5-15</td>
<td>0.71</td>
</tr>
<tr>
<td>Platform</td>
<td>E2</td>
<td>2 Other</td>
<td>21.0 18-24</td>
<td>12.0 10-14</td>
<td>9.5 5-14</td>
<td>0.57</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>Mean</td>
<td>18.5 12.5</td>
<td>6.8</td>
<td></td>
<td>0.65</td>
</tr>
</tbody>
</table>

### TABLE 14:1B Dimensions of 70 scaled artifacts from Tidbinbilla I.

<table>
<thead>
<tr>
<th>Group</th>
<th>N.</th>
<th>Material</th>
<th>Mean Length (mm)</th>
<th>Mean Breadth (mm)</th>
<th>Mean Thickness (mm)</th>
<th>Mean B/L ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pebbles</td>
<td>A</td>
<td>1 Quartz</td>
<td>51 35</td>
<td>22</td>
<td></td>
<td>0.68</td>
</tr>
<tr>
<td>Bipolar</td>
<td>B1</td>
<td>30 Quartz</td>
<td>19.4 10-29</td>
<td>14.9 10-24</td>
<td>6.7 3-15</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>8 Other</td>
<td>22.6 14-34</td>
<td>17.3 10-22</td>
<td>6.7 4-11</td>
<td>0.76</td>
</tr>
<tr>
<td>Slivers</td>
<td>C</td>
<td>13 Quartz</td>
<td>18.6 14-24</td>
<td>7.8 5-10</td>
<td>4.9 3-8</td>
<td>0.41</td>
</tr>
<tr>
<td>Broken</td>
<td>D1</td>
<td>13 Quartz</td>
<td>18.1 9-25</td>
<td>17.6 9-34</td>
<td>7.4 3-12</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>D2</td>
<td>5 Other</td>
<td>17.0 15-21</td>
<td>19.8 16-27</td>
<td>10.6 8-14</td>
<td>1.16</td>
</tr>
</tbody>
</table>

### TABLE 14:1C Dimensions of 62 scaled pieces from Gudgenby sites.

<table>
<thead>
<tr>
<th>Group</th>
<th>N.</th>
<th>Material</th>
<th>Mean Length (mm)</th>
<th>Mean Breadth (mm)</th>
<th>Mean Thickness (mm)</th>
<th>Mean B/L ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pebbles</td>
<td>A</td>
<td>Absent</td>
<td>18.4 13-28</td>
<td>14.5 7-26</td>
<td>6.4 4-12</td>
<td>0.79</td>
</tr>
<tr>
<td>Bipolars</td>
<td>B1</td>
<td>22 Quartz</td>
<td>25.0 19-29</td>
<td>16.5 12-21</td>
<td>7.2 5-9</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>4 Other</td>
<td>19.2 15-23</td>
<td>10.2 8-12</td>
<td>6.7 5-9</td>
<td>0.53</td>
</tr>
<tr>
<td>Slivers</td>
<td>C1</td>
<td>8 Quartz</td>
<td>17.2 11-26</td>
<td>13.7 7-19</td>
<td>5.9 4-9</td>
<td>0.79</td>
</tr>
<tr>
<td>Broken</td>
<td>D1</td>
<td>23 Quartz</td>
<td>16.0 10-23</td>
<td>15.0 10-16</td>
<td>6.2 3-9</td>
<td>0.93</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>Mean</td>
<td>18.0 13.5</td>
<td>6.2</td>
<td></td>
<td>0.75</td>
</tr>
</tbody>
</table>
### TABLE 14:2 Parameters of bipolar scaled pieces from some Australian sites.

<table>
<thead>
<tr>
<th>Site</th>
<th>Age B.P.</th>
<th>Material</th>
<th>Mean Length$^8$ (mm)</th>
<th>Mean Breadth$^9$ (mm)</th>
<th>Mean Thickness$^{10}$ (mm)</th>
<th>Mean B/L Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Tidbinbilla$^1$</td>
<td>&lt;370</td>
<td>Quartz</td>
<td>N = 30</td>
<td>19.4 ± 5.1</td>
<td>6.7 ± 2.6</td>
<td>N=30</td>
</tr>
<tr>
<td>B. Yankee Hat$^2$</td>
<td>&lt;770</td>
<td>Quartz</td>
<td>N = 30</td>
<td>18.0 ± 3.2</td>
<td>6.2 ± 1.9</td>
<td>N=30</td>
</tr>
<tr>
<td>C. Sassafras I$^3$</td>
<td>&lt;1700</td>
<td>Quartz</td>
<td>N = 53</td>
<td>17.9 ± 4.7</td>
<td>6.4 ± 2.0</td>
<td>N=53</td>
</tr>
<tr>
<td>D. Currarong I$^4$</td>
<td>&lt;2000</td>
<td>37% Quartz</td>
<td>N = 37</td>
<td>21.1 ± 8.0</td>
<td>7.7 ± 3.4</td>
<td>N=37</td>
</tr>
<tr>
<td>E. Lapstone Ck.$^5$</td>
<td>&lt;2300</td>
<td>44% Quartz</td>
<td>N = 118</td>
<td>23.0 ± 6.0</td>
<td>8.0 ± 3.0</td>
<td>N=85</td>
</tr>
<tr>
<td>F. Capertee III$^6$</td>
<td>3500–7500</td>
<td>48% Quartz</td>
<td>N = 32</td>
<td>25.0 ± 7.0</td>
<td>10.0 ± 4.0</td>
<td>N=25</td>
</tr>
<tr>
<td>G. Green Gully$^7$</td>
<td>&gt;8000</td>
<td>54% Quartz</td>
<td>N = 15</td>
<td>25.0 ± 7.0</td>
<td>9.0 ± 2.0</td>
<td>N=9</td>
</tr>
</tbody>
</table>

1 All unbroken bipolars (A).
2 All unbroken bipolars and slivers (A and C).
3 All unbroken bipolars (A).
4 Data from Lampert 1971:44.
5 Data from Wright 1970:88–9.
6) Data from Wright 1970:88–9.
7) Data from Wright 1970:88–9.
8) Length = maximum distance between 2 opposed worked edges.
9) Breadth = maximum width of artifact at 90° to Length.
10) Thickness = the smallest opening of calipers through which the scaled piece can be passed.
### TABLE 14:3 Results of t-tests on parameters of bipolar scaled pieces

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>Tidbinbilla</th>
<th>Yankee Hat</th>
<th>Sassafras I</th>
<th>Currarong I</th>
<th>Lapstone Creek</th>
<th>Capertee III</th>
<th>Green Gully</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>*</td>
<td>*</td>
<td>PS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>HS</td>
<td>HS</td>
<td>HS</td>
<td>*</td>
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<td></td>
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<td>F</td>
<td>HS</td>
<td>HS</td>
<td>HS</td>
<td>PS</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>S</td>
<td>HS</td>
<td>HS</td>
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<td>*</td>
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<table>
<thead>
<tr>
<th>BREADTH</th>
<th>Length</th>
<th>Tidbinbilla</th>
<th>Yankee Hat</th>
<th>Sassafras I</th>
<th>Currarong I</th>
<th>Lapstone Creek</th>
<th>Capertee III</th>
<th>Green Gully</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>HS</td>
<td>HS</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>D</td>
<td>HS</td>
<td>HS</td>
<td>HS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>X</td>
<td>X</td>
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<tr>
<td>F</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>G</td>
<td>X</td>
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<td>X</td>
<td>X</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>THICKNESS</th>
<th>Tidbinbilla</th>
<th>Yankee Hat</th>
<th>Sassafras I</th>
<th>Currarong I</th>
<th>Lapstone Creek</th>
<th>Capertee III</th>
<th>Green Gully</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>D</td>
<td>*</td>
<td>PS</td>
<td>PS</td>
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<td></td>
</tr>
<tr>
<td>E</td>
<td>PS</td>
<td>S</td>
<td>HS</td>
<td>*</td>
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<tr>
<td>F</td>
<td>HS</td>
<td>HS</td>
<td>HS</td>
<td>PS</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>PS</td>
<td>HS</td>
<td>HS</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

* No significant difference
PS = <.05   S = <.01   HS = <.001
A comparison of the metrical parameters of scaled pieces from Sassafras I on the coastal ranges with those from the Canberra region shows a very close similarity, together with a similar range of varieties. In all cases quartz is markedly predominant as the raw material of the scaled pieces. In table 14:2 below samples from these upland sites are compared with scaled pieces from other parts of Australia (for location of sites see figures 1 and 2). It will be seen that the mean length, breadth and thickness of the different samples appear to be fairly similar. This apparent similarity was tested by means of t-tests. Although this test assumes that the population is normally distributed, and that the variances of the two populations are equal, whereas of course no real population is exactly 'normal', experiments have shown that the t-test is a 'robust' test, being insensitive in practice to deviations from normality (Simpson et al., 1960:183-4). The results of these t-tests on the parameters of scaled pieces are shown on table 14:3. There it will be seen that there is no significant difference between the scaled pieces of the two sites analysed in the Canberra region, Tidbinbilla and Yankee Hat, in mean length, breadth or thickness. Likewise in mean length and thickness there is no significant difference between the Canberra scaled pieces and those from Sassafras and Currarong; between the Currarong and Lapstone Creek or Green Gully specimens; or between those from Green Gully and the Lapstone Creek or Capertee examples.

The most striking feature of this comparison is the very close metrical similarity between scaled pieces so widely separated in space and time. The scaled pieces are metrically much more alike than the asymmetric backed blades discussed later in this chapter. This close similarity in mean length is suggested below to be a result of function, because whether the bipolar scaled pieces are regarded as 'fabricators' or as residual cores, in both cases a bipolar becomes too small to be usable at a length of about 2cm.
**Antiquity and distribution:** Most of these bipolar scaled pieces are found in the younger Australian industries, characterised by Mulvaney (1969:107) as 'the small tool phase', which was marked by the introduction of small tools such as backed blades some 6000 years ago. However, bipolar scaled pieces were present at Green Gully before 8000 BP (Wright, 1970:88-9), and also occurred in the pre-Bondaian levels of site 3 at Capertee (McCarthy, 1964:238). Scaled pieces therefore pre-date the 'small tool phase' in Australia, and appear to be of some antiquity. They have also been found in Tasmania, which was isolated from 'the small tool phase' of mainland prehistory. However the Tasmanian bipolar pieces are very different from the mainland ones described above. They are made on pebbles of chalcedony or petrified wood, and are much larger than the mainland examples, having a mean length of 39.1mm. (ra. 25-49), breadth 34.2mm. (ra.20-41), thickness 14.6mm. (ra.5-30). Thus the only feature these Tasmanian bipolars have in common with the mainland ones is the use of the hammer and anvil bipolar technique (Brimfield, 1968:691-3).

The scaled pieces are generally associated with the use of quartz, the intractable nature of which makes the hammer and anvil percussion technique often the only means of breaking up the quartz pebbles. The bipolar technique has been pointed out by Breuil and Lantier (1965:63) as the only method of 'reducing an entire block of quartz to small pieces'.

Quartz is a widespread and readily available stone material, with a high degree of hardness and a sharp cutting edge. It is therefore not surprising that it has long been utilized in different parts of the continent.

In other parts of the world scaled pieces have been found as widely separated geographically and chronologically as in Sinanthropus Locality 1 at Choukoutien, Peking (Pei, 1939), Upper Palaeolithic levels in the caves of Wales (Sollas, 1913), France (de Sonneville-Bordes, 1960), and South Africa (Clark, 1958) and the Epi-Palaeolithic of the
Sahara (Tixier, 1963). Three particular studies have been made of the hammer and anvil technique and the resulting scaled pieces. The first was by Bardon and Bouysonie (1906), the second by Van Riet Lowe (1946) and the third by J.P. White (1968). The most striking feature to emerge from these studies is the extremely widespread occurrence of the bipolar technique both in space and time.

Function of bipolar scaled pieces

a) Fabricators: Leakey has proposed (1931:98, 130) that they were unretouched flakes used as hand-held tools to back blades and retouch scrapers, which resulted in bruised edges. The existence of rounded coroid examples, however, does not fit in with this theory, and the use of pièces esquillées, especially in quartz, for the manufacture of blades, is rejected by Tixier from his study of the Maghrebin Epipalaeolithic (1963:146). He still believes, however, that the scaled pieces are tools, the bruised edges resulting from use for some unknown function.

In Australia there is no known case of the use of such scaled pieces by Aborigines. And if their main function was to act as 'fabricators' or 'punches' in retouching other stone artifacts, they should be found in association with trimmed artifacts. Instead at sites such as Sassafras I and II and Currarong I they occur in an inverse proportion to retouched artifacts, such as backed blades. There is a possibility, however, that quartz bipolars were produced in the process of manufacturing, not backed blades, but ground-edge axes. F.P. Dickson has been doing some experimental work on the technology of quartz (see Appendix XIII), and recently stated (pers.comm.):-

'If one wants to produce a pecked surface on stone or to do some fine dressing, as on an axe preparatory to grinding, a lump of quartz broken from a sizeable pebble and driven with a hammerstone is very suitable. After a bit of use in which plenty of chips fly off it, the quartz is reduced to a typical bipolar of 2cm. or so... At that stage one discards it because it is
'too short to hold without risk that it crumbles enough for the hammerstone to make painful contact with the fingers. The way a bit of quartz breaks at the end under impact makes it very suitable for pecking, as most other kinds of stone become too rounded to make sharp indentations'.

If most of the bipolar scaled pieces of quartz were the by-product of the manufacture of axes, one must hypothesize that there was a great increase in the number of axes in the Southern Uplands during the last two thousand years or so, when bipolar scaled pieces become predominant in the local occupation deposits. Alternatively the efficiency of quartz for this function may have formed a new discovery.

The few axes that have been found in dated archaeological contexts in Australia all belong to the last six millennia, except for the small, pecked edge-ground axes found at Oenpelli by C. White (1967b:149-52), which are indisputably of Pleistocene age (c. 18,000 - 23,000 BP). Ethnographic evidence shows that at the time of first European contact a stone axe was a normal part of every adult male's equipment, and evidence of the re-sharpening of their cutting edges is attested by the axe-grinding grooves found so widely in sandstone areas, and the whetstones found elsewhere. It seems quite possible, therefore, that at least some bipolar scaled pieces of quartz were produced in the process of hammer-dressing ground-edge axes, as Dickson suggests from his own technological experience.

b) Knives/Chisels: Some scaled pieces bear clear signs of use-wear in the form of polish, but their numbers are small. None were found among the specimens from Sassafras I and II or the Canberra region; at Burrill Lake two examples occurred amongst the 34 scaled pieces, and at Currarong there were 4 out of 126 (Lampert, 1971b:46-7). It may be significant that use-polish occurred along the un-scaled margins. This suggests that the scaled margins were not produced by use, but rather that a scaled piece was subsequently utilized as a tool. The type of polish and striations most closely resembles that
found by Semenov (1964:109) on knives for cutting bone or wood, and Lampert suggests that they were end-hafted on the end of a spear-thrower.

Bone or wood-working was the function proposed by Semenov for similar pièces écaillees from European Upper Palaeolithic sites:

'Specialised tools (pièces écaillees) have been found on upper palaeolithic sites, consisting of flakes and even blades with wear facets on both faces. The facets as a rule have a wavy surface with sharp short flaking line and commonly a steep fracture. The character of the facets indicates that they arose not from pressure retouch but by direct blows into the flake in a vertical position on a hard base, and the facets are best regarded as signs of use, not as trimming. There are grounds for considering such flakes and blades as chisels or gouges for working bone and probably wood' (1964:148-9).

This bone-working function accords very neatly with Mulvaney's hypothesis that the late prehistoric period in Australia was marked by a 'degeneration' in stone craftsmanship, explained as 'a trend away from stone supplies towards the substitution of local organic raw materials' (1969:91). However, it does not explain why scaled pieces are so numerous in the upper levels of some sites and totally absent in others.

c) Residual cores: The evidence that bipolar scaled pieces are residual cores is as follows:-

(i) J.P. White observed percussion flaking in the Western Highlands of New Guinea and recorded nodules of flint being shattered by the bipolar technique, the nodule being held vertically on a stone anvil and pounded with a heavy stone until it broke (White, 1968:661). A strip of bark was sometimes wrapped round the nodule before flaking, serving to direct the force of the hammer blow down the core to produce long thin flakes and to keep the flakes from scattering, and enabling small pieces of stone to be flaked to produce the preferred fine thin flakes less than 3cm. long. The object in this case was the production of the flakes,
and the bipolar cores which resulted were merely a by-product of manufacture, and were not utilized, but thrown away on a pile of waste stone.

(ii) Experiments with the knapping of quartz, described by F.P. Dickson in Appendix XIII, show that the hammer and anvil technique is the most efficient, and sometimes the only means of producing flakes from a lump of quartz, and that the by-product of this manufacturing process is one of more bipolar scaled cores, which become too small to work when they have been reduced to a length of about 2cm. and a weight of about 10-30 grammes.

(iii) At Sassafras I and II and at sites in the Canberra region specimens have been found which demonstrate every stage of manufacture, from the first slight bipolar percussion of a quartz pebble to the final decorticated scaled core with heavily battered opposed margins (see fig. 30).

(iv) There is also a close correlation in the excavated sites between the presence of bipolar scaled pieces of quartz and that of large numbers of small flakes of the same material. This is seen at Yankee Hat I and II, Tidbinbilla I, Rendezvous Creek, and particularly clearly at Sassafras I and II. The percentage of quartz flakes also increases at the same time as that of quartz scaled pieces in the middle level of Currarong I (Lampert, 1971b: 45), and at Lapstone Creek, where the most recent period was marked by a significant increase in the number of scaled pieces and 'an enormous increase in the quantity of knapped quartz pebbles and flakes although very few of the latter show any signs of use' (McCarthy, 1948:22).

(v) At other recent sites like Durras North, the absence of small simple flakes was accompanied by the absence of bipolar scaled pieces (Lampert, 1966).

(vi) Classification of quartz scaled pieces as cores provides the otherwise missing core component for the large numbers of small quartz flakes in the recent assemblages of the Southern Uplands sites.
(vii) The very small size of the quartz flakes fits the suggestion that they are derived from small cores, which measure about 2cm. in length after débitage.

The results of analysis of a sample of 725 quartz flakes from Yankee Hat I and II are given below. Since the quartz waste from the Gudgenby, Tidbinbilla and Sassafras sites was all of similar appearance, I think the results may be taken as typical of all these quartz industries. An average breadth/length ratio of 0.76 was obtained by Hume on a sample of 1030 quartz flakes from Sassafras I (1965:68), but unfortunately he did not put the mean length or breadth on record.

Table 14.4 Size of quartz flakes at Yankee Hat I and II.

<table>
<thead>
<tr>
<th></th>
<th>Small (5-15mm.)</th>
<th>Medium (15-20mm.)</th>
<th>Large (&gt;20mm.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Horizon</td>
<td>278 (50%)</td>
<td>182 (33%)</td>
<td>95 (17%)</td>
<td>555</td>
</tr>
<tr>
<td>Lower Horizon</td>
<td>110 (65%)</td>
<td>36 (21%)</td>
<td>24 (14%)</td>
<td>170</td>
</tr>
<tr>
<td>Total</td>
<td>388 (53%)</td>
<td>218 (30%)</td>
<td>119 (16%)</td>
<td>725</td>
</tr>
</tbody>
</table>

Function of the unmodified quartz flakes: The obvious use of large numbers of small quartz flakes produced by percussion flaking is as stone barbs on death-spears, as suggested by Lampert (1971b: 46) and the ethnographic evidence (described in chapter 5) from the Southern Uplands supports this hypothesis. What is more problematic is whether the backed blades, which the quartz industry replaced at Sassafras and other upland sites, were also used as spear-barbs, and this question is investigated later in this chapter.

Relationship of flakes to scaled pieces: The ratio of unmodified flakes to knapped bipolar cores recorded by White in New Guinea
(1967:125-6) was utilized by Lampert to distinguish between manufacturing and non-manufacturing situations in the Currarong sites (1971b:44). Averaging White's figures for 5 cores gives a ratio of 23 usable flakes and 175 waste flakes to each core, from which one can derive a core/flake percentage of 0.5%. However, the New Guinea cores were of chert and extremely large (weighing an average of 223 grammes after flaking), and the results of this small sample are certainly not applicable to sites where all or some of the material is of quartz.

The ratio of cores to unmodified flakes in quartz and in other stone materials at sites in the Southern Uplands was shown in table 13:1. There it will be seen that the ratio of quartz bipolar pieces to quartz flakes ranges between 1:19 and 1:31 (4-3%). The ratio of non-quartz cores to flakes is very similar, ranging from 1:21 to 1:28 (4.7-3%). Experiments were undertaken by F.P. Dickson to test this suggestion that about 20-30 quartz flakes were derived from each bipolar core. These are fully reported in Appendix XIII and the results can be summarised as follows:

a) No such regular numerical relationship between quartz cores and flakes was apparent, the number of flakes from one core varying widely according to the size and fracturing qualities of the original lump.

b) Bipolar cores can disappear without trace by one extra blow, or their numbers be increased by longitudinal splitting of one core into two.

It seems, then, that in spite of the consistency of the ratios on table 13:1, little weight can be attached to the exact number of quartz bipolar pieces to flakes in a deposit.

Conclusion: Bipolar scaled pieces were probably produced by a variety of activities such as stone, wood or bone-working or as a by-product of primary flaking, and are extremely widespread geographically and temporally. However, when they comprise the main artifact type in an
assemblage, one may be able to establish their function from their associations. In the case of the most recent stone industry of the Southern Uplands, the most economic explanation is that they are the by-product of the manufacture of large quantities of small flakes destined to form rows of stone barbs on death spears.

II. Backed Blades

The backed blades in the Southern Uplands can be divided into three categories: Asymmetric backed blades of the type known as bondi points, geometric microliths, and eloueras (cf. chapter 12). In making the division between the first two categories I used firstly only subjective criteria of shape and size, but these were substantiated by the metrical analysis, which showed all my bondi points to be differentiated from the geometric microliths by having a length/breadth ratio of more than 2:1. Glover established this as a useful distinguishing criterion among the backed blades from Western Australia (1967:419), and Lampert found that it accorded with his subjective classification of the Currarong backed blades (1971b:42).

However factor analysis of backed blades from Currarrang suggested that bondi points and geometric microliths might be the two ends of a continuous range rather than two independent types (Glover, 1969). The backed blades from Currarong generally supported this hypothesis, although the sample was small and there was a hint of a bimodal distribution for length (Lampert, 1971b:42). Unfortunately, the number of geometric microliths in the Southern Uplands is too small to shed any light on this question of the unitary or binary nature of the varieties of backed blade.

However, the four examples of geometric microliths that occur in the lower horizon of Yankee Hat II are remarkable for their small size, averaging 11.2mm. in length (ra. 10.5-13.0), 6.5mm. in breadth (ra. 5.0-7.0), and 2.6mm. in thickness (ra. 2.0-3.0), with a mean length/breadth ratio of 1.73:1.
The bondi points are the most numerous variety of backed blades in the Southern Uplands, and their characteristics are compared with assemblages elsewhere in Table 14:5 below.

Table 14:5. The Parameters of Bondi Points in Nine Australian Industries

<table>
<thead>
<tr>
<th></th>
<th>Length (mm.) x Range</th>
<th>Breadth (mm.) x Range</th>
<th>B:L Ratio x Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidbinbilla</td>
<td>23.7 (15-33)</td>
<td>8.3 (6-13)</td>
<td>1:2.8</td>
</tr>
<tr>
<td>Yankee Hat</td>
<td>(N=19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sassafras¹</td>
<td>24.0 (16-36)</td>
<td>8.5 (6-12)</td>
<td>1:2.9</td>
</tr>
<tr>
<td>(N=35)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curracurrang¹</td>
<td>22.7 (15-44)</td>
<td>8.1 (5-13)</td>
<td>1:2.8</td>
</tr>
<tr>
<td>(N=57)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curra rong³</td>
<td>22.5 (14-29)</td>
<td>8.6 (7-12.5)</td>
<td>1:2.7</td>
</tr>
<tr>
<td>(N=14)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bobadeen²</td>
<td>19.0 (6-49)</td>
<td>7.2 (3-13)</td>
<td>1:2.6</td>
</tr>
<tr>
<td>(80 quartz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sandy Hollow²</td>
<td>25.0 (13-46)</td>
<td>7.0 (5-14)</td>
<td>1:3.5</td>
</tr>
<tr>
<td>(N=58)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lapstone Creek¹</td>
<td>28.0 (20-41)</td>
<td>9.0 (6-13)</td>
<td>1:3.1</td>
</tr>
<tr>
<td>(N=63)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millstream¹</td>
<td>28.4 (19-43)</td>
<td>8.0 (5-11)</td>
<td>1:3.6</td>
</tr>
<tr>
<td>(N=51)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pialligo⁴</td>
<td>30.6 (18-49.5)</td>
<td>8.9 (6.5-18)</td>
<td>1:3.6</td>
</tr>
<tr>
<td>A.C.T.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Data from Glover (1967:424)
²Data from Moore (1970:53)
³Data from Lampert (1971b:43)
⁴Data from Bindon (1973).

This comparison shows that the bondi points of the Southern Uplands fall in the middle of the size range of this artifact type in Australia, between the tiny examples (mainly of quartz) from Bobadeen in the Hunter valley, and the huge specimens from Pialligo. T-tests between the Tidbinbilla- Yankee Hat sample and those from Curra rong showed there to be no significant difference between the means in length and breadth. However, the significant difference between the Pialligo specimens and those from
Tidbinbilla only 30 kilometres away (19 miles) suggests that, amongst morphologically identical artifacts, we should not attach too much importance to size differences. In this case the size difference seems due to the very different nature of the raw material at the two sites, those at Tidbinbilla and Yankee Hat being made on chert blades, and those at Pialligo on long flakes of silicified mudstone.

**Backed Blades: Function**

The function of the backed blades is still a matter of contention. At Fromm's Landing Shelter 2 (Mulvaney, 1960: 79), in the New England region (McBryde, 1968:8), and in the Hunter valley sites north of Sydney (Moore, 1970:59), the presence of gum along the thick margin of some backed blades has clearly demonstrated that they were hafted.

**Cutting tools?** A significant percentage of the Hunter valley bondi points (between 14% and 18%), both quartz and non-quartz, had traces of use-wear and/or retouch along the chords (*ibid*). This suggests that they may have been a general purpose cutting tool. Use-wear has also been found by McCarthy on 16 out of 186 (8%) bondi points at Lapstone Creek and 275 out of 2340 (11%) from the south coast of New South Wales (McCarthy & Davidson, 1943).

It may be, therefore, that some bondi points were mounted on saw-knives, with the blunted back set in the adhesive and the chord as the working edge, in the same way that geometric microliths were found mounted in series in Europe (cf. Oakley, 1963:68, fig.39b). Such tools would have resembled the *Taap* saw-knife (McCarthy, 1967:34-5, fig.12), found in the south-west of Australia and used for cutting flesh off carcases. The stone teeth on museum specimens of *Taap* saw-knives are untrimmed chips of stone, but it is possible that in earlier times backed blades were used. Such a function would account for the use-wear and polish found on the chords of some backed blades. The presence of use-wear/retouch on a high percentage of the very small
quartz bondi points, average length 19mm., from Bobadeen in the Hunter valley (Moore, 1970:52-3) suggests a possible correlation between small quartz backed blades and a cutting function, which would be worth further examination.

Spear Barbs? On the other hand it has long ago been suggested that backed blades were set in gum and hafted as spear barbs or points (McCarthy, 1943: 149, 1967:42, 44, 47; Mulvaney, 1960:79-80). Factors in favour of this view are:

1. Enormous numbers of backed blades occur on some sites. Over 1000 were found at Curracurrang, and 20,000 in a restricted area west of Lake Torrens (Mulvaney, 1969:124). These large numbers can easily be accounted for if their function was to form part of a row of as many as 22 barbs on a spear, as has been recorded on a specimen in a European collection by Mulvaney (1969:93). Moreover, it has been suggested on the basis of the recorded row lengths, (allowing about 1" = 2.6cm. for each flake) that spears might have as many as 36 stone barbs (Etheridge and Whitelegge, 1907:244).

All the flakes hafted as barbs on the extant death spears are untrimmed, but this does not mean that they must always have been untrimmed. There is evidence to show that early twentieth, and even nineteenth century Aborigines were totally unaware of the function or even existence of such finely-made tools as the backed blades, which suggests that they went out of use a considerable time ago in those areas (cf. Flood, 1970:48).

2. The change demonstrated at Sassafras and suggested at Yankee Hat, from an earlier backed blade industry based on silcrete-chert to a later bipolar industry producing large numbers of small, mainly quartz, flakes requires an explanation. The most economic explanation is that both industries were aimed at producing stone barbs for death-spears. The technological change-over was the result not of decadence, but of a series of discoveries. These, I would suggest, were firstly that quartz was a harder and
sharper material for spear barbs than quartzite, but that it generally had to be worked by the hammer and anvil method, of which the bipolar artifacts were the by-products; secondly, that trimming the back of the flake was unnecessary. The latter discovery could have resulted from a change in hafting techniques from an earlier method of setting backed blades in a groove cut in the shaft (the blades being backed to avoid their sharp edges splitting the shaft) as seen on European specimens (e.g. Oakley, 1963:fig.39b), to a later technique of unbacked small flakes set in gum on an un-grooved shaft, as seen on death-spears in ethnographic collections (cf. fig.8).

3. At Sassafras broken backed blades were generally represented by their butts alone, being snapped off approximately halfway along the length of the blades. Out of 317 backed blades in Hume's Pit R, 146 were broken in this way (Hume, 1965:28). This preponderance of butts among the broken blades suggested that the artifacts were used for an activity likely to cause transverse snapping, whereupon the tool would be brought back to the shelter for rehafting. This equates with a function as a spear-barb much better than with a wood-working tool.

**Distribution of Backed Blades:** The distribution of the microlithic blade industries does not exactly coincide with the distribution of death-spears, although both are found in the south-east of the continent and in the south-west of Western Australia. The main difference lies in the total absence of bondi points or geometric microliths in the northerly part of the continent, as seen on Mulvaney's map (1969:123). There are no reliable records of their occurrence north of the Tropic of Capricorn, the find spots on Mulvaney's map at Wave Hill and north of Lake Mackay being based on one or two doubtful examples (Glover, 1967:415). Excavations on Cape York and in the Oenpelli and Katherine regions of the
Northern Territory have not produced a single backed blade, which must be regarded as strong negative evidence.¹

One explanation for this difference in distribution of the backed blades and death-spears might be that the death-spears diffused into northern Australia from the south and west after the change had been made from finely-trimmed microlithic backed blades to untrimmed flakes as the barbs. At Fromm's Landing shelter 2 on the River Murray the latest geometric microliths dated to before $3240 ± 80$ BP (Mulvaney, 1960:78), but 4 backed points (3 of them of milky quartz) in the top four levels show evidence of cultural continuity, and the presence of some 1300 waste flakes (77% of them of quartz) show both that stone was still being worked at this time, and that quartz was an important raw material. If it was during this latest phase that death-spears diffused into northern Australia it is understandable that no microlithic backed blades have been found there.

On the south-east coast of Australia the decline in numbers of the bondi points and geometric microliths occurred rather later, apparently around 2000 years ago at Sassafras and Currarong (see Table 15:2). At some sites on the tablelands they lasted until 500 years ago or less, as shown on Table 15:1. However, the prehistoric culture contacts of the north within Australia appear to have been with the south rather than with the east, since pirri points are found in northern and south-central Australia, but not in the eastern coast. I therefore tentatively suggest that the death-spear diffused into northern Australia from somewhere west of the Great Dividing Range after the decline of the microlithic backed blade industries. Thus one can account for the presence of death-spears but lack of bondi points and geometric microliths in northern Australia. Such an interpretation is also consistent with Davidson's view that 'the death-spear is apparently quite an ancient weapon...It seems likely that it followed the plain spear, its foundation, and that it/

¹The large use-polished eloueras are trimmed on the back, but are a quite distinct tool type from bondi points and geometric microliths.
preceded barbs cut in the solid [wood] which it outflanks in distribution in several regions" (1934:149).

Summary: I propose that the majority of the microlithic backed blades were hafted as spear barbs, on the evidence of their very large numbers, the nature of broken specimens, and their apparent replacement at Sassafras and Currajong by unmodified flakes of quartz which were the armament of the death-spears encountered by the first Europeans in Australia.

The presence of use-polish and retouch along the chords of some microlithic backed blades suggests that some also served as general purpose cutting or scraping tools but the percentage of those exhibiting use-wear is generally small. It would be interesting to see whether the presence of use-wear correlates with small size, material (such as quartz), or geometric rather than asymmetric shape.

It is possible that the microlithic elouera, bondi points and geometric microliths each have different functions. If the function of the elouera was a general wood or bone-working tool and the others were spear-barbs, this would explain the use-wear frequently found on the chord and continued use of the elouera into the uppermost levels at sites such as Lapstone Creek (McCarthy, 1948) and Currajong (Megaw, 1965; 1968a), whereas the other backed blades tended to be replaced by unmodified flakes. The geometric microliths and bondi points seem to have a similar distribution in time, but bondi points predominate in eastern New South Wales and geometric microliths in Victoria. If they are, as Glover suggested (1969), the two ends of a continuous range rather than two independent implement types, their varying occurrence could be interpreted as merely the expression of regional preferences. If, however, they have different functions, these remain to be established by much further microscopic examination and practical experimentation.
The Prehistoric Cultural Sequence of the Canberra-Monaro Region

Before discussing the prehistoric sequence of industries in the Canberra-Monaro region, an outline is given of the Eastern Regional Sequence of the east coast of Australia, proposed by McCarthy (1948; 1958b) and recently revised by Lampert (1971a and b). The location of the mentioned sites is shown on fig. X, bibliographical references will be found on Table 15:2, and tool types which occur in the Southern Uplands are illustrated in figures 26 and 30.

1) Pre-Bondaian Period (= McCarthy's Capertian)

This industry has large amorphous scrapers as its largest component, but some saw-edged flakes occur at Burrill Lake, Curracurrang and Capertee, some horse-hoof core-scrapers at Burrill Lake, Curracurrang and Kenniff Cave, and some unifacially worked pebble tools at Burrill Lake, Curracurrang, Capertee, and at Seelands. The basal levels containing this industry are dated at Burrill Lake to c. 20,000 BP, at Keniff Cave to c. 19,000 BP (Mulvaney, pers.comm.) and at Capertee and Curracurrang to c. 7,400 BP.

2) Bondaian Period

The beginning of this period is characterized by the introduction of small tools, especially the asymmetric bondi point, which add to, but do not entirely replace, the existing tool kit. At Capertee, Seelands, Kenniff Cave and Burrill Lake there seems considerable continuity of tool types into the Bondaian period, and at Seelands the pebble tools continue from the basal levels at c. 6,500 BP, through the Bondaian into the post-Bondaian period.
The Bondaian period lasted several thousand years. In New England backed blades appeared at Graman (Bl) about 5,500 years ago and lasted at the nearby Bendemeer site till about 500 years ago (McBryde, 1966a:285-6). At Burrill Lake, and in the Hunter valley, the first appearance of backed blades was also dated to more than 5000 years ago, and on Wilson's Promontory on the southern tip of southeastern Australia geometric microliths were present before 4000 BP (Coutts, 1970:99). The waning of the Bondaian period has been dated to about 2000 BP at Currajong, 1800 BP at Currajong, and to 500 BP or less on the New England tablelands and the Upper Hunter Valley.

3. Post-Bondaian Period (= McCarthy's Eloueran)

The disappearance or marked decrease of bondi points and geometric microliths characterizes this period, rather than any diagnostic tool type. At Lapstone Creek, the type site for the 'Eloueran', and at Currajong 1CU5/-, their decrease was accompanied by a significant increase in eloueras, which are likewise backed blades but "generally larger and probably functionally different from the bondi points and geometric microliths of the middle phase" (Lampert, 1971a:119). However, at other sites such as Currajong and Gymea Bay, bipolar scaled pieces (= fabricators) were the predominant artifacts in the final phase, which lasted till the time of European settlement. On coastal sites such as Durras North fish hooks of shell, stone fish-hook files, and bone points characterized the post-Bondaian period.

The Canberra-Monaro region

Pre-Bondaian?: Of the three phases of the Eastern Regional Sequence outlined above, the earliest pre-Bondaian phase has so far not been discovered on the Southern Tablelands or the Monaro. The chronology of cultural sequence revealed by the excavations in the Southern Uplands is summed up in Table 15:1 below.
shows that no site so far discovered on top of the coastal ranges or on the tablelands goes back more than 4000 years. At Sassafras I there is only one backed blade (a geometric microlith) in the upper part of the 35 cm. of deposit below the main Bondaian levels, but since the small amount of occupation material could account for this lack of artifacts and there are no signs of any pre-Bondaian tool types, there are no grounds on which to assign this basal occupation to the pre-Bondaian period. However, nine excavations in a region of 100,000 km$^2$ (60,000 square miles) is a small sample. Moreover all but one of these excavations were of rock-shelters, so that if early occupation tended to be in the open rather than in shelters, it could well be still undiscovered.

It was partly for this reason that I undertook an analysis of the artifacts from all the known open sites in the region, even although there was no means of dating the majority of these. Amongst over 2000 pieces of modified stone from 25 camp-sites there were none of the horse-hoof cores found in the pre-Bondaian levels at Burrill Lake and at the 26,000 year old Mungo site in Western New South Wales. There were a few steep-edged scrapers (13 out of 576 scrapers) slightly reminiscent of Tasmanian ones (cf. Jones, 1971) but their sparse occurrence in such a large sample could be merely the result of variation on the very numerous low-angled scrapers.

There are thus no indications so far of the presence of a pre-Bondaian industry in the Southern Tablelands region. Moreover, the Southern Tablelands Bondaian assemblages suggest a late occupation of the region, perhaps from an area and/or at a time where and when the local Bondaian culture had lost recognisable signs of any pre-Bondaian element.

**Bondaian period:** The Bondaian period in the Canberra region is remarkable for its long duration, comparing more closely in this respect with the Hunter valley and New England sites than with the coastal
sequences. On the coast the mid-point of a gradual transition from backed blades to scaled pieces as the diagnostic artifact was dated to 1970 ± 80 BP at Currarong I (Lampert, 1971b:34). Dates for the same transition at Sassafras (56km. inland) are broadly compatible with the Currarong date. At Sassafras II the uppermost layer containing backed blades gave a date of 2780 ± 115 BP. At nearby Sassafras I the lowest level in which scaled pieces and quartz flakes were markedly predominant over backed blades was dated to 1695 ± 90 BP. All this evidence points to a very gradual transition, spanning perhaps a thousand years.

The Lapstone Creek rock-shelter, some 160km. (100 miles) to the north, shows a definite transition from a Bondaian period (with a midpoint dated to 3650 ± 100 BP) to a post-Bondaian period lacking backed blades but characterized by great increases in the number of eloueras and scaled pieces. The early to middle-point of this post-Bondaian period has been dated to 2300 ± 100 BP1 (Polach et al., 1967:20). Backed blades were present at 3060 ± 100 BP but absent by 1260 ± 90 BP on Wilson's Promontory, on the southern tip of south-east Australia (Coutts, 1967a, b).

Most of the other dates tabulated on Table 15:2 fit in with this general picture of a decline in the production of backed blades (except the elouera) taking place between about two and a half and one and a half thousand years ago. However, at several sites they continued. Most noticeable among these are the New England and Upper Hunter sites, where backed blade production continued unabated till 500 years ago or less. At Sassafras I and in the Canberra region the backed blades also continue till very recent times, but in small numbers with scaled pieces and unmodified

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1The radiocarbon dates for Lapstone Creek were run on samples collected many years previously, and the dates can only be approximately correlated with the original excavation spits.
### TABLE 15:1  Chronology of excavated sites in Canberra region.

<table>
<thead>
<tr>
<th>ARTIFACTS</th>
<th>SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backed blades</td>
<td>Scaled</td>
</tr>
<tr>
<td>370 ± 60 BP (ANU-1047)</td>
<td>Basal date. (✓) ✓ Tidbinbilla I</td>
</tr>
<tr>
<td>550 ± 60 BP (ANU-1048)</td>
<td>- ✓ Yankee Hat 2</td>
</tr>
<tr>
<td>770 ± 140 BP (ANU-1051)</td>
<td>Transition from backed-blades to scaled pieces. - ✓ Yankee Hat 2</td>
</tr>
<tr>
<td>760 ± 110 BP (ANU-1060)</td>
<td>Upper backed blade horizon. ✓ - Nardoo</td>
</tr>
<tr>
<td>1000 ± 60 BP (ANU-1050)</td>
<td>Basal date. Associated with moth-pounder. ✓ - Bogong Shelter 2</td>
</tr>
<tr>
<td>1600 ± 60 BP (ANU-1049)</td>
<td>Base of shallow deposit. ✓ ✓ Caddigat, Monaro</td>
</tr>
<tr>
<td>1695 ± 90 BP (ANU-741)</td>
<td>Scaled pieces. Early quartz period. (✓) ✓ Sassafras 1</td>
</tr>
<tr>
<td>2780 ± 115 BP (ANU-744)</td>
<td>End of backed blade predominance. ✓ (✓) Sassafras 2</td>
</tr>
<tr>
<td>3090 ± 95 BP (ANU-742)</td>
<td>Early backed blade period. ✓ (✓) Sassafras 1</td>
</tr>
<tr>
<td>3770 ± 150 BP (ANU-743)</td>
<td>Basal date of occupation. (✓) - Sassafras 1</td>
</tr>
</tbody>
</table>

**Key:** ( ): present in very small numbers. 
Underlined: the date is associated with the underlined tool type.
<table>
<thead>
<tr>
<th>Date B.P.</th>
<th>Site</th>
<th>Zone</th>
<th>Backed blades</th>
<th>Eloueras</th>
<th>Bipolar scaled pieces</th>
<th>Untrimmed flakes</th>
<th>Bone points</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern</td>
<td>Currajong ICU5-N.S.W.</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Megaw, 1965, 1968a</td>
</tr>
<tr>
<td>351 ± 90</td>
<td>Seelands, New England</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1966a</td>
</tr>
<tr>
<td>370 ± 45</td>
<td>Cape Otway 2, Victoria</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Mulvaney 1962</td>
</tr>
<tr>
<td>370 ± 60</td>
<td>Tidbinbilla, A.C.T.</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>410 ± 40</td>
<td>Bendemeer 1, New England (latest b. blades)</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1966a</td>
</tr>
<tr>
<td>480 ± 80</td>
<td>Durras North, N.S.W.</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Lampert 1966</td>
</tr>
<tr>
<td>530 ± 80</td>
<td>Sandy Hollow, Hunter Valley</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Moore 1970</td>
</tr>
<tr>
<td>550 ± 60</td>
<td>Yankee Hat 2, A.C.T.</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>630 ± 60</td>
<td>Milbrodale, Hunter Valley</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Moore 1970</td>
</tr>
<tr>
<td>730 ± 70</td>
<td>Bobadeen, Hunter Valley</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>770 ± 140</td>
<td>Yankee Hat 2, A.C.T. (transition from b. blades)</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>760 ± 110</td>
<td>Nardoo, N.S.W.</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>840 ± 90</td>
<td>Currajong ICU5-N.S.W.</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Megaw 1965, 1968a</td>
</tr>
<tr>
<td>900 ± 150</td>
<td>Wattamolla, N.S.W.</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Megaw</td>
</tr>
<tr>
<td>1000 ± 60</td>
<td>Bogong Shelter, A.C.T.</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>1220 ± 55</td>
<td>Gymea Bay, N.S.W.</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Megaw 1966</td>
</tr>
<tr>
<td>1260 ± 60</td>
<td>Wilson's Promontory, Victoria</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Coutts 1967</td>
</tr>
<tr>
<td>1600 ± 60</td>
<td>Caddigat, Monaro, N.S.W.</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>1695 ± 90</td>
<td>Sassafras 1, N.S.W.</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>1680 ± 100</td>
<td>Burrill Lake, N.S.W.</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Lampert 1971b</td>
</tr>
<tr>
<td>1930 ± 80</td>
<td>Currajong ICU5-N.S.W.</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Megaw</td>
</tr>
<tr>
<td>1980 ± 80</td>
<td>Lapstone Creek, N.S.W. (transition from b. blades)</td>
<td>C</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Lampert 1971b</td>
</tr>
<tr>
<td>2300 ± 100</td>
<td>Lapstone Creek, N.S.W. (transition from b. blades)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McCarthy 1948, Polach et al. 1967</td>
</tr>
<tr>
<td>2550 ± 90</td>
<td>Kenniff Cave Queensland, (latest b. blades)</td>
<td>WS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Mulvaney and Joyce 1965</td>
</tr>
<tr>
<td>2780 ± 115</td>
<td>Sassafras 2, N.S.W. (latest b. blades)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>2865 ± 60</td>
<td>Capertee 3, N.S.W. (Upper Bondaian)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McCarthy 1964, Berrington 1966</td>
</tr>
<tr>
<td>2950 ± 91</td>
<td>Fromm's Landing 6, S.A. (latest b. blades)</td>
<td>R</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Mulvaney 1964</td>
</tr>
<tr>
<td>3060 ± 100</td>
<td>Wilson's Promontory, Victoria</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Coutts 1967</td>
</tr>
<tr>
<td>3500 ± 95</td>
<td>Sassafras 1, N.S.W. (early b. blades)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Flood 1973</td>
</tr>
<tr>
<td>3650 ± 100</td>
<td>Lapstone Creek, N.S.W. (mid-Bondaian)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McCarthy 1948, Polach et al. 1967</td>
</tr>
<tr>
<td>3600 ± 93</td>
<td>The Tombs, Queensland (3830 ± 90 at Kenniff C.)</td>
<td>WS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Mulvaney and Joyce 1965</td>
</tr>
<tr>
<td>3625 ± 70</td>
<td>Capertee 3, N.S.W. (pre backed blades)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McCarthy 1964, Berrington 1966</td>
</tr>
<tr>
<td>3770 ± 150</td>
<td>Sassafras 1, N.S.W. (earliest occupation)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Mulvaney and Joyce 1965</td>
</tr>
<tr>
<td>3920 ± 90</td>
<td>Wilson's Promontory (early b. blades)</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1966b</td>
</tr>
<tr>
<td>4040 ± 65</td>
<td>Seelands, New England (earliest b. blades)</td>
<td>I</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1967</td>
</tr>
<tr>
<td>5150 ± 170</td>
<td>Bobadeen, Hunter Valley (earliest b. blades)</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1967</td>
</tr>
<tr>
<td>5320 ± 150</td>
<td>Burrill Lake (earliest b. blades)</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1968</td>
</tr>
<tr>
<td>5450 ± 100</td>
<td>Graman Bl, New England (earliest b. blades)</td>
<td>T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>McBryde 1968</td>
</tr>
</tbody>
</table>

C = Coastal  I = Inland  T = Tableland  R = Riverine  WS = Western Slopes  Q = Predominately Quartz  (✓) = Present in small numbers
quartz flakes predominating. At Yankee Hat II the transition has been dated to about 770 years ago.

An explanation for the late occurrence of backed blades on the sites of the New England and Southern Tablelands is that innovations were late coming there, so the old tools lingered on amongst the 'conservative hill people'. The Upper Hunter valley sites with their large numbers of sophisticated but 'late' backed blades fit with this hypothesis, if they are regarded as upland rather than coastal sites, and their position 200-250km. inland and almost on the watershed of the Great Divide justifies such an interpretation. However, other problems are the dates of between 800 and 900 years for upper Bondanian levels at Curracurrang ICUS/- and at Wattamolla WD/-, although the latter is unreliable because of the nature of the deposit.

While more evidence is needed before we can be absolutely sure that technological changes took place at a later date on the tablelands than on the coast, the present evidence certainly points in that direction.

Proto-historic period: This is characterized by the presence of bipolar scaled pieces and a marked increase in the exploitation of quartz in Yankee Hat I and II and Sassafras I and II. The other excavated manufacturing sites of Tidbinbilla I and Rendezvous Creek have similar assemblages but appear to belong only to this late period. At the other excavated rock-shelters there was far too little material to suggest the nature of the industry.

In the Southern Uplands, therefore, one could characterize this upper industry as the Quartz Period, or the period of unretouched flakes. The latter term would have a wider application, and could be applied to the upper levels of Currarong I, Cape Otway and Wilson's Promontory (cf. Table 15:2). It probably could also be applied to many of the other sites, but because of a tendency in excavation reports to neglect unmodified material in favour of 'the implements',
it is often difficult to obtain information on the quantity of waste flakes from different levels, and on their material. Nearly a decade ago Shawcross (1964:12) pointed out the importance of studying the whole assemblage, in situations such as those found frequently in New Zealand, Australia, and indeed, in much of the world, where secondarily retouched tools form only a small part of the stone material.

Artifacts considered to characterize this latest phase in Australian prehistory have been eloueras (McCarthy, 1948 etc.) bone points (Mulvaney, 1969:91, etc.), and bipolar scaled pieces (Lampert, 1971b:67, etc.). At Burrill Lake and Currarong all three are present in the uppermost levels, but most other sites contain only one or two of these elements in the late period.

In examining their distribution it will be noted that:

(a) Bone points: Although bone was preserved in the upper levels of sites in the Canberra-Monaro region, no bone points occurred. Bone points found on coastal sites fall into two groups (i) small unipoints and bipoints made of split bone, hafted as barbs and tips of multi-pronged fishing spears (ii) large points of unsplit macropodid fibulae probably used for sewing skins (cf. Lampert, 1966:106-10, 1971b:50-4).

The use of bone points is not confined to the protohistoric period for in the limestone shelters of the lower Murray River where there was good preservation of bone, bone points were more important earlier (c. 3750 ± 85 BP at Fromm's Landing 2 - Mulvaney, 1960) than in the most recent levels where they were rare. Their absence from the Bondaian levels on the east coast of New South Wales is not significant, since on these sites generally no organic material older than about 1500 years is preserved. Moreover they have been found at Rocky Cape in Tasmania in levels dating to 8000 BP (Jones, 1971), and one specimen occurs at Cloggs Cave, Buchan in a Pleistocene context, as will be seen in chapter 19.
(b) Eloueras: In the late horizons of many of the sites of eastern New South Wales, eloueras comprise the only secondarily retouched artifacts. They are also generally present in Bondaian levels, but their numbers increase dramatically in the late period in sites such as Lapstone Creek (McCarthy, 1948) and Curra-curra- icu5/- (Megaw, 1966). The evidence from the Southern Upland sites, slight as it is, connects eloueras with the late Bondaian or proto-historic period.

(c) Bipolar scaled pieces: Like eloueras, bipolar scaled pieces and the hammer and anvil technique were present before the late period of south-east Australian prehistory, indeed at Green Gully, Keilor, they occur before 8000 BP (Wright, 1970), but only in recent times did they become predominant in any assemblage. It seems likely that bipolar scaled pieces reflect the manufacture of small stone flakes, and eloueras the working of wooden or bone implements.

Is there a post-Bondaian period? Lampert, after coining the name, subsequently suggested that "it might be more realistic to look upon this latest phase in south-eastern New South Wales as a regional development within the Bondaian tradition" (1971:68). The continuity of artifact traditions supports this interpretation, but the latter ignores the general lack of retouched stone tools remarked in the upper horizons of sites from the lower Murray River and Southern Victoria.

I therefore suggest that change did occur in the stone industries of most of south eastern Australia within the last 3000 years. There was a move away from the retouching of stone tools to the utilization of untrimmed flakes. This change could have resulted from the discovery that flakes could be set in gum and function as efficiently as tools or spear barbs without trimmed backs, thus saving time and labour. Alternatively the realization of the greater strength and cutting power of quartz
could have led to its growing popularity, which in turn would lead (because of the intractable nature of most quartz), to the lack of retouching and the use of the bipolar percussion technique, resulting in the scaled pieces.

The latter interpretation fits the evidence from the Southern Uplands best. This would mean that the decline in the quantity of backed blades in recent prehistoric time indicates not a degeneration in craftsmanship, but a step forward in manufacturing more efficient tools with less expenditure of effort.