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Dreamtime Superhighway:
An analysis of Sydney Basin Rock Art
and Prehistoric Information Exchange.

Josephine McDonald

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

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Abstract

This research examines the prehistoric rock art which occurs in the Sydney region in coastal south-eastern Australia. The rock art is located in two distinct contexts provided by the sandstone bedrock which defines this region. Engravings, or petroglyph, sites occur in open locations. In rockshelter locations the art consists of drawings, stencils, paintings and engravings.

The principal aim of this thesis is to define a model for cultural interaction which can describe a prehistoric art system. The basis for this proposed model is information exchange theory. By perceiving art and 'style' from a functional perspective it is possible to view the region's art as a conduit for the expression of social affiliations. Depending on the level of interaction - individual, local, regional - different types of information about social interaction might be expected.

Patterns in stylistic variability are examined, with three possible sources of variability being investigated. The effects of medium, diachronic change and synchronic variability are all considered. The contemporaneity of art and occupation evidence is also investigated across the region. Four rock shelter art sites were excavated for this purpose.

Using information exchange theory, as has been developed ethnographically, it is argued that varying levels of stylistic heterogeneity reveal different types of social information. Higher levels of stylistic homogeneity demonstrated by prehistoric art can be interpreted in terms of larger-group cohesion. Higher levels of heterogeneity is interpreted as demonstrating local-group identifying behaviour. In the Sydney region, complex patterns in the levels of variability in both contexts demonstrate the nature of the contacts between language groups, as well as areas where the stresses resulting from these contacts may have been the greatest.

It is argued that the rock art in the Sydney region functioned as a prehistoric information superhighway. Through stylistic behaviour, groups around the region who were not in constant verbal contact with each other were able to communicate important social messages and demonstrate both broad-scale group cohesion and within-group distinctiveness.
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The (slightly modified) old adage that 'no woman is an island' is certainly true. This thesis would not have been possible without the assistance of many people. I would particularly like to thank my supervisor, Andrée Rosenfeld, for her support, friendship and inspiration over the years. This thesis is definitely the better for her gentle persuasion. My advisers, Isabel McBryde and (the late) Anthony Forge also generously provided experience and wisdom.

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Chapter 1

Introduction

1.1 Background

This thesis focuses on the prehistoric rock art of the Sydney Basin. The art in this region occurs in two contexts; open engraving sites and sheltered, predominantly, pigment sites. The aim of this thesis is to explore the sources of stylistic variability in these art media. Diachronic and synchronic variation are investigated, as are the effects of medium and site location. The interrelatedness of art and other archaeological evidence in the region is also a focus of this research. The contemporaneity of evidence, art and deposit, in shelter sites is examined as a means of testing assumptions about the age of the art. This work was also important for developing models about how the two art components may have functioned across this region. A model which is founded in information exchange theory is proposed for the region. This model views style in a functional as opposed to semiotic way.

The Sydney Basin is defined geologically and the study area for this research is restricted to the Hawkesbury sandstone formation (Figure 1.1). The homogeneity of the sandstone medium across this formation means that the region's boundaries can be defined objectively, if arbitrarily from a cultural perspective. The designation of the study area's boundaries on this basis means that the inherent problems of an arbitrarily defined 'style area' can be neatly avoided.

There are some basic theoretical issues which must be clarified at the outset of this analysis. The definitions used and the parameters set for this work are thus described. This chapter defines the theoretical framework for this research in terms of the following broad research issues.

What is style in rock art and what is a regional style?

What are style boundaries?

What sort of social interaction is likely to result in stylistic boundary development and maintenance?

and,

The model for testing by this research.
Figure 1.1: The Sydney Basin. The study area showing cities, major rivers and the extent of Hawkesbury sandstone.
1.2 What is style?

It is no wonder that style has been referred to as elusive, controversial and the proverbial 'black box'. It is no wonder that many debates in the archaeological literature are over the use of style in analysis, in interpretation, and in legitimation of specific archaeological viewpoints. (Conkey and Hastorf 1990:1)

The number and variety of definitions for 'style' in the archaeological literature reflect the interest in this aspect of archaeological record, and the range of approaches which have been developed to resolve problems relating to style (for instance; Ashton 1983, Binford 1962, Conkey 1978, 1990; Clarke 1978, Clegg 1978, 1981a; Davis 1986, Deetz 1965, 1968; Dunnell 1978, Flannery 1976, Franklin 1984, Hodder 1978a, McDonald 1993a; Maynard 1976, Morwood 1979, Officer 1984, 1992; Plog 1980, 1983; Sackett 1973, 1982; Whallon 1972, Wiessner 1984, 1990; and Wobst 1977). It is not the intent of this thesis to review and contrast all possible interpretations of this concept. Rather it is proposed to define how style is identified and used in this research.

The definition to be used in this research is broad. Style is the particular way of doing or producing material culture which signals the activity of a particular group of people who distinguish themselves from other, similarly constituted groups. The preferred application of this definition is that used by advocates of information exchange theory whereby style is 'that part of the formal variability in material culture that can be related to the participation of artefacts in the processes of information exchange' (Wobst 1977:321). From this perspective, style is non-verbal communication which negotiates identity (Wiessner 1990:107).

1.3 A Regional Style

Hunter-gatherer behaviour is regionally embedded. (Wobst 1983:222)

The rock art from the Sydney Basin is acknowledged as being a distinctive regional style (Franklin 1984; McCarthy 1979, 1988; McDonald 1985a, 1990a, 1991; McMahon (= Maynard) 1965; Maynard 1976; Officer 1984). What makes it distinctive and what distinguishes it from other regional styles has been addressed previously (Franklin 1984, Officer 1992, 1993; Layton 1992a). The internal variation across this region and possible causes for these are the focus of this research. However, the very presence of this regional style, and the fact that it has a generally definable extent is of some import.

What was it about the prehistoric culture in the Sydney Basin that led to the proliferation of this mode of artistic behaviour here? Why is this rock art style area surrounded by a comparative artistic vacuum (Officer 1992)? Does the advent of this geographically
extensive and yet relatively homogeneous art body signal that the operation of certain types of social mechanisms, particularly social identity signalling behaviour in relation to place, were a necessary part of survival in this region? Conversely, was the region so wealthy, resource wise, that the proliferation of artistic activity signals an extraordinary amount of leisure time (Jones 1977)?

In this region there is a proliferation of material with which one can address regional questions (Conkey 1987, Wobst 1983). Regional patterning operates multifariously and 'many important processes and institutions ... should be understood at a variety of scales of inclusion' (Conkey 1987:70). It is necessary to understand the complexity of intrasite patterning (e.g. Balme and Beck pers. comm., Frankel 1987, McDonald 1992a), the evidence from individual sites as well as localised catchment patterns (e.g. Attenbrow 1987) before regional patterning can be understood.

In the Sydney region, where there is a long history of archaeological practice (Chapter 4) there is archaeological evidence available at all of these scales. The results of more fine grained analyses at the intra-site and local levels provides a contextual complexity to the approach taken in this research overall. Various small scaled analyses (e.g. Attenbrow 1987, Attenbrow and Negerevich 1984, McDonald 1986a, 1988a; Officer 1984; Smith 1983) provide evidence for localised variability, and complement the current approach, which is, by necessity, relatively coarse grained and aimed at identifying broader patterning. Through an understanding of the identified localised variability, regional patterning can be quantified and assessed.

1.4 Style and Information Exchange

Style

The way that archaeologists have interpreted style in the archaeological record reflects the belief that style relates directly to cultural behaviour; that the distribution and interaction of different groups should be identifiable through an analysis of certain stylistic traits. There are, of course, conflicting theories about how this may be achieved, as indeed there are contrary views about the role of style in the original behaviour of any particular group (cf. Conkey 1978, Davidson 1936; Hodder 1978a, 1979; McCarthy 1957; Plog 1980; 1980; Whallon 1968; Wiesner 1983, 1985, 1989; Wobst 1977; etc; and see C. Smith 1989 for a review of social interaction vs information exchange theory).

Social interaction theory views stylistic similarity as a function of social and geographic similarity, proximity and interaction. The nature of interaction between groups controls the exchange of stylistic information, '... the direction and limits of diffusion will be
conditioned by the kind, frequency, and channelling of interaction among the producers of stylistic material' (Whallon 1968:223). Behavioural interpretations based on this theory are limited to those of general communication: the continuity of a style through time represents the continuity of communication processes; the widespread distribution of homogenous stylistic material reflects high levels of interaction throughout the region in question.

Information exchange theory has been successfully applied in recent years in various ethnographic and ethno-archaeological contexts (Hodder 1978a; C. Smith 1989; Wiessner 1983, 1984, 1989; Wobst 1977).

If style is a means of negotiating identity relative to that of those surrounding one, then change in the amount of personal and social expression in a given artefact in a region through time should give some measure of changes in the condition ... personal and social expression being measured by heterogeneity and homogeneity, respectively, in artefacts. (Wiessner 1989:59)

In her work amongst the Kalahari San, Wiessner (1983, 1984, 1985, 1989, 1990) has developed a model of stylistic behaviour based on the duality of emblemic and assertive styles. The primary element here is the specificity of referent. Styles with distinct or specific referents are assertive. Styles with more generalised associations are classed emblemic. The basic assumption for these categories are that style is seen as a means of non-verbal communication used to negotiate identity, by comparison or contrast.

The level at which comparisons are made is seen as an important source of variation in style. Comparisons at the individual level will result in different stylistic distributions and rates of change from those at the group level (Macdonald 1990, Wiessner 1988), and determinants of style become more complex as social systems evolve (Plog 1990). Since style is seen generally as a medium for projecting identity, both individual and group identity can be expressed in style. Wiessner (1988) has defined different situations which might stimulate the different identity emphasis and result in stylistic messages demonstrating different levels of social interaction.

Group identity will be emphasised where there is fear, real or potential inter-group competition and aggression, a need for co-operation to achieve certain goals and imposed political control requiring group cohesion. Conversely, individual identity will dominate where there is competition between individuals, when there are options for individual economic gain or where there is a breakdown in the social order that would require individuals to seek solutions to their own problems. The individual may be difficult to recognise in archaeological studies (Deetz 1965, Hill and Gunn 1976).
Increasing individual expression, however, and the concomitant decreasing stylistic homogeneity overall, should be observable.

But where, within the formal variation identified in one's assemblage, does style reside?

Sackett's work is explicitly directed at this question, and he believes style is found wherever isochrestic options exists and where factors allied to ethnicity dictate the choices made among them (Sackett 1990:33). This may not seem to get us any closer to an analytical approach or answer, especially since Sackett also conceptualises 'style and function as complementary and dualistic aspects that also simultaneously reside in instrumental form' (ibid.:34). He does however, perceive of style as having both active and passive voices. The 'active voice' is a recognition that the iconic properties of style constitute ethnic 'messaging' generated by what is essentially self-conscious, deliberate and premeditated behaviour intended to identify and maintain boundaries within and between groups (viz. Wobst 1977). The concept of passive voice recognises that the majority of iconic information carried by objects is but latent, 'inherent in the isochrestic choices which lie behind their manufacture and which themselves are for the most part made unselfconsciously' (Sackett 1990:36).

Style enters the picture when we see that the artisans of any given fraternity (or sorority) are aware of only a few, and often choose but one, of the isochrestic options potentially available when performing any given task, and that the choices that they make are largely dictated by the technological traditions within which they have been enculturated as members of social groups that delineate their ethnicity. (ibid 1990:33)

Sackett also perceives of another, less well defined concept, which he labels the vernacular style. This consists of the 'bedrock' design notions inherited by the artisan of any cultural group:

notions as deeply and unconsciously embedded in their behaviour as their motor habits, the dialects they speak ... Inculcated as much by insinuation as by instruction, and therefore all the more unquestioned, these notions thus constitute a kind of substratum to the group's style (ibid.:39).

He argues that this level of stylistic information may be responsible for a significant proportion of the ethnically significant variation that archaeologists are able to perceive in an assemblage, particularly given the usual degree of resolution possible and an absence of ethnographic or ethnohistoric information. This concept suits that of the regional style, particularly in the Sydney Basin, and indeed describes the development of a regional style over considerable distances. It is another way of explicating schematic consistency over a dispersed area.

There are various methodological advantages to an isochrestic approach. These include the reminder that style is potentially ubiquitous in artefactual variation and the requirement that the suitability of one's data and classifications for providing stylistically

Chapter 1
meaningful patterns should be continually assessed. The way that generic and specific levels of categories are defined is vital to achieving particular, and stylistically 'correct', levels of resolution (Sackett 1990:40). Sackett’s comments on classification are salutary. Indeed the validity of one’s typology must be constantly addressed (see Appendix 4), as should the possible sources of variation inherent in the data (e.g. Clegg 1977).

Sackett proposes a challenging classification system based on thematic variability. There are various examples of how the combination of motifs and compositional features may indicate high levels of ethnically significant patterning (e.g. Glassie 1975, Longacre 1981) and he suggests that ‘themes may well be the [things] that give congruence to isochrestic choices in non-material aspects of cultural life’ (1990:41).

An approach which views its classification as thematic has not been explicitly attempted on an archaeological rock art assemblage before, although it could be argued that previous regional analyses of motif assemblages per se have indeed explored the congruence of design themes (e.g. Franklin 1984, McMah 1965, Taçon 1989; and see C. Smith 1989 on portable Australian art). Such an approach is considered well suited to the analysis of the Sydney region’s dual art assemblages and will be pursued in Chapters 8 and 9.

Information Exchange

Information exchange theory is used here to explore how art may have facilitated interaction across the region.

One of the major functions of stylistic behaviour is to link those members of a community who are not in constant verbal contact with each other, and make their interaction more predictable and less stressful. (Wobst 1977:327)

Wobst (1977:330) proposed the following principles for stylistic expression in artefacts that function in social communication processes. These were defined in relation to the analysis of stylistic artefacts generally, not specifically archaeological rock art assemblages:

1) artefacts that are more visible, which enter into more information exchanges and which are potentially encountered by more individuals are the most appropriate for stylistic messages;

2) specific stylistic forms, which are revealed by those artefacts which are the most visible and the most accessible to other individuals, will have the widest distribution;
3) specific stylistic forms seen by a relatively small number of individuals will reveal clinical distribution within and between social units; and,

4) those messages which are most widely broadcast, that broadcast social group affiliation and that enter into processes of boundary maintenance indicate social-group-specific stylistic form.

Information exchange theory has been modified and elaborated by studies of living societies seeking to explain stylistic manifestations in relation to the degree of competition between groups over resources (Hodder 1978a, 1982). It has also been developed to explore the maintenance of personal and social identity distinctions (Hodder 1978b, Wiessner 1983, 1984, 1990). In an archaeological context, the theory has more recently been applied to relate degrees of stylistic homogeneity and/or heterogeneity to the nature of prehistoric social (exchange) networks. Limited applications have been made on hunter-gatherer rock art in Australia (David 1994, Franklin 1992, Godwin 1990, Lewis 1988, 1990) and in Norway (Madden 1983), and on pastoral rock art in Africa (Brandt and Carder 1987). More comprehensive usage of this concept has been made in the European Upper Palaeolithic (e.g. Gamble 1982, 1983, 1986; Jochim 1983; Soffer 1987). Gamble's 1982 work on the Venus figurines and the ensuing debate (e.g. Soffer 1987; Bahn 1986, Clegg 1986) focuses on the question of heterogeneity. Gamble argued that the widespread stylistic homogeneity of the Venus figurines over a vast area of inhospitable Palaeolithic Europe between 29-23,000 BP demonstrated widely ramified open social networks. The major criticisms of Gamble's work lie not in his interpretation of the results but rather on whether the figurines are stylistically similar or not.

... the attributes which were originally singled out [on the figurines] are too superficial to successfully segregate them chronologically or spatially from similar manifestations at different times and in different parts of the world. (Soffer 1987:339)

So what do we mean by stylistic heterogeneity and how can we define it?.

A conventional definition of heterogeneity is 'the state of being different in kind; unlike; composed of parts of different kinds; having widely unlike elements or constituents.' (Macquarie Dictionary, 1st ed., 1981).

Stylistic heterogeneity therefore is perceived here as being the variability in style which demonstrates widely unlike artistic components; the end result of doing or producing material culture which signals either a less culturally fettered activity of a particular group of people, or the activity of a particular group which either has less rigorous cultural proscription or in which individual expression is practised more freely
(viz Wiessner 1989). Whatever its cause, it is relative heterogeneity which must be determined. It can only be defined as such in comparison to stylistic activity which is relatively homogeneous.

Claire Smith (1989) tested the thesis that increased stylistic heterogeneity is correlated with more fertile environmental conditions and closed social networks (e.g. Gamble 1982, Jochim 1983). Her analysis compared Arnhem Land bark paintings with 'acrylic' paintings from the Western Desert of Australia. The environments of these two sample areas are as diverse as can be imagined in Australia, and the art forms under analysis are also very different. Smith successfully demonstrated the art from the more fertile region had a greater degree of heterogeneity than the art of the arid zone with respect to artistic vocabulary. She did not explore compositional aspect. She also made important conclusions about social structure and symbolic behaviour:

the art of the Western Desert appears to function to integrate groups of people on the basis of their rights to specific sites, which are viewed in relationship to sites of neighbouring groups. Social interaction is less frequent but probably more intense, than in Arnhem Land. In both cases, however, social and artistic interaction occurs within a framework in which such interaction is derived from ancestral dictates. ... it appears that art serves as a bounding function in Arnhem Land and a bonding function in the western desert. (1989:147)

Smith's classificatory system, however, may well have been a contributing factor to the diversity demonstrated by the Arnhem Land barks. Given that the two art bodies are intrinsically different, the selection of her taxonomy was extremely important to ensure that some level of comparability existed in any analysis of the two. For instance, the acrylic art sample classified 38 motifs, which was compared to a bark painting sample described by 307 motif classes. While intrinsic variety in an assemblage may require a larger taxonomy, much of Smith's classification appears to consist of unjustified splitting. Munn's (1966) distinction between motif systems of continuous and discontinuous meaning is also relevant here. Examples of the motifs which appear to have been unnecessarily split are the 25 motifs which are fish (with varying degrees of morphology and internal detail); the 46 anthropomorphic categories; the 15 snakes, and so on. Most (224: 72.9%) of her Arnhem Land motif classes occur only once in her sample paintings and are thus more likely to relate to 'assertive' stylistic behaviour than emblemic. While there is less repetition in the classification used for the Western Desert art, 15 of the 38 motif types (39.5%) still occur only once in the assemblage. Given this duplication of motif classes, the calculations of potential combinations possible and of motif co-occurrence for each art body (C. Smith 1989:126) are potentially meaningless.

A clumping of these duplicated motifs would still produce a more extensive motif taxonomy for the Arnhem Land art than for the Western Desert art because of the figurative component in this medium. In central Australian art, compositional criteria
create meaningful distinctions within formal categories (Dickens 1992). The potential for heterogeneity, based on motif, would thus always be greater for the Arnhem Land art body.

These classificatory problems mar an otherwise excellent testing of information exchange theory. Smith's very thorough analyses do demonstrate that the Arnhem Land art, from a fertile and densely populated environment, is more heterogeneous in its motif elaboration than that of the arid Western Desert area, which is characterised by low population densities and open social networks. She states that;

> Application of the information exchange theory of style to prehistoric contexts is complicated by problems in determining environmental conditions and past population densities. However, despite these problems, the theory does explain social processes associated with stylistic variation among the art of hunter-gatherer populations. In archaeological circumstances where there is no ethnographic information available it may be necessary to analyse stylistic differences in the art system as a whole. (C. Smith 1989:167).

The engraved and pigment art bodies of the Sydney region provide a unique opportunity for just this purpose. There is no ethnographic data on how this art functioned within Aboriginal society prior to white contact. There is, however, ethnohistoric literature compiled by journalists of the First Fleet, linguistic evidence for the region, and ethnographic work on remnant pockets of the original populations (Chapter 3). Extensive environmental research suggests that environmental conditions throughout the Holocene have been stable and there is a detailed context provided by four decades of archaeological research (Chapter 4). This information allows a fairly detailed model of the recent past to be formulated.

In the Sydney region comparisons of stylistic homogeneity can be made at regional and more localised levels (intra-media). Comparisons can also be made between the two components (inter-media). It is intended to define the stylistic homogeneity of each component at a regional scale and then examine possible variations within these at more localised levels. A comparison of the levels of homogeneity present in the respective components will then be made. The intention here is not to explore environmentally different areas (cf. C. Smith 1989), nor to be comparing completely different social systems (viz. open vs closed networks).

Given that the style being explored is a regional one, the assumption is that environmental factors, and to a large extent the resultant economic constraints, would have been constant across the area. The Sydney region comprises one culture area (Peterson 1976). Linguistic and ethnohistoric evidence indicate underlying social patterning, but the stylistic variability here is being explored at a much finer scale than
previous studies (e.g. of the European upper Palaeolithic) which ultimately compared style regions and not the internal variability of these.

Based on existing 'environmental' models and on information exchange theory, the Sydney region, due to its position in the fertile coastal zone could be expected to have had high population densities and territorially based social networks. The effect that these networks would have on the social organisation and bounding behaviour requires consideration. The rock art here would be expected to demonstrate relative homogeneity on a regional scale, but evidence for micro-regional heterogeneity and boundary demarcation between territories within the region.

1.5 Social interaction and style boundaries

... it is commonly assumed or implied that prehistoric populations of hunter-gatherers lived in spatially discrete, isolated units forming tightly bounded social economic and cultural entities. ... On the basis of ethnographic evidence alone, it seems more likely that many hunter-gatherer populations would have resembled networks of rather loosely defined groups and communities linked by a variety of social relationships, often extending over vast regions ... It is therefore of some importance in archaeological interpretation to consider how the distribution of populations was organised over such vast areas; what were the number, nature and arrangement of their articulated components; what sort of processes maintained this pattern of distribution and articulation; how these processes were structured and at what points discontinuities occurred; in what way these processes are related to the differentiation of sociocultural systems within a region, as manifest in the variability in the archaeological record; and how this aspect of archaeological variability is to be distinguished from other variables related to raw material and functional requirements. (Madden 1983:191)

There are various approaches to the question of stylistic boundaries within stylistic systems. Again these can be clumped under the two dominant models of how stylistic systems work, the information exchange and the social interaction models. As this research is embedded within information exchange theory, the explanations under this banner for different types of social networks and their respective boundaries are examined more closely. The works of Gamble (1982, 1983), Hodder (1978, 1979), Jochim (1983), Madden (1983), Wiessner (1983, 1984, 1989) and Sackett (1985, 1990) are the most pertinent to the question of boundaries, albeit in very different social systems to that operating in Sydney at European contact.

ethnographic evidence ... suggests that material culture can be used to express and reinforce aspects of social relationships that are related to economic and political strategies. This is true between sex, age, and political groups within society as much as it is true between societies as a whole. (Hodder 1979:448)

Hodder's (1978a) paper analysed the bounding behaviour exhibited by pastoralists in the Baringo district, western Kenya. The tribal groups in this area maintain material culture differences in items of display and dress (e.g. earrings, necklaces, shields etc.) in domestic items (e.g. eating and cooking utensils) as well as in the spatial patterning of
their settlements. There is generally a great uniformity in material culture over the extensive areas covered by these socially unstratified groups, although relatively sharp boundaries are identified between groups. There is usually very little ambiguity over which tribal group a person belongs to - however, these identities are malleable in that a person crossing a tribal boundaries usually changes their dress to conform with their 'new' tribe.

The styles of locally made and non-exchanged items frequently show greatest similarity within, and sharp differences between tribes, particularly when there are high population densities and fierce competition for scarce and shared resources. Where there is greater economic conflict, material culture dichotomies are clearly emphasised and stylistic boundaries are marked. In other border areas, where alternative social mechanisms exist for relieving economic stress, e.g. lower population densities, the exploitation of a wider resource base, and slightly different adaptations to the same environment, material culture from neighbouring tribes are stylistically indistinguishable and/or interchangeable. There are no marked style boundaries in these situations.

Hodder (1979) projects these results into the archaeological context of the French Neolithic. He interprets the developments within this tradition as reflecting a gradual increase in local within-group dependence as strains and pressures on the environment (population expansion and economic intensification) increased. Within-group dependence was reflected in localised homogeneity in items of material culture and the appearance of megalithic tombs. Conflict between groups led to marked cultural differences on a broader scale, particularly visible in pottery specialisation.

Jochim (1983) views the art of the upper Palaeolithic in an ecological framework, and explains both the proliferation and diversification of Franco-Cantabrian art in terms of population shifts and changing social organisation.

The need for greater potential mobility, communication, and flexibility of affiliation, together with periodic aggregations of large groups, led to fundamental changes in social arrangements and mating networks. These are thought to be reflected by: (1) the appearance of items of portable art and adornment to symbolise and reinforce through their exchange the broad lines of communication and affiliation; and (2) the elaboration of burial treatment to include large energy expenditures, suggesting the involvement of large groups and perhaps some degree of role differentiation. The distribution of such items and features should be rather continuous or clinal in situations of interlocking open networks of interaction, and should become more discontinuous and discretely clumped as such networks become more closed and exclusive. (Jochim 1983:216; emphasis mine)

The problems induced by declining communication networks may have been overcome by increasing frequency of ritual, more society specific and closed ritual, and increased exchange of exotic items (Wobst 1977). In south-west Europe after 23,000 BP,
Palaeolithic groups had to adapt to increased population densities. In this area, the widespread open network system (Gamble 1982) is seen as being replaced by more closed communication networks. The regionalisation of cave art styles is explained in terms of a focussing on reliable salmon resources and a resultant sedentism and territoriality. The decline in portable art is interpreted as evidence for this 'general decrease in mobility and declining need to maintain widespread affiliations' (Jochim 1983:217). Davidson (1989) has suggested that this may also have been due to the increasing information restrictions resulting from tightened links between art production and social control.

Madden's (1983) work concentrates on one aspect of this particular theoretical problem viz. creating the appropriate framework for dealing with social and economic organisation using archaeological data.

She defines two sets of variables as being important in structuring the patterning of regional interrelationships:

(1) the spatial organisation of the subsistence economy, and

(2) exchange relationships.

The first of these refers to the distribution and organisation of local populations with specific references to the environment and their particular subsistence economy. Topography and resource distribution are of primary consideration, and Madden argues that the most likely model of hunter-gatherer organisation is one of discontinuous local population aggregates, the size and spacing of which vary in accordance with the distribution of food resources and the requirements of social structure (viz. Peterson 1976). Her second set of variables refer to the exchange relationships between these local population aggregates. These relationships are identified as the main nexus of integration at the regional level and as determining the relationships between the participating groups (Madden 1983:192).

Exchange relationships [Madden's 'social interaction fields'], may involve exchange of energy in the form of food resources, other subsistence goods or services, of information (both verbal and non-verbal), and of personnel (e.g. as in marriage). The sum of the overlapping sets of social interaction fields (exchange relationships) is equivalent to the region's social network system. Madden's concept does not rely on identifying specific organising principles (such as political affiliations or marriage alliances), but rather on the nature and strength of the linkages and the degree of interaction and integration amongst the participating units (ibid.:192-3). She defines three variants of social network
systems; each model conditioned by a distinctive permutation of three variables. The most important variables are;

1) population density,

2) competition for scarce resources, and

3) distances between the local groups.

Two basic assumptions for these models are (ibid.:193):

1) that a minimum number of individuals is necessary to ensure the viability of a population through time and that groups must distribute themselves across space and maintain a network of exchange relationships to allow for this minimal interaction; and,

2) that the nature of the exchange relationships will be regulated in an effort to minimise costs and risks (following Wobst 1977).

Her three models describe increasing levels of interaction, and intervention, by local populations to ensure a workable social system. These are the undifferentiated network system, the differentiated network system due to distance, and the differentiated network system due to imposed social boundaries. Boundaries vary between these, from vague and fluctuating in model 1; relatively 'unconscious' (i.e. not enforced), due more to a lack of communication than consciously conceived behaviour to signal or reinforce group affiliation (Model 2); and, more formalised and structured linkages and an actual increase in the frequency of certain exchange relationships between the bounded groups (Model 3). Recognition and maintenance of these social boundaries would be facilitated both by increasing internal integration and the cultural distinctiveness of the bounded groups (Madden 1983:193-4).

Madden's testing of her models was fairly unconvincing, mainly due to a lack of adequate data (ibid.:200). Nonetheless Madden's work remains one of the only tests directed towards identifying and interpreting bounding behaviour in the archaeological record. She identifies those elements in the regional organisation which are primary in formulating the type of social networks and consequently the types of boundaries which are likely to occur. Her models are considered further in light of the ethnographic models of Australian territorial organisation and ethnohistoric evidence in the Sydney region (Chapter 3).

The challenge of applying information exchange to a rock art assemblage is that this prehistoric symbolic behaviour is 'grounded'. The art remains in the location that it was produced, and is representative of the activities of its producers, at that location. Much
of the symbolic behaviour which accompanied increasing social complexity, and which has been the subject for analysis by previous information exchange research, has been mobiliary (e.g. Gamble 1982, Hodder 1978a, C. Smith 1989, Wiessner 1984, Wobst 1977). Much of the symbolic behaviour which signalled group identity and affiliation in the Sydney region (body painting and scarification, tooth avulsion, removal of the little finger of coastal women etc.) may also have been in a mobile form, being individually borne by people involved. While the fixed or grounded nature of the rock art provides a immobile record for symbolic activity, shifting boundaries over time, as well as the mobility of the art producers and the complexity of their social contacts could be expected to blur this evidence. This issue is further considered in Chapters 8 and 9

1.6 A model for the Sydney Region

Geographical and environmental evidence for the Sydney region indicates that throughout the Holocene the environmental conditions were fertile and relatively stable (Chapter 2). The ethnohistoric literature suggests that the population densities at contact were high (Chapter 3). Archaeological evidence suggests these have probably been high for the last 3,000 years (Chapter 4), throughout the period that most of the art was being produced.

On the basis of this evidence one would expect that the social networks across the region would have been relatively closed and exclusive. It would be expected that stylistic messaging would be discontinuous and show a tendency to be discretely clumped, compared with the art of a harsher environment with open social networks.

This thesis is testing internal levels of homogeneity within a regional art style. The assumption is that stylistic messaging operated at different levels to reinforce different social information. Here, varying levels of heterogeneity will be explained in terms of the amount of inter- and intra-group cohesion being demonstrated.

It is not known how art functioned across this region, and it is possible that stylistic information which demonstrated social group affiliation was present in forms which have not entered the archaeological record (body scarification and/or painting, tooth avulsion, items of material culture, and so on). Given that style is found 'wherever isochrestic options exist and where factors allied to ethnicity dictate the choices among them' (Sackett 1990:33) it is considered that the rock art of the region provides a perfect opportunity for demonstrating the 'bedrock design notions' (no pun intended) of the region's artists. As the art is 'fixed' in space, many of the problems (and advantages) of portable artefacts are avoided. The art remains where it was produced, and while the
individual artists would have had considerable mobility, the art is a record of their ranges of activities.

Following previous analyses based on information exchange theory, the model to be tested in the Sydney Basin is as follows.

The two art components potentially functioned in different ways. On the basis of information exchange theory it is anticipated that the art which was viewed by a larger proportion of the population and which is located in a public context, would be expected to contain the best potential for stylistic messaging of an emblemic kind. Art produced in a domestic context, following Wiessner 1990, may also have allowed the opportunity for individual stylistic expressions, similarly resulting in the development of localised stylistic trends.

The two media appear to have presented different opportunities for projecting identity. The argument is developed that one form may have been used to establish group identity and have acted as a bonding force, while the other may have provided for opportunity for an expression of individual or localised emblemic variability. The latter thus would have provided a medium in which bounding behaviour would be manifest.

It has been argued in the literature that the engraving sites in Sydney fulfilled a ritual function (Elkin 1949, McCarthy 1956, 1959a). McCarthy (1961) also suggests that shelter art fulfilled the same function. This interpretation is based on the motifs present at some of these sites, and by ethnographic analogy with Bora ceremonies from the north coast of NSW. While disagreeing with the manner and intent of this earlier interpretation, it is proposed to posit a model whereby the engraving sites fulfilled a regional bonding function and thus provided the opportunity for large scale group cohesion. This may in part have been achieved by a 'ritual function'.

These sites are perceived as being mostly on ridgelines, largely away from the economic resource areas and often on access routes around the region, i.e. not in the centre of any particular group's foraging territory (see also Layton 1989, 1992b). There is regional evidence for gender exclusivity and inter-group participation in some ceremonies, particularly for male initiation. If any particular group, i.e. men or women, used these sites for ceremonial purposes, it would be expected that these sites would be viewed by particular and more limited section of the population. The audience was restricted, not public. Stylistic patterning with this art form then should be clinal within and between social units. Given that these sites are often on access routes, it is possible that generic social group identity messaging was further reinforced in these
locations. Such a usage would contribute to a 'blurring' of boundary information in this component.

In contrast, the shelter art sites with their concomitant evidence for occupation are mostly within valley systems and are demonstrably also living sites. It could be expected that all members of a local territorial group (men, women and children) used these sites. It is speculated, then, that the shelter art would be the most likely to reveal social group specific stylistic form. It is in this component that the expression of individual identity would be most likely to reside. Local territorial groups operating in their own territories are least likely to be communicating a politically motivated need for large scale group cohesion. Wiessner's individual identity is most likely to function in this context with individual traits reflecting the territorial range of the local group. The art in this context, while not necessarily defining the locations of boundaries per se, contains the best potential for stylistic bounding information. It is expected that the stylistic messaging revealed by this art would be discontinuous and discretely clumped.

1.7 Thesis organisation

The aims of this research fell into three major areas of inquiry;

1) defining a model for cultural interaction which could be examined using a prehistoric art system;

2) exploring possible causes of stylistic variability;
   - medium;
   - diachronic; and,
   - synchronic.

3) demonstrating the contemporaneity of art and occupation evidence.

The investigation of all three of these areas was required for the complete analysis of this region's art assemblages.

There are two assumptions directing this research, which will be discussed further in Chapters 5 and 6. These are;

1) that the majority of the art coincides with the most archaeologically visible period of Bondaian occupation. Most of it, therefore, is younger than c.3,000 years. Art was produced up until white contact; and,

2) that the two art components were being practised contemporaneously throughout this period.
1) The model

As described above, the model being tested here is based on information exchange theory. By perceiving art and 'style' in a functional perspective it is possible to view the art in the region as a conduit for the expression of cultural or social affiliations. Depending on the level of interaction (individual, local, regional) different types of information about social affiliations might be expected.

Style as a manifestation of cultural identity and the uses of style in social interaction has been explored in this chapter. Subsequent chapters flesh out this model with environmental, ethnohistoric and archaeological material.

In Chapter 2 the Sydney Basin is defined and described. The significance of the monogeology is explained. Topographic features and landscapes are discussed in terms of probable prehistoric land use patterns. Environmental conditions are broadly defined.

Chapter 3 describes the ethnohistoric evidence collected at contact about social organisation in this region. The aim of this discussion is to highlight specific aspects of the Aboriginal culture observed at contact which are relevant to both analysing the art and producing a model for social interaction in the region. The linguistic evidence for tribal boundaries is discussed (Capell 1970) as are the problems associated with the geographic distributions of these and the interpretation of these boundaries. Aspects of material culture which may be depicted in the art and used as cultural markers (temporal and social) are also discussed.

Chapter 4 discusses the archaeological framework for the Basin, provided by existing research. Several themes relevant to the proposed regional model are identified. These include

- technological and subsistence changes over time, including an apparent late coastal specialisation;

- a coastal-hinterland dichotomy including the evidence for different economic strategies;

- the import of the Cumberland Plain in the centre of the Basin in terms of interregional contacts and localised resource opportunities; and,

- variability at the archaeological record at the localised catchment level, e.g. Attenbrow 1987.
2) Stylistic variability

The analysis of stylistic variability for both art components was based on large samples of the known rock art assemblages of the region.

Medium

Chapter 5 describes the general characteristics of both art components. The samples used in this work are described, including how these were gathered, and their recognised limitations and biases. Also described are the motifs and technical information which have been collected and the regional summaries of this information. Effects of medium/technique on style are discussed particularly in light of how the different media might indicate different social messages. Means of demonstrating group cohesion and individuality in terms of the two art media are introduced here but are explored fully in Chapters 8 and 9. The results of these analyses are synthesised in Chapter 10.

Diachronic variation

The possibility of stylistic patterning in the rock art resulting from changes over time is explored. Of particular importance is the evidence for social changes throughout the late Holocene. A localised diachronic experiment is undertaken on the shelter art sites from the Mangrove Creek Valley. A large number of sites (31) had previously been excavated in this valley by Attenbrow (1987) and another sites was excavated for this research (Upside-Down-Man).

Chapter 7 investigates diachronic variability in the shelter art assemblage. It discusses a previous model for such change in the region (McCarthy 1979, 1988) and problems inherent in this. The Bondaiian, as part of the Eastern Regional Sequence, has three well dated phases of technological production. The question of whether these phases indicate the types of cultural change which would be mirrored by the art is investigated. The ramifications this research's overriding assumption, i.e. that the majority of the art coincides with the most archaeologically visible period of Bondaiian occupation and is therefore younger than 3,000 years, is investigated.

Synchronic variation

Regional stylistic patterning is explored using both art components. Chapter 8 examines the regional stylistic variability in the engraved component. Chapter 9 explores these same sources of variability in the shelter art component. This analysis looks at variations in both motif and technique in the shelter art sites. It is restricted to investigating motif depiction in the engraved component, since the technical variations in
this component are limited. The analyses are aimed at identifying whether broad scale patterns can be interpreted on more than environmental grounds (viz. McMahan 1965).

The presence of a previously identified style boundary to the south of the region (McMah 1965, McDonald 1990a) is further investigated. Stylistic clines elsewhere are also defined and described. These are manifested by fluctuating levels of stylistic homogeneity in localised areas. The significance for these result in terms of the social model for the region is discussed.

3) Contemporaneity of Art Media, Art and Deposit:

In Chapter 6 the basic issues of contemporaneity and the association of art with other archaeological manifestations are discussed. The contemporaneity of the two media has, for the most part, to be assumed. Arguments are made for this contiguity, in term of motif and style. Regional anomalies are also described. In order to test the contemporaneity of art with deposit, four shelter art sites were excavated. The lithic assemblages at these sites were characterised and dated and the contemporaneity of evidence at these sites is argued. A brief investigation of other previously excavated shelter art sites in the region is also made.

Summaries of results of the excavations undertaken for this research are found in this Chapter, with the detailed excavation reports being presented as Appendices 1-3.

4) Interpretations and Explanations

Chapter 10 draws together the threads which are identified in Chapters 3 and 4 and woven in Chapters 5 to 9. The model for stylistic behaviour formulated in this introduction is evaluated in terms of the identified sources of variability in both art assemblages. The contemporaneity of art and deposit is discussed both in terms of a diachronic model of change, and also in terms of the general assumptions of regional patterning. The results are discussed in terms of information exchange theory. The relevance and suitability of this type of model and overall approach to the analysis of prehistoric rock art is discussed.

Chapter 1
Chapter 2

The Sydney Basin - Environmental Context

The Sydney region is located on the south-east coast of Australia between the coastline and the Great Dividing Range (Figure 1.1). Latitudes 33° to 35° south, and longitudes 150° to 151° 30' east describe the parameters of this area.

The Sydney Basin is defined geologically and the study area for this research is restricted to the Hawkesbury sandstone formation (Figure 1.1). This Formation is the surface bedrock in the centre of the Greater Sydney Basin. Sydney is located towards the centre of the study area, and the cities of Newcastle and Wollongong roughly define its northern and southern extents. The Hawkesbury sandstone covers an area of approximately 190 km x 90 km - 17,100 square kilometres.

Throughout this work the study area will be called the Sydney region or the Sydney Basin interchangeably, this meaning the geographic extent of the Hawkesbury sandstone within the Greater Sydney Basin.

2.1 Geology of the Sydney Basin

The Greater Sydney Basin resulted from a marine transgression at the end of the Late Palaeozoic glaciation, followed by a marine regression during Late Permian and Triassic times.

Three stratigraphic divisions have been defined within the Hawkesbury Tectonic Stage. These are based on gross lithological features. The lowest division is the Narrabeen group, followed by the overlying Hawkesbury sandstone. The Wianamatta group which is uppermost, is predominantly shaly with sporadic thin, lithic sandstones (Branagan et al. 1976: 28). This last formation predominates in the centre of the region, forming the Cumberland Plain.

The Hawkesbury sandstone is a fairly friable medium with relatively homogenous grain size. It weathers cavernously to form overhangs (shelters) which occur in a range of topographic locations (see Plates 1-8). It also occurs as flat topped outcrops (platforms of varying sizes) and boulders, mainly on ridgetops but also along the sides of gullies and in valley bottoms.
For the purposes of this work, geological homogeneity is significant - not only because the sandstone provides an homogeneous medium of a relatively restricted extent. In the remainder of the Greater Sydney Basin, an area of approximately 36,000 square km (Branagan et al 1976: 1), the surface bedrocks are of different sandstones (eg. the Nowra sandstone, Narrabeen sandstone etc.). These also contain Aboriginal rock art some of varying styles (eg. Officer 1992, 1993). The boundaries of this study area were selected on the basis of geology rather than on a presumed extent of the Sydney Basin style. By limiting this current study to a restricted lithology then, it has been possible to impose a natural, although culturally artificial, boundary;thus not pre-empting the cultural significance of the distributions or boundaries in the art.

2.2 Geomorphology: structure and terrain

In the archaeological literature for the Region, the area between the coast and the Great Dividing Range has been described as the coastal strip (Lawrence 1968, Lampert 1971a, 1971 b; Poiner 1971, Ross 1976, Attenbrow 1987). As Attenbrow (1987) points out, however, this area can be divided into two further broad geographic/environmental divisions, of the maritime or shoreline zone (which includes estuarine influences) and the coastal hinterland (or "inland" Lampert & Hughes 1974, Poiner 1971). Within these broad zones, further subdivisions based on specific ecosystems can be identified. These are broadly relevant in terms of our understanding and interpretation of prehistoric Aboriginal landuse patterns in the Region.

The maritime zone includes the open coastal margin, coastal heath and estuaries. This zone (following Attenbrow 1987), is taken as extending approximately 10km inland from the coastline, this distance being related to prevailing estuarine conditions along major waterways. The hinterland zones here encompasses riverine, forest and woodland environments. It includes the strip of country between the maritime zone and the Great Divide. In both zones, and the variety of localised environments, the characteristics of the underlying sandstone geology dominate, and the landscape is unrelentingly dissected and fairly rugged. Throughout this work 'maritime' and 'coastal' will be used interchangeably to describe that zone, while 'hinterland' and 'inland' will be used to describe the westerly portion of the region.

In the centre of the Sydney Basin is the Cumberland Plain. This provides a different landscape unit of open plain woodland on shale geology. The relief across the Plain is low and gently undulating. Surrounding the Cumberland Plain are three plateaux, the Hornsby, Woronora and Blue Mountains Plateaux. The boundaries between the Cumberland Plain and the adjacent north (Hornsby) and south (Woronora) plateaux are poorly defined, while that at the west of the Plain is the distinctive Lapstone Monocline.

Chapter 2
Plate 1  A typical upper tributary gully with ridgeline in background of shot. Six sites were found in this gully on various of the sandstone shelves and platforms visible.

Plate 2  The Georges River to the south of the region. Looking west from Alford’s Point.
Plate 3  Engraving site on the ridgetop overlooking Berowra Waters. This vast expanse of sandstone had only one motif engraved on it.

Plate 4  Relatively small boulder with engravings near Maroopa, just south of the Hawkesbury River. Engraved mardoes and anthropomorphs are located on the sloping top surface.
Plate 5  Large shelter with honeycomb weathering near Warre Warren Creek. This shelter has formed in an extensive sandstone cliffline along a minor ridgeline. Art is located on smooth surfaces on the periphery.

Plate 6  This small overhang near Wheelbarrow Ridge Road has formed as a lip in an extensive sandstone platform, above and below the shelter. Despite its small size this shelter has a moderately large assemblage.
Plate 7

Large free standing boulders such as this one provide ideal small shelters for a range of assemblage sizes. This one is located towards the north of the region near Howes Valley.

Plate 8

This is the smallest recorded shelter in the region, near Warre Warren Creek. To enter this overhang you have to crawl in behind the large tree. Three motifs only were found in this site. [WW1/14]
and Nepean Fault system (Branagan et al 1976: 45). This research is confined mostly to the Hornsby and Woronora Plateaux, although some sites (on Hawkesbury sandstone) occur on the Blue Mountains Plateau.

Altitude varies across the region. The Hornsby Plateau has a maximum altitude of 250m and between Hornsby and the Hawkesbury River. To the west, elevation is consistently between 250-350m AHD (Australian Height Datum) between the Hawkesbury and the Hunter Range. Closer to the coast, the elevation is between 100-150m AHD. Mt Yengo, to the north west, has the highest elevation above this plateau at 386m.

The Blue Mountains Plateau rises steeply from the Nepean to 250m AHD in the first line of ridges around Blaxland. The maximum elevation in the region is recorded at Blackheath in the Blue Mountains (1,087m AHD).

The region is drained by a significant drainage catchment, the Nepean-Hawkesbury River. This system drains all three of the plateaux in the study area, as well as part of the southern Tablelands. The Nepean River rises in the south-west of the Sydney Basin, and drains the Avon, Cordeaux, Cataract Rivers to its east, and the Nattai, Wollondilly and Cox's River from the west. It become the Hawkesbury River downstream of Richmond (and its tributary, the Grose River). The major river systems of the Colo and the Macdonald are also drained by the Hawkesbury River.

Downstream of Wiseman's Ferry, the point at which the river becomes affected by tidal salinity, several major creek systems enter the Hawkesbury. These major drainage basins include Mangrove, Berowra, Cowan, Mooney Mooney Creeks. Pittwater and Brisbane Water are major embayments which open onto Broken Bay, wherein the Hawkesbury meets the Tasman Sea.

Other creeks and river systems do occur within the Basin, specifically draining the central part and south-eastern corner of the study area. These include Port Jackson (Middle Harbour and the Lane Cove and Parramatta Rivers), Botany Bay (the Cook's and Georges Rivers) and Bates Bay (Port Hacking).

The regional or "culture-area" population (Peterson 1976: 51) is probably described well by this major drainage catchment. The extent of the Hawkesbury sandstone is less than the outer Hawkesbury-Nepean watershed boundaries, (particularly to the south and west). However, the northern boundary is situated along the Hunter Range, which also delimits the northern extent of the Hawkesbury sandstone.
2.3 Climate and climatic change

The Sydney region presently possesses a climate which is classified as Cfa trending towards Cfb in the Blue Mountains and on the Woronora Plateau (Dick 1975; Table 2). The climate is generally warm with uniform annual rainfall. In the Blue Mountains there is a long, mild summer, while elsewhere there is a hot summer.

Temperatures are generally dependant upon season, aspect, distance from sea and elevation. Proximity to the sea is the major factor in maintaining temperate conditions, namely mild winter minimum temperatures and summer maximum temperatures. On the coast the summer temperature is commonly less than 26°C, while that on the Cumberland Plain is greater than 29°C. Winter minimums, on the other hand are commonly between 7-8°C on the coast and 3-4°C inland (Fitzpatrick & Armstrong 1973:12).

The average annual rainfall also varies with distance from the coast. The coastal annual fall is in the order of 1250mm, with the heaviest falls in winter. In the hinterland and areas of higher elevation, the rainfall is lower (around 750 mm/year) and the heaviest falls are in summer (Bureau of Meteorology 1979: 9, Fitzpatrick & Armstrong 1973, Sanders et al 1988).

The climate in coastal south-eastern Australia has been relatively stable throughout the Holocene (10,000 BP - present) at least in terms of the human adaptive strategies required in response to changing environmental conditions (McBryde 1976, Hughes and Lampert 1982). Human occupation in the Sydney Region spans the late Pleistocene and Holocene, and the pre-Holocene climatic conditions are considered to have contributed to the very low population present in the region at that time (Stockton & Holland 1974, Attenbrow 1987). In the late Pleistocene (35,000-c.10,000 BP) there was a period of glaciation in the Alps and southern Tablelands, with deglaciation commencing before 15,000 BP (Bowler et al 1976: 370). The height of the last glaciation is currently accepted to have occurred c.18,000 BP (Chappell 1983a: 129, Chappell & Grinrod 1983: 43). Colder conditions prevailed until c.10,000/9,000 BP with glacial and periglacial conditions existing above 1,000m.

It is estimated that temperatures in the highlands would have been 8-11 degrees Celsius lower than present. This degree of change may not have occurred in coastal or coastal mountain areas subject to oceanic conditions (Costin 1971: 35). Reduced precipitation is likely to have been a more significant factor. At the height of the last glaciation until around 15,000 BP, there was a period of considerable aridity (Bowler et al. 1976). From c.15,000 to c.10,000 yrs BP conditions are thought to have improved.
There was a gradual increase in rainfall and growth conditions (Dodson & Hope 1983:75). These climatic improvements continued into the Holocene as the sea levels rose.

In the last 10,000 years conditions are considered to have been warmer and wetter than the preceding 10 millennia. Peak precipitation and temperature conditions within this period are considered to have occurred in the early Holocene, within the period c.8,000 and c.5,000 yrs BP (Bowler et al 1976:359). Temperatures during this time are considered to have been higher than at present (Colhoun 1983:94) and high lake levels across New South Wales suggest that it was also wetter (Bowler et al 1976:389). It would appear that there was then a colder, drier phase between c.3,000 and c.1,500 yrs ago, with temperatures 2 to 3 degrees colder than at present, strong prevailing winds and lower rainfall (Costin 1972: 589, Bowler et al 1976:371). The current climatic conditions are thought to have prevailed for the last millennium.

Koettig's study of Aboriginal habitations in varying environments across Australia concluded that rockshelters would mainly have been used as refuge from the sun or rain - but not the cold (Koettig 1976: 141, 152). This suggest that a deterioration in climatic conditions, particularly a colder and drier regime (as witnessed between c. 3,000 - 1,500 yrs bp) is unlikely to have forced people into shelters, while wetter conditions during the last millennium might have provided the impetus (cf. Attenbrow 1987: 255-7).

2.4 Eustatic change

The current coastline has only existed for the last 6,500 years (Chappell 1982:71; Chappel 1983b: 121; Chappell & Thom 1977:278-80). Prior to this, at the height of the last glaciation, it was as much as 25km to the east and 150-60m below its present level (Chappel 1983b: 121). It is now essentially a drowned embayed coast, with prior bedrock valleys partially infilled by sandy barriers, tidal flats, and deltaic plains (Roy & Thom 1981:471). Rocky clifffed headlands alternate with bays which incorporate bayhead beaches, barrier beaches and lagoons.

There is no broad coastal lowland (Brannagan et al 1976: 50). The coastal zone morphology is due primarily to the Holocene eustatic rise in sea level. Many of the present coastal forms, however, were initiated during Pleistocene stages of higher sea level. Following the Holocene transgression, these have been reworked and extended (ibid 1976: 50).

The most striking features of the Region's coastal zone are the rias, in particular Port Jackson and Broken Bay. Many smaller valleys and embayments have been partially or completely enclosed by sand barriers, consisting of a series of sand beach ridges
and swales running approximately parallel to the present beach lines. Major lagoons of this nature occur immediately north and south of the study area, at Lake Macquarie, Tuggerah Lake and Lake Illawarra. Within the study area there are a number of smaller lagoons at Narrabeen, Dee Why, Curl Curl, Manly, Currracurrang, and Wattamolla.

The drowning of the coast affected the region in several ways. It reduced the available land area, altered the configuration of the coastline and substantially increased the estuarine conditions along the present shorelines. While the sea was gradually encroaching on the land mass, it has been argued that there would have been an immature coastal morphology with no, or fewer, lagoons, less established tidal rock platforms and generally less shallow water than during periods of stable sea levels. An immature coast is less diverse and also poorer in resources.

It is further argued that a period of c.2,000 years would have been required, after the Holocene stabilisation of sea level at c.6,500, for the marine coastal ecology to stabilise, and for resources, particularly littoral, to exist in optimum exploitable quantities (Callaghan 1980: 44-7; and see Walters 1992b). The likely scenario is that coastal productivity would not have been as great during the period of relatively rapidly rising sea levels in the late Pleistocene/early Holocene, as in the mid- to late Holocene (Lampert & Hughes 1974: 228; White & O'Connell 1982: 98-9).

2.5 Vegetation

The vegetation in the Sydney Region is diverse and dependant primarily on geology, aspect and topography. Proximity to the coast and water (sea, rivers, creeks etc.), rainfall and elevation are also determining factors. Vegetation surveys have been undertaken in various ecological zones within the region.

Three are summarised here in order to demonstrate the regional variation. Ku-ring-gai Chase National Park, Mangrove Creek and Yengo National Park were selected, since these areas demonstrate the gamut of vegetation communities across the Region, and contain large numbers of art sites, including those excavated for this research.

Ku-ring-gai Chase National Park

(maritime conditions, estuarine plus major tidal creek system, coastal heath, open woodland)

Ku-ring-gai Chase National Park is bounded on the north by the Hawkesbury River and to the east by Pittwater. The ridge along the Cowan-Berowra peninsula marks its western boundary, and Cowan Creek flows south-north through its centre. The Park covers more than 15,000 hectares.
A vegetation analysis for the park (NPWS 1988:7-9) identified 24 plant communities within the park, several of which are of limited size and are associated with unusual geological and topographic features (e.g. remnant rainforest communities along western Pittwater, diatreme vegetation communities at Campbell’s and Smith’s Craters and dyke vegetation communities on West Head).

Predominant vegetation communities include coastal heath, swamp sedge, littoral vegetation, low woodland and open forest [Baker et al. (1989), Beadle et al. (1986) and NPWS (1988)].

**Mangrove Creek**

(hinterland, fringe maritime, major creek system)

Mangrove Creek drains north-south into the Hawkesbury River and is c.36 kilometres long. It forms the second major northern tributary valley along the Hawkesbury River west of the coastline, and has a catchment area of 420 sq km (Vinnecombe 1980).

To the west, the Judge Dowling Range forms a watershed boundary, to the north the Hunter Range, while to the east Peat’s Ridge forms another catchment boundary.

The climate of this area can be generally categorised as fringe temperate maritime. While the summers are hot and warm and the winters cool to mild, these are more extreme than on the (truly temperate maritime) coastal strip. Rainfall on the coast and on the Somersby Plateau averages 1200 - 1400mm per year (Bureau of Meteorology 1979).

A vegetation survey of Upper Mangrove Creek (Benson 1979) identified four communities in this area:-

Woodland, open Forest (associated with Hawkesbury sandstone), Open Forest/Tall Open Forest (associated with the Narrabeen Group on the lower drier aspect of the hillslopes) and Tall Open Forest.

The various topographic locations defined in this area by Attenbrow (1987) have been used in this research. These are broadly ridgetops, hillsides and valley bottoms. The cut-off for distinguishing these topographic locations was 5m in elevation below ridgetops and above valley bottoms.

**Yengo National Park**

(true hinterland, north-west edge of Hornsby Plateau, higher average elevation and relief)

This area is located in the north-west of the study area and is centred around the Macdonald River. The bedrock in this area represents the northern extent of the Hawkesbury sandstone. Most of deeply incised creeklines and rivers in this area have
Narrabeen sandstone exposed on the surface in the lowest levels. There are extensive areas of Quaternary alluvium both along the valley bottoms of major creek and river systems, as well as along the western ridgeline boundary, eg. around Mellong Swamp.

The annual average rainfall varies considerably across this area. This results from the area's distance from the coast, and the counteracting orographic effects of the elevated landscape. In the north west (at Howes Valley) the annual rainfall is 737mm, while at Wiseman's Ferry, on the Hawkesbury River, it is 819 mm (Bureau of Meteorology 1975). Most of this area has little standing water and there is rapid runoff of rainwater. Numerous springs, however, are known to exist across the area (Sanders et al. 1988: 15) these being of variable reliability (John Bowen, Big Yango, pers. comm.).

A total of thirteen vegetation communities were identified by this analysis although more than 75% of the vegetation can be characterised by the four communities described below. The most common vegetation community across the area is the exposed Hawkesbury sandstone woodland, followed by the Narrabeen-Hawkesbury ironbark forest, the Sheltered Hawkesbury Sandstone forest and the Complex Hawkesbury sandstone sheltered forest. Of more limited extent, and located on richer and moister soils are pockets of rainforest and sheltered forest. Paperbark swamps are also recorded in poorly drained, alluvial areas (ibid.: 64-81).

One thing which is clear from this vegetation analysis is that the vegetation regimes across this hinterland area are extremely complex and variable. Geology is the major determining factor in the distribution of vegetation communities but Sanders et al. point out that the landforms are equally important, in an interrelated fashion. The ridges are much less varied geologically than the gullies, being predominantly capped by Hawkesbury sandstone. The gullies however, cut through a range of geological strata as well as colluvium and alluvium (ibid.: 82-6), providing a complex mosaic of soil types and vegetation communities in these locations.

Thus while the economic resources of this true hinterland are significantly reduced in comparison with the maritime or estuarine environments, it can be expected that the resources of this area were not marginal since the complex distribution of the vegetable resources would have ensured ecological variability and localised resource rich high-value patches (cf. Fletcher-Jones 1985).
2.6 Conclusions

The Sydney region is generally described as a fertile coastal zone. The environmental conditions across the region, however, vary in terms of localised biomass. Two main zones are defined for this work, the being the coastal and hinterland zones.

Localised resources could be expected within these broadly defined environmental zones. Geological variation is known to delimit the extent of particular lithic resources (eg. silcrete is found in cobbles of the St Mary's formation on the Cumberland Plain; the gravel beds of the Nepean are a localised source of cherts and indurated mudstone; quartz is ubiquitous across the Hawkesbury sandstone formation (although good quality sources are not common); axe quality basalt occurs across the region in localised areas (eg. Kulnura, Mount Yengo, Prospect, Barranjoey headland).

Food resources would also not have been dispersed evenly across the region. The maritime or coastal influence (including estuarine resources) extends approximately 10km inland along major river systems (i.e. to Mangrove Creek along the Hawkesbury River; the Lane Cove River on Port Jackson; Mill Creek on the Georges River). Fish, waterbirds and eels would have contributed significantly to the diets of those living further inland. However, even in close proximity to major waterways, there could not have been the same degree of maritime specialisation afforded by the coastal zone.
Chapter 3
Ethnohistoric and Early Sources

'Ethnography tells us nothing about the past unless we make it do so.'

(Davidson 1988:17)

3.0 Introduction

Archaeological evidence suggests that the Aboriginal populations observed in the Sydney region at the time of European settlement had not remained unchanging throughout the Holocene. Changes in stone tool technology (e.g. McCarthy 1948, 1978, Bowdler 1970, Lampert 1966, 1971a), the apparent late introduction of a specialised coastal economy (e.g. Lampert 1971b, Sullivan 1987, Walters 1988) and the possible variations in size and movement of populations in the recent past (Attenbrow 1987, Hiscock 1986, Kohen 1986) all demonstrate a social dynamic (Chapter 4). While being wary then, of a 'timeless ethnographic present' (Meehan and Jones 1988:viii), this section seeks to establish a model, with certain behavioural parameters, for the study of the prehistoric Sydney Basin rock art style. Certain constraints are placed on this model by archaeological realities, which will be discussed more fully in Chapter 4.

The Aboriginal society around Port Jackson was not studied systematically, in the ethnographic sense, by those who arrived on the First Fleet. Numerous accounts were made of the more obvious aspects of Aboriginal culture (e.g. Bradley 1786-92; Collins 1798, 1802, 1804; Dawes 1790; Hunter 1793; Phillip 1789, 1791; Tench 1793; Watling 1794; White 1790). Later, quite detailed references to Aboriginal life in the region were made (e.g. Barrallier 1802, Angas 1847, Threlkeld 1824-1859 in Gunson 1974, the Russians between 1814-1822 in Barratt 1981), but explicitly anthropological work was not undertaken in the region until the late 19th century, with Mathews' work (1896d, 1897c, 1897e, 1898b, 1900, 1901, 1908; Mathews and Everitt 1900) on the languages and social organisation of tribes in south-eastern Australia.

Within two years of contact, an epidemic of (probably) smallpox had reduced the local population to less than half (Phillip 1791, Tench 1793, Collins 1798, Butlin 1983, Curson 1985), irreparably changing the traditional social organisation across the region. Many of these references then, particularly those made after 1790, should be viewed with appropriate caution:-

Leaving aside white misunderstanding and prejudice, were whites able, at any stage after 1789, to observe a stable black society? Is the ethnographic evidence not only limited but positively misleading? ... (Butlin 1983:155)
Mathews' work is the most anthropological in approach. This, however, took place in already decimated communities living in much altered circumstances more than 100 years after contact, and after a second epidemic of smallpox in the 1830's (Butlin 1983, Curson 1985). The detail in his works must therefore be considered in the light of these constraints.

While the Sydney ethnohistory is disjointed and its interpretation requires many 'leaps of faith', it has been pointed out that the First Fleet journalists were, in fact, 'trained military observers' and that the very survival of the colony depended on 'their observations and assessment of the 'enemy'' (Isabel McBryde, pers. comm., 1990). Also, in the early days of the colony, there was an atmosphere of philanthropy, with a humane Governor Phillip intent on carrying out orders to 'establish with th[e native inhabitants] a strict amity and alliance' and to treat them 'with the utmost kindness' (Phillip 1789[1970]:36). Thus, many of the descriptive accounts are useful in establishing daily activities of the Port Jackson Aborigines at 1788. However, the accompanying interpretations and conclusions, particularly about the more abstract qualities of Aboriginal life, should be treated carefully.

In 1788 certain gross differences were observable between groups of people living in the region. These included tribal (family and language) groupings, economic divisions (based on environmental conditions) and social behaviour (gender divisions/prohibitions, ceremonies etc.). While this information is not sufficient evidence upon which to base an interpretive model, it does provide material and 'clues' for the interpretation of the stylistic patterning encountered in the art. Detailed regional, ethnographic interpretations have previously been completed in the region (Attenbrow 1988, Kohen 1986, 1988, Kohen and Lampert 1989, Lawrence 1968, Ross 1976, Vinnecombe 1980) and it is not the intention here to complete a detailed analysis. The conflicting nature of the behavioural models produced by these preceding analyses (cf. Kohen 1986, Poiner 1971, Ross 1976) requires a certain amount of reassessment nonetheless (Chapter 4).

My aim in this Chapter is to outline the relevant behavioural parameters used to assist in the interpretation of the art produced by the prehistoric inhabitants of the Sydney region. Of particular importance to this research are the social divisions which were recognised across the region, and the types of social 'boundaries' which might have existed between these. Stylistic behaviour depends not only on social cohesion, and the maintenance of social ties, but also on social exclusivity, and the maintenance of boundaries between groups of people (Wiessner 1983, 1990, Wobst 1977).
3.1 Social organisation, linguistic boundaries and population sizes

The Sydney region falls within one cultural-area group, the south-east coast (Peterson 1976). As such while the population would usually have subsisted in smaller localised groups, they would have formed part of a larger population group. The boundaries of these were determined by the importance of water which determined plant cover and hence available food (ibid. 1976:67).

The social organisation of the Aboriginal people around Port Jackson was observed as named groups associated with designated tracts of land. It was generally recognised that the basic economic unit in the region was the family group, several of which usually teamed together to forage in a fairly restricted area (Lawrence 1968:171). It can be assumed that the family group consisted of one or two adult males, their wives and dependants (young and old).

[They are] divided into families. Each family has a particular place of residence, from which is derived its distinguishing name. This is formed by adding the monosyllable Gal to the name of the place; thus the southern shore of Botany Bay is called Gwea, and the people who inhabit it style themselves Gweagal. (Collins 1798[1975]:453)

Within a year of arriving in Sydney a number of named groups had been recognised by the First Fleeters; the Cadigal, Cammerragal, Wannegal, Wallumedegal, Gweagal, Boromedegal, Noronggerragal, Borogeal and the Gomerrigal (Phillip to Lord Sydney, 13 Feb, 1790; HRA 1,1 [1914]:160). Only the first six of these were provenanced. Linguistic information (Capell 1970, Dawes 1790) has since been used to supplement this list (Kohen 1988:Figure 2).

The complexity of arrangements between family groups (kin relationship), was not recorded. The presence of linguistic sub-groups was indicated by different dialects although the connections and social mechanisms which enabled the larger social or 'culture' group (def. Peterson 1976) to function were not understood. The division of territory was still less clear, although most early writers observed that smaller groups had specific connections with particular locations (e.g. Collins 1798[1975]:453, Hunter 1793[1968]:62).

When considering the nature of territories and boundaries (viz. information exchange theory), it must be recognised that these are not entirely useful concepts when it comes to viewing Aboriginal territorial organisation. The idea of 'walled enclosures' and an entrenched maintenance thereof, is not appropriate in the Australian prehistoric context. Aboriginal territorial organisation is much more complex than any Eurocentric concepts of individual, or even corporate, ownership. Rigsby and Sutton's (1982-3) paper even questions whether social, linguistic and political units are conterminous. Territorial
organisation of groups included considerations of estate, range, domain and ecological 'life space', as well as 'the pleasures and duties connected with the 'external structure' of social life' (Stanner 1965:2).

The anthropological literature is divided over the basic units of territoriality (e.g. Radcliffe-Brown 1951, 1954, Hiatt 1962, Stanner 1965, Peterson and Long 1985) and the bases for territorial organisation. Even definitions of 'the tribe' and its composite parts are not standard (cf. Tindale 1940, Berndt 1959, Birdsell 1970, Peterson 1976). There are, however, certain substantive matters which are basic to a consideration of territoriality in contact Sydney. By necessity these must be projected from ethnographic material generated elsewhere on the continent, due to the absence of ethnographic study of the extant Sydney region tribes.

Peterson (1985:v) has defined four concepts which must be considered in analysing territorial organisation:

- the band (the land-using group);
- the clan or estate group (the land-holding group);
- the estate (area held by a clan or estate group); and,
- the range (area used by a band).

The following generalisations regarding Aboriginal territorial organisation in the region are relevant:

i) the demarcation of defined tracts of territory and sets of totemic sites was usual in Aboriginal society. The extent of this area can be defined as the extent of the resident population's ecosystem (sensu strictu) (Peterson 1976:58). While the periphery of this may have been vague, the 'heartland' of any group's estate gave that group its habitation and name - 'the coordinates of existence which were those of no other group' (Stanner 1965:12);

ii) a kinship defined 'residence group' (or band) occupied a defined tract of land (the range). This small scale exploitative population combined for various economic reasons: conservation of effort, population pressure, seasonality and scheduling, a mixed diet and the division of labour (Peterson 1976:59). Band size is seen to vary considerably by region across Australia but reports of community sized groups as the usual residential group are not uncommon (Peterson 1985:50);

iii) residence groups comprised not only the members of the local descent (and therefore language) group, but wives, and also others of 'foreign agnatic stock' (Stanner 1965:11), and there was fairly fluid movement of individuals between one group and
another. Band size has been recorded as being remarkably consistent amongst hunter gatherers generally and Australia in particular (Paterson 1985). These are cited as variously being between 25-50 people with the optimum being 30 (Davidson 1938, Tindale 1974) with possible regional variations (Peterson 1985:38);

iv) in many instances, 'zones of indeterminacy' exist between adjacent groups 'without clash over title' (Stanner 1965:12). These and indeterminate tracts (used, for instance, as access routes) were not the exclusive possession of any one band.

v) the local group population was usually part of a larger regional or 'culture-area' population (Peterson 1976:51) and as such, shared a number of cultural traits and/or characteristics (Kroeber 1939, McCarthy 1940, Lampert 1971b). Visits between groups within such a region were ruled by convention. 'Constant interaction of this kind characterised both the religious and the secular life. There was a real interest in mixing with neighbours, and a strong moral requirement to share life-supports with them' (Stanner 1965:2). The evidence in the Sydney region is sparse [e.g. Collins (1798) and Howitt (1904)] but would appear to indicate that as many as 200 men or 600-800 people might congregate for the final sequences of initiation ceremonies;

vi) the Aboriginal life pattern had a marked polarity; the population aggregated and dispersed in successive phases. Periodicity and length of the phases varied considerably, but generally, the local group clustered in good times and dispersed in the bad.

vii) the degree of interaction between groups depended on general ecological conditions and good seasons, on population density and a tendency towards the conservation of effort; e.g. by division of labour and the ethic of reciprocity (Peterson 1976:58; Stanner 1965:3-7). Localised seasonal abundances, such as evidenced by the Bogong moth feasts (Flood 1980), the Bunya nut festivals (Morwood 1987), the annual mutton bird migration (Threlkeld in Gunson 1974:65, Lampert 1966:97), would also have encouraged interaction, as would have the (less predictable) 'windfall' resources such as beached whales reported in the Sydney region (Tench 1793[1961]:176, Bradley 1786-92:120, Collins 1798 [1975]:490, Threlkeld in Gunson 1974:55).

On the basis of these generalisations, certain parameters for the current analysis are clear.

Distinct bands, speaking separate languages or dialects would have been identifiable, and have inhabited discrete tracts of land. Given the relatively rich ecological conditions of the Sydney coastal region, each of these groups could probably have maintained a
degree of economic independence, since their ranges would have provided for the basics of survival (Stanner 1965, Godwin 1990).

These bands would have been part of a larger clan group, whose estate would have represented the extent of the land inhabited by that larger group of people with economic and ritual rights. This larger group is assumed in this work to be the language group (cf. Rigsby and Sutton 1982-3).

Interaction between the clan groups would have occurred on the periphery of these estates for economic activities. Shared ritual responsibilities would have required interaction between these sub-groups of the larger culture area, and social conventions would have controlled such visits. Ritual and economic relationships between people and land (Hiatt 1962:284, Peterson 1985:24), and the distinction between land-using and right-holding groups would have regulated this interaction.

Interaction between clan (or language) groups to hold ceremonies indicates larger scale group cohesion of the culture area population, and there is evidence that considerable stability in social activities is thus achieved; e.g. 'correct' designs are maintained on Pukamani Poles amongst the Tiwi by supervision from neighbouring (totemically related) individuals (Hart 1970). Hiatt (1965) records similar 'owner/manager' interaction in Gidgingali ceremony, as they have been made to bark painting production (Morphy 1977, Taylor 1987, 1989).

This same social organisation can be construed in the Sydney area. Collins commented (1798 [1975]:467) on an initiation ceremony which could not commence in the absence of elders from adjacent 'tribes'. The ethnohistoric observations made in the region suggest that social organisation existed as a fairly fluid network. Similar social customs (as manifested by ceremonial behaviour) were manifested in various parts of the region, and these appear to have relied on ritual relationships with neighbouring groups. Large aggregations of people were recorded on various occasions, the purposes of these being variously described as for social events or ritual (see below).

Specifically anthropological descriptions of social organisation in the Sydney region were made by R.H. Mathews (although see comments above, Section 3.0). He states that all members of the Darningung community were segregated into two moieties (phratries) Dilbi and Kuparthin, whose names correspond with the Kamilaroi (Mathews 1897e:161, 170). Each moiety was further subdivided into two sections, for the Darningung these were named Bya and Kubbi (for the former moiety) and Ippai and Kumbo (for the latter). On the basis of these moieties and sections, totemic affiliation and marriage relations were determined. Totems consisted of animate or inanimate
objects, such as animals, plants, heavenly bodies, the elements or seasons. 'Names selected from the animal kingdom are far the most numerous; next come the names of plants; and after that all the totems are more or less rare' (ibid. 1897e:157). Mathews named some of these totems. For Bya and Kubbi totems included scrub possum, emu, bandicoot, eaglehawk and wallaroo; for Ippai and Kumbo, grey kangaroo, diamond python, wombat, black snake and wallaby (ibid. 1897e:171). While totemic affiliation controlled many social interactions, it did not dictate general economic activities; 'members of each group, and consequently of the totems also, [were] found in all the local divisions of the tribe' (ibid. 1897e:159).

Mathews notes that the Darkung tribe had 'uterine [matrilineal] descent' (ibid. 1897e:170), with a dispersal of male and female members of the same totem. Conversely, Mathews records that the Gandangara speaking tribes (which by implication include the Darug: see below) had patrilineal descent, but that the women married out of the group into which they had been born (Mathews and Everitt 1900:264). Here, while the females of the same totem were dispersed by marriage, the males of the same totem, would have co-resided: there was patrilineal descent and virilocl residence.

Peterson (1986:17) indicates that these post-marriage arrangements would have resulted in two different types of residential groups, with the Darkung exhibiting characteristics of the mixed group and the Gandangara adhering to the characteristics of a kin group. Peterson argues that the latter situation was the culturally proscribed ideal, both anthropologically (e.g. Radcliffe-Brown 1931) and by individual adult men. The former, however, was probably more common. Most groups probably oscillated between the two, depending on economic obligations and ritual (Peterson 1986:26).

Several early commentators noted an inequality amongst the 'tribes' around Port Jackson, stating that the Cammaraygul (from the north shore) were the largest and strongest group by the 'influence of their numbers and muscular appearance' and that 'there is no doubt of their decided superiority over all tribes with whom we were acquainted' (Collins 1798[1975]:453). These comments were recorded after the 1789 epidemic, which is known to have greatly affected the groups on the southern shore of Port Jackson¹. This relative 'superiority' may have reflected the survival of an intact band of initiated people upon whom the relict bands depended for continuing social activities and cohesion. However, the possibility of one group in the region exerting overriding control in the social sphere is a possibility which should be considered.

¹ the Cadigal dialectic group, from east of Farm Cove were reputedly reduced from 30 people to three by this disease (Collins 1798 [1975]: 497).
Linguistic Evidence

The linguistic evidence for the region indicates the presence of discrete language groups (Capell 1970, Dawes 1790, Mathews 1897c, 1901, Mathews and Everitt 1900, Threlkeld in Fraser 1892, Tindale 1974, Troy 1990). This evidence is sketchy, and there are conflicting views on how it can be interpreted (Kohen 1986, 1988; Kohen and Lampert 1988; Ross 1976, 1988). The boundaries between these different language groups, as well as inter-relationships between these create the greatest disagreement in archaeological interpretation (Chapter 4).

The geographic distribution of linguistic groups within the region relies heavily on late nineteenth century research into relict groups and regions, i.e. Kamilaroi and Wiradjiri (e.g. Mathews 1897c, 1897e, 1903, 1904). Linguistic evidence collected at contact was largely in the form of unprovenanced word lists (Collins 1798:Appendix XII, Hunter 1793[1968]:523, Tench 1793[1961]:291-3), although the Dawes (1790) manuscript provides a detailed and comprehensive analysis of the Sydney language. This exciting document details interaction between several notable Sydney Aborigines such as Barangaroo and Benalong (e.g. Dawes 1790:14).

Lancelot Threlkeld arrived in Sydney in the 1820’s and completed a detailed and provenanced grammar of the Guringai language sometime thereafter (Capell 1970). This agrees with a vocabulary by J.F. Mann (Capell 1970), completed in the 1870’s and based on the information of Long Dick, son of Bongaree. The Dawes, Threlkeld and Mann manuscripts, while giving detailed vocabularies, do not indicate the geographic extents of these languages.

Mathews' work in the region defined three distinctive languages, the Darkung, Gandangara and Tharawal. Darug was defined as a dialectic variation of Gandangara (Mathews and Everitt 1900:265). These four languages provided an incomplete coverage of the region, as they did not include the coastal area north the Hawkesbury (specifically) and possibly also north of Port Jackson (Capell 1970). Mathews placed the Darkung to north of the Hawkesbury River in the drainage basins of the Macdonald and Colo Rivers, Putty Creek and Wollombi Brook (Mathews 1897c:1). The Gandangara were said to have existed in 'the coastal district ... from the Hawkesbury River to Cape Howe, extending inland to the Blue Mountains, and thence southerly ...' (Mathews and Everitt 1900:262). The Tharawal speaking people were spread over the coast from Port Hacking to Jervis Bay, ...extend[ing] inland for a considerable distance

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2 The spellings for the names of these languages vary between sources. Unless being directly quoted the spellings used throughout this thesis will be Guringai, Darkungung, Darug, Tharawal and Eora.
3 Bongaree was 'king ... of the Pittwater tribe' (Macquarie 1822:258) or 'Broken Bay tribe' (Barratt 1981: Plate III).
(Mathews 1901:127). Mathews recorded *Darug dialect being spoken at 'Campbelltown, Liverpool, Camden, Penrith, and possibly as far east as Sydney, where it merged with *Thurrawal' (Mathews and Everitt 1900:265).

Ross (1976) and Kohen (1988) provide conflicting syntheses of this early material (Chapter 4). Capell's (1970) model, based on linguistic evidence, is described here.

Capell concludes that four language groups (each with varying numbers of recorded dialects) existed in the region at contact. These were *Guringai, *Darkungung, *Darug and *Tharawal (Figure 3.1). The presence and location of the *Gandangara language is not discussed in Capell's paper.

Figure 3.1: The four language areas defined for the region (after Capell 1970:Figure 1).
The *Guringai* inhabited the coast between Port Jackson and somewhere (unlocated) north of Wyong, where it met the *Awaba* language (Threlkeld in Gunson 1974, Mann 1885).

The *Darkung* speakers occupied land to the west of the *Guringai*, north of the Hawkesbury River (following Mathews 1897c). The boundary between the *Guringai* and *Darkung* is along Mooney Mooney Creek (cf. Kohen 1986, Smith 1983) and thence northerly (Capell 1970:22). The *Guringai*’s western neighbours south of the Hawkesbury were the *Darug* speakers. This boundary is placed along Berowra Creek and the Lane Cove River to the northern shore of Port Jackson.

*Darug* speakers inhabited the area south of the Hawkesbury River covering the Cumberland Plain and including the upper reaches of the Georges and Nepean Rivers. South and/or east of the Georges River between the *Darug* and the coast were the *Tharawal* speakers, their southern boundary occurring well south of this study area (cf. Tindale 1940).

Between the *Guringai* and *Tharawal* on the coast, Capell places a dialect ‘or even sub-dialect’ (1970:22) of *Darug*, which he calls the ‘Sydney’ language, described elsewhere as the *Eora* (Tindale 1974, Troy 1990). The extent of this dialect was ‘limited to the peninsula on which Sydney now stands’ (1970:22). This designation is based primarily on the fact that both *Tharawal* and *Guringai* are ‘affix-transferring’ languages, but that *Darug* is not (Capell 1970:21).

An inherent problem with Capell’s organisation is the nature of several of his located boundaries, specifically those along creeklines such as Mooney Mooney and Berowra Creeks. It may be more logical to have boundaries designated on the basis of catchment areas (viz. Peterson 1976) rather than running along rivers/creeks, i.e. dissecting catchments and probably band ranges. Mathews’ (1897c) description of *Darkung* territory supports a watershed model, and certainly in the rugged and drier area occupied by the *Darkung*, it makes sense that the ‘heartlands’ of these clan estates were based on catchments.

There is evidence that ridgelines in the Sydney region, e.g. the Boree Track and Kulnura/Peat’s Ridge, were used as access routes (and see Ross 1976:Map 2.1). Due to the rugged sandstone landscape, movement around the region would have been mostly by way of ridgelines. It makes sense that major access routes would have occurred in ‘zones of intermediacy’ (Stanner 1965:12), on the periphery of a clan’s estate (and see Layton 1989:2, 1992b:9). Following this line of argument, it would seem
unlikely that boundaries between clan estates would have been along creeklines, except perhaps if these were large enough to allow easy access by way of canoe.

There is conflicting evidence about this issue. The linguistic evidence indicates that Broken Bay, a significant physical barrier, was not a language boundary. Ethnohistoric evidence suggests that the people on the Hawkesbury in the vicinity of Richmond Hill lived on both sides of the river - 'on the opposite bank of the river they had left their wives and children' (Tench 1793[1961]:230, *my emphasis*). At the south of the region, however, the Georges River appears to have been the boundary between the *Eora* and *Darug*, to the north and west, and the *Tharawal*.

There is no dispute that distinctive linguistic divisions existed within the region at European contact. The actual distribution of these groups across the landscape is less clear.

To the north and south of the region there is firm evidence for a separation of coastal and hinterland groups; the *Daringung* and *Guringai* in the north and the *Darug/Gandangara* and *Tharawal* in the latter. In the centre of the region, primarily covering the Cumberland Plain and Sydney peninsula, there is a suggestion of linguistic continuity between the coast and Cumberland Plain. This is only of marginal import to the current research, since the distribution of Hawkesbury sandstone, and thus art, is not extensive in this problematic area. Nonetheless, in pursuing stylistic variation and the possible link between linguistic boundaries and style boundaries, an acknowledgment of this problem is required.

For the purposes of this study, the distribution of the four language groups recorded at contact, the *Daringung*, *Guringai*, *Dharug* and *Tharawal*, will be tested according to Capell's (1970) model (Figure 3.1).

**Population sizes**

No accurate census of the Aboriginal population living in the Sydney region was made by the First Fleeters (Butlin 1983, Curson 1985). In 1788, several references were made to sightings of large aggregations of people. '[N]ative parties of between two and three hundred men, women and children' were seen on the northern seaboard of Botany Bay (Bradley 1786-92[1969]:112, 120; Collins 1798[1975]:25; Tench 1789[1961]:52) while Bradley describes a fight between 'about 200 of them [men and women] collected together' on the north shore of Port Jackson (1786-92[1969]:121; HRNSW 1[2] 1893[1978]:191). Phillip's early explorations of Broken Bay also record large groups of people around the shores of these waterways (Phillip 1789:41). At Manly Cove in late
1790 (when Phillip was speared) about 200 people were recorded as feasting on a beached whale (Tench 1793[1961]:176; White 1790[1962]:23).

Phillip did estimate the size of the population 'in Botany Bay, Port Jackson, Broken Bay, and the intermediate coast' to be in the order of 1500 persons (Phillip to Sydney, 10 July 1788, PRO, CO 201:3). This is thought to have halved as a result of the smallpox epidemic, by late 1789 (HRA:l, 1:159). Kohen (1986:43) estimates the 1788 population of the western Cumberland Plains (on the basis of ethnohistoric evidence) as being between 500 and 1000 people.

The validity of these estimates will never be known. The large aggregations of people sighted in numerous areas around Sydney Harbour were composed of mixed groups, some of whom had travelled a considerable distance (Tench 1793[1961]:176). The mobility of individuals and family groups, and therefore the unwitting counting of them more than once, cannot be overlooked. Conversely, the figures may be gross underestimates. While those Aborigines fishing and inhabiting the waterfront were clearly visible, those inhabiting the densely vegetated hinterland would have been practically invisible to early observers (Bowdler 1976:249). Ethnohistoric sources certainly suggest that the 'wood's tribes' were less populous.

It has been estimated that the population density for the Sydney Aborigines was between 5 - 10/square mile (Maddock 1975:23). This is a relatively high population density, although a common coastal (or riverine) density (Eyre 1845(II):372, Lawrence 1967:173). These population estimates do not take into account environmental variability within the region. While the hinterland contained a mosaic of soil types and vegetation regimes as well as localised areas which were resource rich (Chapter 2) the overall resources of the hinterland were significantly less than the maritime and estuarine zones. It cannot, therefore, be assumed that the population on the coastal strip was matched further inland. Kohen (1986) argued that the Cumberland Plain was densely populated while the coastal population was 'extremely dense' (Kohen 1986:40-41; my emphasis).

3.2 Landuse strategies and habitations

they did not encroach on each others' mode of getting a livelihood.
(Anon in Field 1825:468)

Early sources suggested that there was little contact between the coastal and inland tribes (eg. Tench 1793, Collins 1798[1975]). This was based on differences in economic behaviour as well as on findings made during early explorations that the Port Jackson Aborigines had no knowledge of the country north or west of Parramatta, nor
south of the Georges River (Phillip 1792, Tench 1793, Barrallier 1802). A complete separation of 'hunters and fishers' was reported, presumably in terms of coastal and inland groups, and some archaeological interpretations agree with this (Ross 1976, Kohen 1986, Kohen and Lampert 1988). Numerous references indicate that specific adaptation to different resources existed.

Along the coast, the protein portion of the diet was seen as being entirely based upon seafood. Captain Cook noted that 'shellfish is their chief support yet they catch other sorts of fish' (Cook [Beaglehole ed.] 1955:312). Collins gained some insight into the range of foods eaten;

Fish is their chief support ... the woods, exclusive of the animals which they occasionally find in their neighbourhood, afford them little sustenance; a few berries, the yam and fern root, the flowers of the different banksia, and at times some honey, make up the whole vegetable catalogue. ... The wood natives also make a paste formed of the fern-root and the large and small ant bruised together; in the season they also add the eggs of this insect. (Collins 1798[1975]:461-2)

From archaeological research, it would appear that this apparent seafood bias in the coastal diet has been overstated (McDonald 1992a, Megaw 1968a). At the Angophora Reserve site, maritime resources (i.e. fish and shellfish) contributed to less than 8% of the calorific content of food remains (Wood 1989:82).

Ethnohistoric reports indicate considerable diversity in the diets of the woodland and riverine groups and different adaptations to environmental conditions.

Barrallier in his expedition through Darug and Gandangara territory in the early nineteenth century, describes the swamps in the Nepean River area as being excellent sources of fish, shellfish and 'enormous' eels and he states that;

the people from this area usually fed upon opossum and squirrels, which are abundant in that country, and also upon kangaroo rats 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. (Barrallier1802 [1975]:2-3)

Such a kangaroo hunt, with a large group using fire, spears and 'tomahawks' was described near a Menangle Swamp. The participants were spaced at '30 paces ... [and] formed a circle which contain[ed] an area of 1 or 2 miles' (Barrallier 1802[1975]:3). Based on this description, in the order of 100 people may have been involved in this hunt, suggesting that such activities may have involved co-operation between several bands.

Lizards and grubs, 'particularly those which are found in the trunks of trees' (Barrallier 1802[1975]:6, Collins 1798[1975]:462), were also documented as part of the diet. For
the purpose of collecting these grubs (*Cahbrogal*) a specific utensil was used, this being described as:-

a switch about twelve inches long and of the thickness of a fowl's feather ... One of the extremities of this stick is provided with a hook. ... [which is used upon finding evidence of these grubs in the bark of trees having] widened the hole ... with their axe ... dip their switch into the hole, and, by means of the hook, draw it out, and eat it greedily.  (Barrallier 1802[1975]:6)

Other specialised, inland, adaptations to localised resources include the 'squirrel traps' in hollow trees and 'decoys for the purpose of ensnaring birds' (Tench 1793[1961]:154-5). These decoys were assessed as having great utility as they were full of quail feathers. The accounts described these structures as complex (see also Phillip in *HAR*, 1:156 and Collins 1798[1975]:462) and that they were made of reeds and 'underwood'. They were described as being 'long and narrow, shaped like a mound raised over a grave; with a small aperture at one end for admission of the prey; and a grate made of sticks at the other' (Tench 1793[1961]:154-5). One such structure described by Collins 'was between 40-50 feet long' (1798[1975]:462). He also describes animal and bird traps near inland lagoons as consisting of excavated holes with camouflaged tops (*ibid.*).

Early accounts remarked on the facility with which men of the inland tribes climbed trees (Hunter 1793, Tench 1793, Collins 1798, Barrallier 1803). This was done for the purpose of obtaining possums (usually with assistance of smoke) and was achieved by cutting notches for toeholds 'with a stone hatchet' (Hunter 1793[1968]:430), Tench 1793[1961]:233). Kohen (1986:46) argues that possums and other tree dwelling animals were indeed the staple of the woodland tribes, and that edge-ground hatchets were the dominant subsistence item in the inland toolkit.

**Living sites**

Their habitations are as rude as imagination can conceive.

(Collins 1798[1975]:460)

Many early references comment on the bark huts used as Aboriginal dwellings across the region. The coastal versions of these were described as being larger than the inland ones, being 'formed of pieces of bark from several trees put together in the form of an oven with an entrance ... large enough to hold six to eight people' (Collins [1975]:460). Worn-out canoes were often recycled for this purpose (*ibid.*). Tench described a group of five such huts on the northern arm of Botany Bay as a village (1793[1961]:210). Given the above estimate of the holding capacity of these, groups of up to 40 people could have been so accommodated. There are other references to 'villages' on the sea coast around Botany Bay and Pittwater (e.g. Collins 1798[1975]:47, Worgan 1788[1978]:26).
The huts of the 'woodsman' (Collins 1798[1975]:460), were described as being made of the bark of a single tree, bent in the middle and placed on its two ends on the ground 'exactly resembling two cards, set up to form an acute angle' (Tench 1793[1961]:154; and see Phillip 1789[1970]:55-57) and 'affording shelter to only one miserable tenant' (Collins 1798[1975]:460). These shelters (gunyahs) would be grouped together, up to a total of nine (Barrington 1802:20).

Observers also noted the use of rockshelters;

They appear to live chiefly in the caves and hollows of the rocks, which nature has supplied them with, the rocks about the shore being mostly shelving and overhanging so as to afford a tolerable retreat. (Barrington 1802:20)

Collins also commented on the occupation deposit found in shelters, stating:-

these proved a valuable resource to us, and many loads of shells were burnt into lime, while other parts were wheeled into gardens. (Collins 1804[1910]:306)

The flimsy bark constructions in the open have not survived in the archaeological record as well as habitation evidence within shelter locations (away from Port Jackson gardens; cf. Attenbrow 1990, Bowdler 1971). The fact that the majority of Aboriginal occupation evidence for the region derives from shelter sites is significant, given that shelters may not have represented the predominant location for habitation at contact (Koettig 1976; see discussion Chapter 4), or perhaps in the last millennium (Attenbrow 1987).

3.3 Material culture

The material culture of the Sydney region is poorly represented in large museum collections4 (Lampert and Konecny 1989). Drawings and descriptions in journals (e.g. Watling 1794, White 1790[1962] and see Barratt 1981) are thus the best source of this information. These have been discussed and illustrated extensively in previous research (Attenbrow 1988, Kohen and Lampert 1988, Lampert 1988, Lawrence 1968, McBryde 1979, 1989, Megaw 1967a, 1969, 1993; Ross 1976) and only relevant aspects will be described here.

Of interest here are regional and localised differences noted by early diarists, in particular, those aspects which may be depicted in the art.

Items of material culture include those used for fishing, hunting and collecting as well as weapons. The men's repertoire included spears (hunting, fishing and ritual), spear

4 There are sizeable Australian collections in the British and Pitt Rivers Museums, in England, but the number of items deriving from Sydney - the point of first contact with European settlement, is not large. Scattered items are currently being discovered in obscure museums around the world by Ian Coates' (ANU) PhD research (pers. comm.).
throwers, clubs, ‘swords’ or boomerangs, shields (bark and wooden), and stone hatchets (Bradley 1786-92[1969]:121-8; Collins 1798[1975]:487; Hunter 1793[1968]:55; Tench 1789[1961]:50, 1793[1961]:184,191,200; White 1790[1962]: 152). The women's collection of belongings included fishing hook and line, digging sticks, various bark items (e.g. dilly bags, fishing tackle, water baskets), wooden bowls and large shells used as containers (Collins 1798[1975]:461; Hunter 1793[1968]:63; Tench 1793[1961]:143-6, 186; White 1790[1962]:157, 201, Threlkeld in Gunson 1974:54, 66-8; Bellinghausen in Barratt 1981:35).

Shell vs stone

Differences in material culture in hinterland and coastal zones give a better indication of adaptation to different environmental conditions, than to social diversity. It has been suggested that an absence of stone tools on the coast at contact may have been due to a local absence of suitable raw materials (Ross 1990:10), and that breaks in trade links in the last millennium left the coastal people bereft of this resource (Kohen 1986:320). Geological findings (Chapter 2) indicate that the necessary lithic resources were available in the coastal zone, and a decline in trade links cannot be used to explain this absence or to account for lithics dropping out of the tool kit.

Most ethnohistoric sources state that the coastal people used shell to the exclusion of stone. They hafted it into their spear throwers (Collins 1804[1910]:320, White 1790[1962]); used it as spear barbs (Collins [1910]:320); and raised cicatrices 'using the shell hafted to their throwing sticks' (Collins 1804[1910]:305:and see Watling 1794). Tench states that they also used the shell 'affixed to the end of the throwing stick' to cut up whale meat, in preference to axes (Tench 1793[1961]:177). Shell was also used for wood working (Phillip 1789:45). Women were recorded making shell fish hooks by grinding shell (Turbo) with sandstone files (Bradley 1792:92, Collins 1804[1910]:307).

The use of bone as barbs on (fishing) spears (Collins 1804[1910]:307, White 1790[1962], Megaw 1969:213), is also well documented on the coastal strip, while stone was apparently only used by the woodland tribes on 'death spears', such as that which wounded, and eventually killed, the convict McIntire in 1792 (see below).

Spears

Hunting, fishing and 'death' spears were distinctive types in the region at contact. These were distinguishable on the basis of the number and manner of shafts, prongs and barbs used.
Fishing spears ('fiz-gigs') were variously described as having four bone barbed prongs; ['it was] made of the wattle; ha[d] a joint in it, fastened by gum [as were the prongs]; [it was] from 15-20 feet in length ...' (Collins 1798[1975]:561). Cook's description indicated the use of 'very sharp fish bone in the prongs' (Phillip 1789[1979]:315). White also described the use of fish teeth and sharpened Xanthorrhoea cane for barbs on these spears. He also noted that 'the shaft on this instrument is punctured in many places with very small holes, to the pith in the centre, but for what purpose is unknown' (White 1790 [1962]:Plate 37)⁵.

Hunting spears were not specifically described amongst the coastal peoples' equipment, although Collins did refer to spears which were 'only pointed; ... either shaped from the solid piece of wood of which the spear is made, or fastened on with gum' (Collins 1798[1975]:487).

The 'war-spear' was described by White (1790[1962]:Plate 37) as being 'formed of a light reed-like substance [probably Xanthorrhoea] ... the long pointed head is of hard wood, of a reddish colour, and is fastened into the shaft in the firmest manner by a cement of yellow gum'. It would appear from White's drawings that this variety was shorter than the fiz-gig.

A 'death spear' is variously described in relation to the killing of Phillip's gamekeeper, McIntire. It was said to have had 'a wooden barb (some seven and a half inches long) and several smaller ones of stone, ['red' (St Mary's Formation silcrete?) according to Hunter 1793[1968]:495] fastened on with yellow gum, most of which, owing to the force necessary in extraction, were torn off and lodged in the patient' (Tench 1793[1961]:206). Collins' reference to this event varies only in the description of the spear being 'armed for five or six inches from the point in ragged pieces of shells fastened in gum' (Collins 1798[1975]:118; my emphasis).

**Spear throwers**

Spear throwers were described in detail by Collins and White. Collins describes two types of spear throwers:

> [the] Wo-mer-ra, is armed with the shell of a clam, which they term Kah-dien, and which they use for the same purpose as we use a knife. The other, which they name Wig-goon, has a hook, but no shell, and is rounded at this end. With this they dig the fern-root and yam out of the earth, and it is formed of heavy wood, while the woomera is only part of a wattle split. (Collins 1798[1975]:487)

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⁵ This comment is extremely interesting in light of recent aerodynamics research on javelins. The University of Technological Sciences in Budapest found that pockmarked javelins stay airborne longer, as well as flying flatter and 3-5% further, than smooth skinned javelins (SMH 28.8.90: 44).
An additional detail added by White's description is that the shell was hafted using Xanthorrhoea resin (White 1790 [1962]:Plate 37). White does not mention the second variety of spear thrower, which sound remarkably similar to the Cohbra grub switch (Barrallier 1802 [1975]:6).

Shields

Two types of shields were described in contact Sydney. The first was quite light, being made of bark. This type was used by children in practice combat, in defense against sharpened reeds [with] which they are soon expert' (Collins 1798[1975]:466).

Threlkeld describes most comprehensively the construction of the wooden shields, albeit from around the Lake Macquarie area (Awabagal/Guringai tribes). These were 'three feet long by eighteen inches ... lozenge shaped, pointed at top and bottom, and pigeon breasted rather than flat. ... The shields are always painted with white pipeclay and are generally ornamented with a St George's Cross, formed by two bands two or three inches wide, one vertical the other horizontal, coloured red ... ' (in Gunson 1974:68). Rossiyisky describes the wooden shields from the Sydney area very similarly, although noting that 'they are daubed with various red and white figures' (in Barratt 1981:23; my emphasis). Bellinghausen adds that these shields had a 'dry white colouring substance over which was painted red stripes' (in Barratt 1981:41).

No mention was made in any of the early references to shield designs varying across the region, although Campbell's illustration of a Yoo-lang ceremony (1798[1975]:Appendix 6; Plates 4, 5 and 6) shows a variety of shield designs, none matching that of Threlkeld (and see shield designs and other material objects depicted in drawing of Bennelong in McBryde 1989:Plate 19).

Further reference is made to this item of material culture in the synchronic analysis of the art. The shield motif, particularly in the engraved assemblage, is dispersed widely along the coastal strip.

Canoes

Many references were made to the watercraft observed on Port Jackson, and Tench stated that canoes found on the Nepean 'differed in no wise from those found on the sea coast' (1793[1961]:155).

The canoes in the harbour were variously described as being extremely flimsy, 'nothing more than a piece of bark tied up at both ends with vines' (1789 [1961]:48). Indeed, Tench and several others refused in apprehension the offer for a 'lift' across the
relatively narrow South Creek (Cumberland Plain) in one (Tench 1789 [1961]:235-6). Aboriginal women were observed fishing in these, several miles off the Sydney Heads (Tench 1789[1961]:48).

They were manoeuvred using two paddles like pudding stirrers (Bradley 1786-92[1969]:68, 130). They were recorded as usually having a small fire in the bottom, set on clay and seaweed (Tench 1789 [1961]:48) with which the catch was cooked and/or for warmth and light when night fishing (Bradley [1969]:130).

3.4 Ceremonial and mortuary behaviour

Ceremonies and rituals

The evidence for local ceremonial behaviour is of primary importance in the assessment of the nature of social interaction across the region. Linguistic differences indicate a separation of groups across the landscape, but that these were not mutually exclusive. The cultural behaviour observed, as manifested in ceremonial activities, indicates that there was an overriding similarity and larger scale group cohesion operating amongst the peoples of this culture area. These people, however, spent most of their time in distinctive areas, speaking different languages and/or dialects.

Corroborees were observed in the first years at the settlement, and there is evidence that both genders took part in these (Collins 1798[1975]:486). Dancing and singing played an important part in ceremonial behaviour as did body painting (see below).

All groups from the hinterland were described as having very similar bungung or ceremonies (e.g. Mathews 1897c, 1897e). The main reason cited for these ceremonies was the initiation of young men. A subsidiary reasons was the resolving of 'tribal wrongs which may have been perpetrated since the last initiation gathering' (Mathews 1897c:10).

The ethnohistoric and later reports all describe the initiation ceremonies as involving a number of neighbouring 'tribes' and large gatherings of people (Collins 1804[1910]:311; Mathews 1897c:1-2; Mathews and Everitt 1900:276). Men only took part in the initiation of young men. The women remained in a separate camp (Mathews 1897c, Mathews and Everitt 1900), where it could be presumed (Bell 1983) that they undertook ceremonies of their own. Indeed Mathew’s description of the women during the bungung ceremony, suggests just this:

Every morning the mothers of the novices, accompanied by all the old women of the tribes present, repair to the watvour [a specially prepared area], and light one or more fires in the cleared space, around which they sit and sing songs which have reference to the novices. ... These women are collectively known as the yanniwa,
and the young women or children, or any of the men, are not permitted to go near them when assembled at the wayoor. (Mathews 1897c:7)

Mathews describes the ceremonies of the Darkung and Gandangara as involving the construction of bora rings and ground sculptures, the latter usually involving large earthen sculptures of Daramulan the 'sky god' (Mathews 1904:see below). There is no suggestion amongst any of these sources that rock engravings of such figures served this same purpose.

Collins' description of a Yoo-lang tooth evulsion ceremony (1789[1975]:466-86; plates 1 - 8) is based on an eyewitness account made on the 25th January 1795. The ceremony was held in Farm Cove in Cadigal territory, and was presided over by the Cam-mer-ray elders. Also present was 'Pemulwoy - a wood native' (Collins 1798[1975]:466) and leader of the Botany Bay Bidiagal tribe (Bridges 1970, Dawes 1790). No bora ring was constructed, or earth sculptures built, but an ovoid area was cleared.

Mathews described tooth avulsion of all initiated males in Darkung, Gandangara and Tharawal speaking areas (Mathews 1897c, Mathews and Everitt 1900). Collins (1798[1975]) also described the practice in the Sydney Eora area. Phillip described the Guringal Pittwater people as also 'missing a front tooth' (HR NSW1[2] 1893[1978]:131). However, there is conflict in the ethnographic literature, as collected by Mathews, and ethnohistoric documentation of this trait.

Mathews is unequivocal in his description of tooth evulsion taking place, specifically amongst the Darkung and the Gandangara. He says of the former:

the time spent at [these ceremonies] occupies about a fortnight. ... About the middle of this period, preparations are made for the extraction of one of the novice's upper incisor teeth. (Mathews 1897c:7)

and;

Early the next day the boys ...are shown a colossal horizontal image of Dharamulan ... After that, one of the front upper incisors is punched out of each novice in succession. (Mathews and Everitt 1900:279)

On the other hand, one of the major stated differences between the coastal and inland people was that the latter did not practice tooth evulsion (Ross 1988:48, 1990:3-4). The statement is based on comments by Tench (and Phillip HR NSW 1[2] 1893[1978]:131), made on an early journey to the Nepean/Hawkesbury, in which two natives met with on the River had not 'suffered the extraction of a front tooth' (Tench 1793[1961]:230). However, during this same journey, an individual met by the party and identified as Ber-ee-wan of the Booroberongal tribe, was described by Tench
(1793[1961]:226) as 'differing in no respect from his countrymen with whom we were acquainted'.

The ethnohistoric sources, however are not unequivocal. Most sources only commented on the rare presence of both teeth, rather than the more common absence. Tench, for instance, comments that 'the deficiency of one of the fore teeth of the upper jaw, ... we have seen in almost the whole of the men' (Tench 1793[1961]:46; my emphasis); and, 'neither of these ceremonies [tooth avulsion and the removal of women's' little fingers (see below)] is universal, but nearly so. Why there should exist exemptions I cannot resolve' (Tench 1793[1961]:277). Phillip also noted (1789[1970]:42) that 'several old men were seen [in an excursion to Broken Bay] who had not lost the tooth nor had their noses prepared to receive that gross appendage [long bone or stick]' .

This evidence is not conclusive and could be interpreted in three ways. Either;

i) the people located in Port Jackson with both their front teeth were visiting the coast from inland tribes; or,

ii) tooth avulsion was not universal on the coast or inland; or,

iii) the men seen on the coast with both upper incisors had not yet been initiated (see Collins' comment about a novitiate who fled in fright during his *Yoo-lang* when it came time to remove his tooth (Collins 1798[1975]:481).

This issue is discussed in some detail here since the practices of tooth evulsion and other forms of bodily decoration (see below) are excellent examples of a public information system (Wobst 1977) operating in prehistoric Sydney. Indeed, in terms of boundary maintenance and group identification, these means would have been extremely effective. If tooth evulsion did occur in one part of the region and not in another, one might assume that a significant cultural boundary, or at least group affiliation, existed and was being demonstrated. Consequently, it might be expected that such a boundary could be demonstrated by stylistic changes in the art.

An archaeological investigation based upon museum skeletal specimens was pursued during this research in an attempt to resolve the problem. Unfortunately, due to the absence of skeletal material from the inland zone of the region, this was inconclusive. One interesting finding made during this analysis (to be reported on elsewhere) is that several female skeletons from the region also revealed evidence of tooth avulsion. The

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6 The collection at the Australian Museum was used for this purpose, as at the time of this research the Shellshear Museum (University of Sydney) was closed for renovations. Denise Donlon has since supplied me with supplementary evidence from that Museum's collection, which supports the general patterns identified in the larger Australian Museum collection.
ethnohistoric reports (and Mathews ethnographic descriptions) are quite specific that this was a (male) gender specific trait. Pardoe's work from the Riverina to Cape York has revealed that men and women in different regions do practise this custom, and that the proportions amongst the different genders vary between these regions (Colin Pardoe, pers. comm., 1991).

Given the archaeological evidence in this region and elsewhere (Colin Pardoe, pers. comm., 1991), and the conflicting details in the ethnohistoric and ethnographic accounts, it is more likely that there was considerable variability at the local level in this practice, the nuances of which were completely lost on the early observers.

Another gender and location specific trait was described for the coastal women in Sydney, and there are no conflicting reports on this practice. This form of identification involved the removal of the first two joints of the little finger on the left hand. There is no evidence that this was initiatory, in the normal sense of the word, since by all accounts it was performed very soon after birth;

the operation is performed when they are very young, and is done with a hair, or some other slight ligature. This being tied around at the joint, the flesh soon swells, and in a few days, ... the finger mortifies and drops off. (Collins 1798[1975]:458)

Collins interprets this as having a practical function; 'these joints of the little finger were supposed to be in the way when they wound their fishing lines over their hands' (ibid:458). It has elsewhere been interpreted 'fishing magic' (viz. Leroi-Gourhan 1968, Marshack 1972):-

[the mortified section] was taken out into the bay, and with great solemnity, committed to the deep. The belief was that the fish would eat this part of the girl's finger, and would ever, thereafter, be attracted to the rest of the hand from which it had come. Thus [she] would always have success at fishing because of the peculiar lure in her fingers. (Scott 1929[1982]:4)

Whatever the cause, this form of mutilation readily identified the women from the coastal tribes, and is firm evidence for the maintenance of group identification at a personal level.

**Mortuary Practices**

As the last and most disruptive of the 'rites of passage' ... , death is of considerable significance to any society and we stand to learn much from the examination of a society's response to death. (Pardoe 1988:1)

Pardoe argues that a society's treatment of the dead can indicate evidence for social organisation (1988:1). Along the Murray River he argues that cemeteries indicate the presence of a corporate descent group, a strong sense of territoriality - and the maintenance of boundaries (1988:14). Cemeteries are defined on four criteria; 'number of burials, contiguity, boundedness and exclusivity of site use' (ibid.). Pardoe also
suggests that coastal groups [Broadbeach (Haglund 1976) being an exception], 'whatever the land based organisation, ... did not use the cemetery as evidence of group affiliation and resource control' (ibid. 1988:14-5). This finding suggests that the network in coastal areas may have allowed a greater degree of interaction between groups; or perhaps, that other types of behaviours (e.g. art) in these contexts may have fulfilled this function.

In the Sydney region, the ethnohistoric records suggests that burial of the dead occurred in ad hoc, non-contiguous locations, usually in the open. Cremation and burial were the two forms of mortuary behaviour observed. There is evidence that grave goods were included with the deceased in both forms of disposal (Collins 1798[1975]:500, 502; Tench 1793[1961]:202). These goods involved personal possessions, and do not appear to have been ritual items (cf. Pretty 1977). Eyewitness accounts of Collins (1798 [1975]:500-4) imply that the method of disposal was age related and dependant upon the level of initiation and/or the gender of the deceased, as elsewhere in Australia (e.g. Meehan 1971, Haglund 1976, Pretty 1977);

The natives of New South Wales are accustomed to burn their aged dead, but the young people are buried beneath small tumuli. ... Should a woman die, having a child at the breast, the living infant is buried with her: the natives argue that as no one could be found to nurse the child, it is better for it to lie with its mother, than to be left to pine to death. (Angas 1847 [1969]:227-8)

The archaeology of the region indicates that people were often interred in living sites, and that such locations often contained the bodies of several individuals (viz. Dixon 1974, Harper 1899, Megaw 1968b, 1974, McDonald 1992a). While these sites contain more than one (and sometimes many) individual(s), these certainly do not rate as cemeteries by Pardoe’s criteria, mainly because of the association with other habitation evidence. There is a hint of a possible cemetery on Kurnell peninsula in Quibray Bay where a number of skeletons have been found (Megaw 1968b, Dixon 1974, Rich 1988), although again, many of these have been found in association with occupation evidence.

Some skeletal remains have been found in shelter art sites (Attenbrow 1992, Harper 1899, McDonald 1992a). There is no evidence, however, that there was any relationship between the burial process and the production of engraved or shelter art. It is possible that this contextual relationship was just not observed by the early writers, as there are also no early accounts describing interment in middens, dunes or shelters (the last only in relation to deaths resulting from the 1789 epidemic, e.g. Tench 1793, Collins 1798).
There is some evidence which suggests that body decoration, namely ochre body painting, may have played a part in the disposal process. Collins states that following the burial of Balioderee, certain individuals 'were painted red and white over the breast and shoulder' (1798[1975]:502), while women relatives of deceased persons covered themselves 'entirely in ashes' (ibid.:504).

The evidence for this behavioural aspect in prehistoric populations of Sydney is fairly superficial, as indicated again by conflicts in the ethnohistoric and archaeological evidence. There is no documentary evidence linking mortuary rites with the production of art. While this may have been overlooked by the early diarists, there is no evidence that art played any sort of significant role in mortuary processes, such as has been noted elsewhere in the continent. For instance, in the Central Queensland Highlands, there was a definite connection between burials and art production and commensurate low association with habitation evidence (Morwood 1979, 1992; Quinnell 1975; Walsh 1984; and see Brayshaw 1990).

There is also no evidence, as predicted by Pardoe (1988), that this coastal group engaged in boundary maintenance through the use of cemeteries.

3.5 Art

The early accounts of art in the region are minimal. None of the early writers sought informed opinion about the art they observed, and the conclusion most often drawn was that these were the doodles of children. One early reference (Angas 1847 [1969]) suggests that these sites were the domain of the local 'priests' (see below), but this was an observation made well after the impact of contact on social organisation within the region. It was only much later (e.g. Elkin 1949, McCarthy 1947b, 1956, 1959a) that ceremonial significance was attributed, by ethnographic analogy, to the engraved art in the region.

The earliest reference [22nd April 1788] to the widespread distribution of engraved Aboriginal art was made by Phillip:

In all the excursions of Governor Phillip, and in the neighbourhood of Botany Bay and Port Jackson, the figures of animals, of shields, and weapons, and even of men have been carved upon the rocks, roughly indeed, but sufficiently well to ascertain very fully what was the object intended. Fish were often represented, and in one place the form of a large lizard was sketched out with tolerable accuracy. On the top of one of the hills the figure of a man, in the attitude usually assumed by them when they begin to dance, was executed in a still superior style. (Phillip 1789[1970]:58)

Phillip expressed surprise that the local inhabitants had developed an art form prior to other aspects of 'civilisation', illustrating the First Fleeters' total incomprehension of the nature of the society confronting them.
That the arts of imitation and amusement should thus in any degree precede those of necessity seems an exception to the rules laid down by theory for the progress of invention. But perhaps it may better be considered proof that the climate is never so severe as to make provision of covering and shelter of absolute necessity. Had these men been exposed to a colder atmosphere, they would doubtless have had clothes and houses, before they attempted to become sculptors.
(Phillip 1788[1970]:58)

Other early commentators noted the presence of the engravings around the settlement. In Botany Bay; 'on many of the rocks are to be found delineations of the figures of men and birds very poorly cut' (Tench 1789[1961]:79). In Port Jackson various figures [are] cut on the smooth surfaces of large stones. They consisted chiefly of representations of the natives in different attitudes; of their canoes; of several sorts of fish and animals, and considering the rudeness of the instruments with which the figures must have been executed, they seemed to exhibit tolerably strong likenesses. (White 1790[1962]:141)

In the 1840's, George Angas 'rediscovered' the engravings 'cut into the surfaces of flat rocks in the neighbourhood, and especially on the summits of the various promontories about the harbours of the coast' (Angas 1847[1969]:201). Perhaps because of the intervening short history of European occupation, Angas was less willing to accept the indigenous nature of these 'Aboriginal sculptures in outline'. He and one of his friends took 'Old Queen Gooseberry' (Bungaree's wife) as a guide to visit numerous groups of carvings on North Head, and to tell them 'what she knew' about them (ibid. 1847[1969]:202).

Angas says 'at first the old woman objected, saying that such places were all koradji ground, or 'priests' ground', and that she must not visit them; but at length, becoming more communicative, she told us all she knew and all that she had heard her father saying about them' (ibid). Unfortunately, Angas does not record what he was told by Gooseberry.

Angas illustrates several carvings in his journal, although these consist of clumped groups of isolated motifs from as far afield as Point Piper, Camp Cove, Middle Head and Lane Cove (1847[1969]:274-6, Plates 1 and 2). The detailed recording of engraving sites (including their geographic locations) did not commence until the late 19th century, when R.H. Mathews (e.g. 1895a, 1895b, 1895c, 1895d, 1896b, 1896c, 1897a, 1897b, 1897d, 1898a, 1899) and W.D. Campbell (1899) became interested in the task. W.D. Campbell produced the first comprehensive publication of systematically recorded engraving assemblages from the Sydney region (Campbell 1899:see Chapter 5).

Mathews, as already stated, was mainly interested in collecting ethnographic information about the social organisation of the Aboriginal people in south-eastern Australia. He
prodigiously documented ceremonial events practised in the late nineteenth century, which he described as the Bora Religion.

Baiame is the principal hero in the Bora mythology (Mathews 1904:340) and is said to have had his home in an outcrop of granite near the town of Byrock, 460 miles (approx 740 km) from Sydney. The outcrop was called Bai by the Aborigines, this word 'signifying the semen of men and animals' (Mathews 1904:340). Dharamulan was a sort of half brother or near relative of Baiame's. His name is made up from dhura, thigh, and mulan, one side, the whole name meaning leg-on-one-side, as he is said to possess one leg only. ... He has a voice like rumbling distant thunder. It fell to his lot to separate the youths from their mothers and teach them the Burbung ceremonies. ... A buluroer is also frequently called Dharamulan; its humming sound, ... represents his voice. ...he has the magical power of changing his shape, and making his body smaller and larger at pleasure ... (Mathews 1904:343-5)

Radcliffe-Brown (1930) describes the general myth of the rainbow serpent as being 'the belief in a gigantic serpent which has his home in deep and permanent water holes and represents the element of water which is of such vital importance to man in all parts of Australia' (ibid. 1930:343). In New South Wales he states;

[the] cult of the karia (rainbow serpent) was often an element of the Bora or initiation ceremonies of the NSW tribes. ... Many of the sacred Bora grounds had representations of the serpent in the form of a sinuous mound of earth up to 40 feet or more ... beliefs about the rainbow serpent were explained to the younger men, [as they were for] Baiame [whose representation in earth occurred at] practically every Bora ground ... (Radcliffe-Brown 1930:345)

Mathews (1904) also details some 'miscellaneous superstitions' from the Sydney region. The Darkungung are said to have had a 'mythical malevolent creature resembling a man whose body had a red glow like burning coals, who had his abode in rocky places on the sides and tops of mountains. ... His name was Ghindaring ...' (Mathews 1904:345). More shall be made of this creature in the discussion of culture heroes in the shelter art component (Section 9.5).

The Gandangara and Tharawal had an aquatic monster called Gurungaty, who 'resided in deep waterholes, and would drown and eat strange blacks, but would not harm his own people'. The Tharawal had another fabled monster Mumuga, who possessed great strength and resided in caves in mountainous country. He had very short arms and legs, with hair all over his body but none on his head. While being unable to run very fast, 'he evacuates all the time as he runs, and the abominable smell of his ordure overcomes the individual, so that he is easily captured' (Mathews 1904:345). Of these three more obscure characters, McCarthy has identified only one (Gurungaty) in rock engravings (McCarthy 1947b). McCarthy in this same publication identified an engraving site near Cattai in Darug territory as containing a depiction of this 'aquatic monster'.

Ethnographic and early sources ...
Mathews was particularly taken by the similarities between the Sydney engravings and the earthen sculptures created as part of the Bora ceremony.

A comparison of Mathew's sketches of earthen sculptures (cf. Mathews 1896a:Plate 1) with the Sydney style engravings does reveal some similarities: both are simple outline depictions, mostly large, of anthropomorphs, birds and animals. Elkin (1949) and McCarthy (1961) made much of these similarities in their interpretations of the Sydney art. In particular, Mathews' and Howitt's documentation of the Bora Religion and its principal mythical 'culture heroes', the rainbow serpent, Dharamulan and Baiame (Howitt 1904, Mathews 1904, 1908, Radcliffe-Brown 1930) were pivotal to McCarthy's interpretations of the Sydney engravings (e.g. 1956, 1959a, 1961).

Elkin states that rock engravings 'were cut to serve as records and symbols of historical, moral and totemic import which could be and were interpreted' (Elkin 1949:32). The work of Elkin (1949), McCarthy (1961) and Sim (1966) is interpreted by Morris (1978) as indicating that the second part of male initiation ceremonies took place at sites where rock engraving galleries were situated (1978:50), specifically those sites whose assemblages contained depictions of mythical beings (Elkin 1949:135, McCarthy 1959a:213, Morris 1978:43).

Morris explains Collins' eyewitness account in 1795 of such a ceremony, which does not mention the use of rock engravings, as being only a partial record of the overall event with the more secret-sacred aspect taking place in the absence of women and Europeans, presumably on a nearby engraving site. Collins account, however, describes only men and the novitiates as being present at the tooth evulsion ceremony that he witnessed (1798[1975]:467-85). Interestingly, Mathews also speculates that Collins only witnessed part of the entire ceremony, on the basis that no bora ring or earthen sculptures were mentioned in Collin's account (Mathews and Everitt 1900:281).

An alternative but equally appropriate interpretation, is that while the ceremonies within the region were analogous, they were not identical.

The unsubstantiated ethnographic analogies made by Elkin (1949), McCarthy (1961) Sim (1966) and Morris (1978) made about engravings in the region must be considered as tenuous. It is possible that the engravings were in some way connected with ritual behaviour, but this cannot be documented. The fact that eyewitness accounts of ceremonies (e.g. Collins 1798[1975]) and ethnographic descriptions (Mathews and Everitt 1900) do not mention the art as having a role in these ceremonies tends to weigh against it at European contact, if not prehistorically.

Chapter 3
3.6 Body marking and personal attire

Ambition must have its badges, and where cloathes (sic) are not worn, the body itself
must be compelled to bear them. (Phillip 1789[1970]:42)

Body decoration

It is obvious from early accounts that the Sydney Aborigines practised, and had a
considerable sense of, body decoration.

Notwithstanding the disregard they have shewn for all the finery we could deck them
with, they are fond of adorning themselves with scars, ... It is hardly possible to see
any thing in human shape more ugly, than one of these savages thus scarified, and
farther ornamented with a fish bone stuck through the gristle of the nose. The
custom of daubing themselves with white earth is also frequent among both sexes
... (Tench 1789[1961]:47)

While there is some question that the cicatrices observed were purely for decoration (cf.
Mathews 1898b, 1904), other aspects of personal adornment can had no other
purpose:

To their hair by the means of yellow gum, they fasten the front teeth of kangaroo,
and the jawbone of a large fish, human teeth, pieces of wood, feathers of birds, the
tail of the dog, and certain bones taken out of the head of the fish, not unlike human
thoughts?. The natives who inhabit the south shore of Botany Bay divide their
hair into small parcels, each of which they mat together with gum, and form them into
lengths like the thrums of a mop. (Collins 1798[1975]:457)

Collins further described the use of pigments for body decoration 'on particular
occasions', stating that red signified fighting, while white was used for the more 'peaceful
amusement' of dancing (Collins 1798[1975]:457). He also gave the fullest description
of the nature of body decoration, and indicates that there was considerable variation
present (see also illustrations by the anonymous Port Jackson painter, in McBryde
1989:Plates 9, 13, 31, 32). The descriptions indicates that body painting designs may
have personal (i.e. not a controlled group schema) although this is not certain. He says;

The fashion of these ornaments was left to each person's taste; and some, when
decorated in their best manner, look perfectly horrible ... In general waved lines
were marked down each arm, thigh and leg; and in some the cheeks were daubed;
and lines drawn over each rib, presented to the beholder a truly spectre-like figure.
... Both sexes are ornamented with scars upon the breast, arm and back, ... in some
instances these ... resemble the feet of animals. (Collins 1798[1975]:457-8)

Cicatrices

As well as the reference above made by Campbell, there is extensive evidence that
body scarification was widespread in the Sydney region (see illustration by the
anonymous Port Jackson painter in McBryde 1989: Plates 9, 11, 31; and in Megaw
1993:Figure 14a).
Mathews' (1904:263) work around the Upper Lachlan River indicated that body scarification was related to totems and food avoidance. The custom was described as being 'of widespread prevalence among the Australian Aborigines. The position and extent of the scarring was regulated by the customs of the tribe to which the novice belongs' (ibid.1904:262). Mathews described the procedure at length, and indicated that scarification was an ongoing process for identifying which foods were no longer taboo (ibid. 1904:264-5). The position of the scars signified the type of animal being released from prohibition. The goanna was marked on the shoulders below another row of scars which denoted the emu, tree grubs were marked by vertical cuts on the left arm, the carpet snake on the chest, below collar bone, and so on (ibid.1904:264-9).

Mathews does not describe whether the order is dictated by the individual's totem, although it could be assumed that this would be the case. It is likely then, that different moieties/sections would be differently scarred, and that this would have acted as information to the general group about an individual's totemic affiliations, as well as level of initiation. It too would have been a facet of social cohesiveness.

**Apparel**

Items of apparel observed around the region included various bands worn around the head, neck and waist (Collins 1798[1975]:459, 465-6; Tench 1793[1961]:186) and Collins also described the ritual gear associated with tooth avulsion. Each novitiate, after tooth removal, was given 'a girdle around his waist in which was stuck a wooden sword; a ligature was put around his head, in which were stuck slips of the grass-gum tree: which, being white, had a curious and not unpleasing effect' (1798[1975]:484-5, Appendix 6; plate 8).

There were rare reports of possum skin rugs being used in the region. Phillip described one such cloak found near the Hawkesbury River as being 'made of the skins of the opossum and flying squirrel, very neatly sewed together, the inside ornamented in diamonds of curved lines, by raising the skin with the point of a small bone, which is made sharp for the purpose' (HR NSW 1[2] 1893[1978]:310). This examples was apparently much smaller than those observed on the southern Tablelands (Flood 1980), being described by Bradley as of the size 'to cover a child' (1786-1792[1969]:167-8). The paucity of references to these (e.g. also White 1790[1962]:156; Collins 1798[1975]:486) suggests that the items were rare (cf. the number of references stating that the Aboriginal people wore nothing (e.g. HR NSW 1[2] 1893[1978]:129, 132, 222; Hunter 1793[1968]:59; Stockdale 1789[1950]:44; Tench 1789[1961]:36,47; Worgan 1788[1978]:13, 18).
Several points raised by this evidence are of relevance to investigating the art in the region. Certain items of 'apparel' may be depicted on anthropomorphic figures in the art. These include:

- bands (on head, neck and waist);
- body painting designs;
- designs representing cicatrices (Huchet 1990);
- hair 'styles' and headdresses;
- (possibly) nose bones; and,
- possibly possum-skin cloaks.

The other conclusion which can be made is that the documentation of body painting indicates that women and men had equal access to pigment art materials. It may be assumed, therefore, that both genders may have indulged in other forms of artistic behaviour using these materials; such as the pigment art.

3.7 The impact of European contact on Aboriginal society

While the European settlement in Port Jackson affected most the Aboriginal groups living on the southern side of that waterway, the Aborigines of Broken Bay and the lower Hawkesbury River were also in contact with Europeans very early in 1788. Governor Phillip and a party of men in a long boat and cutter explored this area only a few weeks after the First Fleet arrived. First contact here was friendly and Phillip commented on the large numbers of people in Brisbane Water and Pittwater (Phillip 1789[1970]:40).

It has already been noted that the 1789 small-pox epidemic caused major cultural upheaval in the region, and that this was not restricted to the immediate environs of the settlement. On visiting Broken Bay, Collins noted:

> The pox has not confined its effects to Port Jackson, for on many places our path was covered with skeletons, and the same spectacles were to be met with in the hollows of most of the rocks in the harbour. ... (1790[1975]:496)

As European settlement expanded, the Aboriginal population dwindled rapidly. In 1840, only 35 Aboriginal names were listed in the Gosford census, and by 1841, only 16 years after the opening of the Mission on Lake Macquarie, Threlkeld had to close down because he literally ran out of Aborigines to teach. Government records of the annual issue of blankets to the Aborigines clearly illustrate the decline in the Aboriginal population in the area, and by 1870 the blanket issue was discontinued (Vinnecombe 1980:iV:28). Mathews (1897:c:1) describes a group of about 60, 'mostly half castes', living in a government reserve on the Hawkesbury River in the late 1890's, as well as
an 'isolated and hence the best preserved and primitive remnant' population living in the Burragorang Valley at the same time (Mathews and Everitt 1900:263).

The evidence suggests that traditional life continued for a short time after contact. The diabolical effect of the 1789 smallpox epidemic, however, must have meant that social organisation was soon severely affected. A good indication that the fabric of society quickly disintegrated, is in the very low frequency and restricted distribution of contact art, i.e. motifs of European subject completed in the traditional style.

Relatively few such motifs have been recorded and these are restricted to the environs of Broken Bay (and the Hawkesbury River). In all there are 36 engraved and 45 drawn or stencilled contact motifs. None of these occur south of Port Jackson (Chapters 8 and 9). Many of these motifs are in areas from where Europeans would have been first sighted from a distance and usually across the water, in boats. Some of the sailing ship depictions could predate the arrival of the First Fleet and date to Captain Cook's sail past Broken Bay. Most of, particularly, the drawn versions of these involve fully sailed, double masted ships, not the open cutters used by Phillip (and other early navigators) to explore Broken Bay and its surrounds. This is discussed more fully in Chapter 7.

Mathews observed 'blacks in the Wollombi district execut[ing] paintings in caves up till 1843' (Mathews 1895c:56). While isolated artistic incidents may have occurred up until this time, it is clear, that within 50 years of white settlement the population had been drastically reduced and the culture which had previously thrived no longer existed in its pre-contact form.

The art, along with the other archaeological evidence from the region, survives without the traditions which created, explained and gave it purpose. Ethnohistory provides evidence for the complexity of the social system operating in the region at European contact. The archaeological record supports some early accounts and often provides supplementary evidence. There are instances where the archaeological record even refutes early accounts (e.g. dietary aspects, tooth avulsion, some aspects of mortuary behaviour). The diabolical effects of the 1789 smallpox epidemic means that social traits and organisation observed after this time should be viewed with extreme caution. The archaeological evidence for long term changes in the millennia preceding the arrival of white people, also indicates that projecting these interpretations into the past must be done carefully.
3.8 Summary of ethnohistoric evidence; its relevance to patterning in the art

From the evidence discussed in this Chapter it is possible to supplement the proposed model with details about the region's prehistoric social organisation. It is also possible to suggest how certain aspects of traditional life might affect, or be reflected in, the art of the region. The model may be further modified by archaeological constraints (Chapter 4). The following aspects are relevant:

1) four languages are recognised as being spoken across the study area at contact. These are the Darkung, Guringai, Dharug and Tharawal.

The assumed geographic distribution of the four language groups will be based on Capell's model (Figure 3.1). Certain of the boundaries will be tested in an effort to resolve existing conflicts in interpretation (viz. Kohen 1986, Ross 1976). Testing should also consider a watershed model (viz. Peterson 1976) as opposed to a creekline = boundary model.

2) residence groups 'bands' in the region consisted of named economic units with designated tracts of land. 'Tribes' are perceived as having comprised a number of these smaller residence groups, speaking dialects of a common language. Within the range of any one linguistic group or tribe, there would have been a number of smaller localised bands (maybe as many as fifteen) who would have had kin and/or totemic links with people in other groups and therefore modes of access to resources;

3) considerable social interaction within and across linguistic boundaries occurred. Organised social events (initiation ceremonies, dances etc.), as well as the exploitation of windfall resources (such as whale feasts) resulted in aggregations of large numbers of people of mixed language groups. It would appear that the ritual behaviour in the region required the participation, and possibly consent, of neighbouring tribes;

4) there is no evidence for a rigid demarcation of territorial boundaries, although many of the initial observations did occur on the resource rich coastal strip and possibly within one linguistic group. The evidence suggests that the maintenance of clearly defined territorial boundaries was an unlikely behavioural trait but that social boundaries may have been significant. It seems that the spatial organisation of art traits would probably not demonstrate characteristics of smaller scale boundary maintenance (Wobst 1977), particularly at the band level;
5) linguistic boundaries may be reflected in schematic or other stylistic traits in the art across the region. The presence of distinguishable, localised bands as well as broader language boundaries suggests that there may have been a highly complex pattern of artistic behaviour and signatures within and across tribal 'boundaries';

6) there is no direct evidence that art played a primary role in ceremonial behaviour, nor that it had any mortuary significance. A late reference (Angas 1847) suggests that the engraving sites were the domain of the koradji (religious men). Unfortunately the role of art in the society was not investigated by the First Fleet recorders;

7) food resource, economic options and adaptive material culture varied across the region. This could be reflected in the different emphasis on maritime and land animals on the coast and inland, as well as a differential distribution of certain material culture items;

8) to the north and south of the region, economic differences (east - west) may be reinforced by cultural difference. In both of these areas linguistic boundaries existed at contact between a coastal and hinterland peoples. The absence of sandstone and thus art sites on the Cumberland Plain makes resolution of the Darug/Eora debate beyond analysis in this context;

9) as well as distinctive and localised items of material culture, particular modes of personal adornment may be represented in the art of the region;

and,

10) contact motifs occur in the art assemblage of those areas where the first contact was made and where the production of art retained some cultural milieu. The smallpox epidemic of 1789 means that the time scale for such motifs within the fully functioning artistic system would have been extremely limited.

The fact that so few post-contact motifs do occur suggests that the cultural destabilisation of the region should not affect the integrity of cultural traits in the prehistoric art assemblage.
Chapter 4

Previous Research: an Archaeological Context

While anthropology can help elucidate the complexity of cultural systems at particular points in time, archaeology can best document long-term processes of change. (Layton 1992b:9)

This chapter provides contextual information regarding the region’s prehistory. Previous archaeological research in this region has been extensive and provides a detailed framework for this art analysis. Certain temporal and spatial trends are highlighted for consideration in subsequent analyses in this thesis.

A synopsis of Attenbrow’s (1987) work in the Mangrove Creek valley is given. This focus is necessary for the analysis of diachronic change in sheltered art (Chapter 7). It has also provided the contextual evidence for art production in a regional model of settlement behaviour and group interaction (Chapter 10). Attenbrow’s research provides the most comprehensive body of data in the region. It does however, have shortcomings in terms of the chronology it provides. The ramifications of these shortcomings are investigated and variations are proposed for subsequent model building.

4.1 Regional context

The Sydney region has probably been inhabited by Aboriginal people for at least 20,000 years. It has been suggested that there is evidence in the Cranebrook Terrace, on the Hawkesbury River, for occupation dating to >40,000 years (Nanson et al. 1987), although the identity of these artefacts and the security of their context has been queried by many researchers (pers. observ.). Archaeological sites excavated in the Blue Mountains [at Shaw’s Creek KII: 13,000 yrs BP (Kohen et al. 1984)] and on the coast just south of the region [at Burrill Lake (Lampert 1971a) and Bass Point (Bowdler 1970)] provide the earliest dated evidence for occupation.

During the late Pleistocene it would appear that occupation of the region was sporadic and the population was fairly small. Attenbrow has observed that it was not until 5,000 years ago that ‘an increasing and continued use of shelters began, or was frequent enough to be archaeologically visible’ (Attenbrow 1981:169). The onset of archaeological ‘visibility’ in the region and presumed ‘intensification’ (Lourandos and Ross, in press) postdates the end of the eustatic sea level changes (Chapter 2) with a time lag of around 1,000 years. Excavated sites, both open and in shelters, indicate that the region was most intensively occupied during the last c.3,000 years (Attenbrow 1987; Koettig 1985; Kohen 1986; McDonald 1985b, 1986b, 1992a; Megaw (ed.) 1974).
Throughout the region's Aboriginal occupation history, there have been appreciable changes in the range of ways that stone tools were made. These changes were first characterised by Fred McCarthy (1948, 1964) who named this sequence of stone tool assemblages the Eastern Regional Sequence (ERS). Subsequent work in the region has much refined this sequence. The ERS spans the late Pleistocene and Holocene and is a regional variant of the Core Tool and Scraper Tradition changing to the Small Tool Tradition (Gould 1977). The most widely used terminology in the Sydney region for phases within the ERS are Capertian, followed by Early, Middle and Late Bondaiian (Attenbrow 1981, 1987, Koettig 1985, McDonald 1985b, 1992a).

The change from Capertian to Bondaiian took place sometime after 5,000 BP (cf. Johnson 1979). This is characterised by a major shift in raw material usage and the later predominance of smaller implements. Phases within the Bondaiian are based on the introduction and subsequent decline of backed implements, and the increasing predominance of the bipolar technique and the use of quartz. A change in the proportions of raw materials throughout these phases is also a factor. The introduction of ground implements around 4,000 BP and shell fishhooks in the last 1,000 years were major technological innovations.

Generally speaking these phases can be characterised as follows:

**The Capertian:** consisted largely of large heavy artefacts, uniface pebble tools, core tools, denticulate saws, scrapers, hammerstones and some bipolars and burins.

**Early Bondaiian:** with the introduction of the Small Tool Tradition, and the manufacture of tools on smaller blades, fine grained siliceous materials (i.e. silcrete and indurated mudstone/chert) were predominant. Features of the Capertian continue, but backed implements and ground edge implements were introduced.

**Middle Bondaiian:** the percentage of Bondi points increased and was still greater than the percentage of bipolar pieces. The proportion of quartz is increasing. Edge ground implements were present in higher proportions.

**Late Bondaiian:** Bondi points became more rare and disappeared from some sites. Quartz became the predominant raw material or increased in frequency in sites where it had previously dominated. Eloueras, bipolar pieces and edge ground axes predominated in the tool component. Bone and shell implements including fish hooks, were present in some, particularly coastal, sites.
The change to the Small Tool Tradition is a continent-wide phenomenon of the mid-Holocene and is generally assumed to have been associated with widely ramified social changes (White and O'Connell 1982:102).

The changes in stone artefacts throughout the Bondinaian are of a more gradual nature, and their social import has been extensively debated (Attenbrow 1987, Beaton 1985, Lampert and Hughes 1974, Johnson 1979, Lourandos 1985, Ross 1985, M.A. Smith 1982, Williams 1985). It has been proposed (Walters 1988) that a dual social system became dominant along the south-eastern seaboard with the introduction of fishhooks. The role of women within the social organisation in the last millennium may thus have been radically different from that in place beforehand, where it might be assumed that there was stronger male hegemony (Hamilton 1980, Walters 1988). The significance of such social change is discussed below.

4.2 Previous regional models

Previous models have been proposed for the south-east coast (e.g. Flood 1976, Lampert 1971a and b, Lawrence 1968, Poiner 1976). Considerable local diversity in coastal site assemblages was recognised (Bowdler 1976), and this resulted in two opposing models of cultural interaction.

One 'camp' designated the seasonal movement by the one group of people between the resources of the coast and hinterland1 (Flood 1976, Poiner 1976). This model rested largely on the ethnohistoric observations that there were fewer Aborigines on the coast in winter. This was strongly contested (Bowdler 1976, Lawrence 1968, Ross 1976) by the view that the large scale movement of people away from the coast was unlikely. This alternative model argued that the lower ethnohistoric visibility of people in winter was due to the Aboriginal people foraging in smaller, and therefore less visible, groups. Lampert (1971b) argued that the differences between sites on the coastal strip and the hinterland were not the result of seasonal specialisation by one group of people, but the evidence of two distinct groups of people. Archaeological evidence opposing the seasonal model includes the fact that raw materials (and hence presumably people and ideas) moved up and down the coast, rather than between the coast and inland (Branagan and Megaw 1969, Hughes et al. 1973).

Two previous models for Aboriginal landuse more specifically formulated for the Sydney region were those of Ross (1976, 1988) and Kohen (1986, 1988; and Kohen and Lampert 1988). These models also preferred a coastal: hinterland social division. The

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1 In these models the hinterland is not the same as that defined for this work (Chapter 2). The hinterland, inland and highlands were interchangeable terms in these earlier models and the scale of migration thus considerably greater.
main differences between these two models were i) the nature of regional contacts and interaction, and ii) the location of the designated boundaries between the various identified linguistic groups.

Ross (1976) model operated on the firm separation of coastal and 'inland' tribes. It was a static model in that it perceived no change in this patterns extending into prehistory. Seasonal movement of the coastal tribe inland, during times of resource stress, was not envisaged; the cultural boundary between the Guringai and the Darug was seen as a barrier to such movement (Ross 1976:88). Both groups are seen as operating within culturally proscribed areas which were completely independent; i.e. each contained sufficient localised resources.

'the incentive for inter-tribal' contacts and movement in general for the Guringai and the Dharug was not associated with the quest for food'. (ibid.:89)

Ross also argued that the coastal toolkit comprised largely organic materials, i.e. wood, bone and shell. Trade links, however, with the north and west (but not the south) occurred for the exchange of raw materials (ibid.:90). It was argued that exchange factors (possibly associated with ceremonial activities) were the critical element in interaction between the linguistic groups in the area (ibid.:91).

Kohen’s model for the region was based on his analysis of the western Cumberland Plain (discussed further below). He argued for changing patterns of landuse over time (Kohen 1986:Figure 12.2), commencing with an initial occupation of the coastal strip and Nepean/Hawkesbury River in the early Holocene. At this time, occupation evidence indicated a diverse (i.e. non-specialised) economy and a low population density. The introduction of the Bondaian technology was thought to have resulted from an increasing focus on the hunting of macropods (viz. McBryde 1974), and this signalled an increasing use of the Blue Mountains and western Cumberland Plains. By late in the 3rd millennium BP a general increase in the population was perceived, as was the permanent occupation of the western Cumberland Plain. This resulted, Kohen argued, in the ultimate depletion of macropods.

Kohen argument for this initial occupation phase is based on the widespread distributions of backed blade and silcrete (1986:312) during this time. One population was thought to have occupied the entire Sydney region, with seasonal movements accounting for all occupation evidence (viz. Poiner 1976). Increased territoriality was envisaged from c.1,000 yrs ago, which resulted in a loss of access by the coastal dwellers to the silcrete resources of the Cumberland Plain. This restricted access resulted in the coastal dwellers becoming more dependant on organic materials, i.e. shell, bone and wood, and quartz for their tool technology. From this time on, there was an increasing economic
specialisation in the two areas; towards fishing on the coast and possum exploitation inland (Kohen 1986:311-5).

... the absence of backed blades on the coastal sites is more easily interpreted as an economic change, with a general shift from a hunting to a fishing economy. The ethnographic and archaeological data indicate that the economy of the 'woods' tribes was based on plant foods and possum exploitation. The dominance of edge ground hatchets, described in the ethnography as being used primarily for the capture of possums, and adze flakes (which may have been used to manufacture and sharpen digging sticks for plant foods) in at least some localised areas, tends to reinforce the idea that the demise of the backed blades in the western Cumberland Plain was also for sound economic grounds. Kangaroos were not a significant component of the diet, so the specialised stone component of the technology required to hunt them was lost. (ibid.:314)

The archaeological evidence for Kohen's dietary model is extremely limited. It is based largely on the presence/absence of particular stone tools over time, particularly the introduction and then decline of backed blades. Contrary evidence is provided by the Mangrove Creek data (e.g. Loggers shelter), for instance, which suggests that macropods continued to be an important dietary component when backed blades dropped out of the assemblage (Attenbrow 1981).

While the Cumberland Plain data does not demonstrate a functional relationship between backed blades and macropods, such a change has been supported on a range of data elsewhere; e.g. on the basis of co-variance of blades and macropod remains at Graman (McBryde 1974). At Gatton shelter in SE Queensland, over the last 3,800 years, a change was identified in focus from large, wet sclerophyll dwelling macropods with predictable habitats, to a proliferation of smaller species (macropod and other) inhabiting both wet and dry sclerophyll forests. At the same time, backed blades disappeared from the assemblage and there was a marked decrease in stone artefact densities. Increased faunal, charcoal and sediment rates, however, indicate a continuing site usage. Morwood (1987) interpreted the combined faunal and lithic evidence as indicating changes in hunting strategies, from 'individual pursuit' (with spear) to cooperative and communal strategies (including the use of nets), and economic diversification.

One of Morwood's defined archaeological criteria for recognising increased social complexity is a reduction in occupation intensity at some sites, reflecting increased status differences and restrictions on access to knowledge. The second criterion is an increase in the number of sites concerned with symbolic activities (e.g. art sites and bora rings), while the third involves changes in site content, such as the introduction of exotic materials and/or technologies (ibid.:343). These criteria will be discussed below with regards the model proposed for the Sydney region.
4.3 Mangrove Creek: a catchment's prehistory

Attenbrow (1987) investigated the changes throughout the Holocene in the Upper Mangrove Creek catchment (UMCC). This creek valley is the focus of the diachronic analysis undertaken in this thesis (Chapter 7). The exact nature, direction and timing of changes in the local archaeological record, particularly occupation indices, are thus of considerable interest.

Attenbrow's work in the upper Mangrove Creek catchment (1981, 1982, 1987) provides the most comprehensive data for the region's stone tool assemblage's characteristics and changes in the recent past. A total of 31 'habitations' (mostly rock shelters were excavated for her research. Attenbrow's sample resulted from a probability sampling procedure and covered the range of local topographic zones.

While identifying highly variable patterns of specific site usage, Attenbrow averaged the catchment's data to quantify local characteristics and indicate generalised patterns. She identified four typological phases for the Mangrove Creek catchment (Attenbrow 1987:189; Table 4.8), these being local variants of the Capertian and Bondaian. The Mangrove Creek phases were:

- Phase 1: c. 11,200 to c. 5,000 years BP
- Phase 2: c. 5,000 years to c. 2,800 years BP
- Phase 3: c. 2,800 years to c. 1,600 years BP
- Phase 4: c. 1,600 years to c. 1840 AD.

Two indices were calculated by Attenbrow to demonstrate that shelter establishment rates and artefact discard rates show temporal trends. Both indices indicated that quantitative change in the valley did not coincide with qualitative changes in the stone tool industry. The first index revealed that occupation in the Mangrove Creek valley increased markedly in the second millennium BP during the latter part of her Phase 3 and the beginning of Phase 4. This index showed a further substantial increase in the first millennium BP. There was a continuing increase in the number of habitations established and used in successive periods of time. Artefact accumulation rates indicate a similar burgeoning of shelter usage, although beginning somewhat earlier, c.3,000 BP (ibid.:208). This indicated a decrease in the local artefact accumulation rates during the most recent phase and the last millennium, when large numbers of shelters were in use. These results suggested a change in mobility and settlement regimes over time.

Faunal evidence from Mangrove Creek provided complementary data to the lithic material. Faunal remains were recovered from Loggers, Deep Creek and Mussel shelters.
(spanning the last 3,000 years). Two of these sites (Mussel and Deep Creek) indicate a pattern of an early predominance of *Macropus giganteus* and *M. rufogriseus* and subsequent replacement by *Wallabia bicolor* and *Thylagale sp.* These sites are interpreted by Attenbrow as indicating either a shift in catchment vegetation patterns, from dry to wet, or open to closed communities, or a shift in subsistence activities towards the resources of wetter, more closed forests (Attenbrow 1987:243, Aplin 1981:52-3, Aplin and Gollan 1982:21).

Loggers Shelter, however, reveals a different pattern. While still showing a proliferation of smaller species in the most recent level (i.e. last 1,000 years), there is a concomitant increase in the large and medium sized macropods. N.B the trend demonstrated by this shelter in terms of artefact accumulation, is also a reversal of the general trend for the catchment, with the highest artefact discard rate here also occurring in the last millennium.

In assessing which of these indices might be more relevant to the production of art and to observed changes in the art, the behavioural explanations which have been forwarded suggest that habitation indices are most likely to have relevance to changing patterns in art production (and see Attenbrow 1987:358-365). Behavioural explanations for *increases* in habitation indices (i.e. not *decreases*) have included:

increases in the number of stone artefacts manufactured (required?) per person (Attenbrow 1982, Ross 1984).

changes in mobility (Stockton and Holland 1974, Attenbrow 1982);

changes in hunting and gathering strategies, which may have been associated with increased mobility (Attenbrow 1982) or changing social networks (Morwood 1986,1987); and,

a more 'intensive' use of the region by broadly similar numbers of people (Lourandos 1985).

Many aspects of these explanations could affect art production, particularly when art is viewed as a mechanism for easing the stresses related to increased social interaction.

**Problems with the Mangrove Creek data**

Attenbrow's focus on (mainly) rockshelter sites poses a potential problem. This focus, continues a well established Australian tradition (e.g. Bowdler 1971, 1984a; Hughes and Lampert 1982; McBrtyde 1974; Morwood 1979, 1992; Mulvaney and Joyce 1965; etc.). It is problematic here because the rationale for an averaged catchment analysis is based on subsistence strategy modelling, which assumes that the activities of the group were
dispersed across the landscape (Attenbrow 1987:206; Foley 1981:176), and that all likely activity areas will be represented in the sample used. The omission of open locations has consequences for Attenbrow's results in terms of her overall catchment interpretation.

This focus on rock shelters in this context, and concomitant absence of open sites, denies various behavioural characteristics in Aboriginal land-use practices. These include a preference for open camp site locations (Koettig 1976; Peterson 1971, 1973; Schrire 1972, 1982); the use of base camps and temporary camps (viz. Meehan 1982, M.A. Smith 1982; and see Gorecki 1988); and the likelihood of site specific activities, which may or may not have changed over time (Koettig 1976, Morwood 1987, Hiscock 1985, 1986).

Koettig (1976) studied the structures used and dynamics present in Aboriginal camping behaviour generally in a range of regions and environments. She discovered that camps were not arranged in a random fashion, but organised according to well defined rules of spatial organisation. She also compared and contrasted open camp sites with rockshelters, highlighting the benefits of the former:

... in terms of ... spatial organisation rock shelters would have had limited potential as a camping site, unless the occupants were members of a single residence unit. If used as a shade they would have defined an activity loci, not a camp. ... they would not have been able to accommodate the spatial behaviour of a number of residence units camping together. (Koettig 1976:147, 151, 152)

Koettig states that within the curtilage of a single residence group, an individual occupied between 7-10 sq m while the residence group used up to 65 square metres (Koettig 1976:146). These figures, while deriving from a western desert context (Hamilton 1972), have serious implications when considering rockshelter sites, particularly those with much smaller floor areas, i.e. like the majority in the Sydney region.

In Amhem Land (a fertile, coastal, rockshelter-rich area like Sydney) rockshelters were mostly used in the wet season to escape the rain and because the dry season resource zones and preferred open camping locations were flooded (Brockwell 1989, Koettig 1976, Schrire 1982).

Koettig's study concluded that rockshelters would only have been used as refuge from the sun or rain, but not the cold (Koettig 1976:141, 152). She also observed their use may be as a foci for specific activities (tool making, art production, eating etc.) or as camping spots for residence groups, perhaps in transit. While there may be exceptions to this in the region, e.g. the AR1 site in Angophora Reserve is large enough and has extensive evidence for base camp activities (McDonald 1992a), the curtilage figures for
the personal spaces required in base camps certainly restricts the number of shelters in the Sydney region which could be so used.

This issue has serious implications for regional, or local, models constructed primarily on archaeological evidence from rockshelters. The patterns observed in shelter site use and artefact discard may be indicative of peripheral and/or ad hoc discard behaviour, not general cultural trends. Attenbrow’s evidence for a decrease in artefact discard in the last millennium is equally suggestive of a change in preference to outdoor camping, or more specifically outdoor knapping, viz. complex functional change not simple functional change (M.A. Smith 1982:114). It could also indicate a shift from occupation according to single residence units to one of larger territorial groupings. Ethnohistoric evidence in the Sydney region indicates the extensive use of open bark habitations and ‘villages’ at contact (Section 3.4). Attenbrow’s results then could be interpreted as indicating that there was a shift in settlement patterns, from shelter locations to open locations during the last millennium.

The other problem identified in Attenbrow’s research relates to sample sizes and typological classification. The rates of habitation establishment and number of shelters being used per millennium is based on radiocarbon dates and artefact analysis at eleven sites, and on the identification of typological phases within the assemblages at the remaining 20 sites. Attenbrow’s typological data is presented in summary form (1987:Table 5.6). Certain sampling problems are indicated, particularly with Phase 4 (1987:Table 7.2). While classification here is based both on the depth of deposit and the typological characteristics of the assemblages (1987:Table 7.2 and Attenbrow pers. comm.), there is an obvious problem in the small sizes of the assemblages concerned.

The absence of backed implements was the main criterion used to distinguish between Phase 3 and Phase 4. However, given that 19 sites with Phase 4-only assemblages all have less than 25 excavated artefacts in toto, their designation as such is questionable. The expected percentage frequency of this artefact type, as found at sites with large assemblages (>1000 artefacts), is between 0.2-0.9% (Attenbrow 1987:Table 5.6). Thus, the expected number of backed blades in a site with 25 artefacts would be, at most, 0.225. The absence of backed blades then, in the assemblages of the vast majority of the ‘most recent’ sites may be no more than an artefact of sampling.

The fact that the majority of sites with extremely small assemblages have been classified as Phase 4, also casts doubt on the issue of artefact accumulation rates over

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2 A recent excavation by Rich (1993) to the south of the Sydney region has backed blades in a pre-contact (Late Bondaian) assemblage dated to 230 ± 50 BP (Beta-65747).
time, and particularly the conclusion that this rate dropped significantly in the last millennium.

Rates of artefact accumulation were based on the estimated total number of artefacts in an archaeological deposit and on the estimated total number within each spit/phase/millennium. Estimated artefact totals were, quite reasonably, used 'to avoid problems associated with inter-site variability' (ibid.:202) and in an effort to make comparable a disparate set of data. The sites used had very different sized samples as well as being mostly very small assemblages. At most sites (68%) between one and four 50cm x 50cm test pits were excavated, usually representing <3% of the total floor area. At only two sites (Loggers and Black Hands) was more than 10% of the floor area excavated (ibid.: Table 4.5). The number of stone artefacts retrieved from sites also varied enormously from between 1-30 artefacts at 15 sites, to more than 7,000 at another site.

Questions of comparability and problems of sampling (e.g. spatial variation) were not addressed by Attenbrow (although see 1987:Chapters 4 and 5). However, these problems must be kept in mind when using her data. It would appear that the index for artefact accumulation rates has the most problems, since the way the index has been calculated is subject to more sources of potential error than that for habitation establishment. However, the classification of assemblages into typological phases on the basis of extremely small sample sizes, also has the potential to have skewed the results towards a proliferation of sites with low artefact numbers, and late establishment rates, in the most recent millennium.

In order to establish if these sampling problems had affected Attenbrow's patterns, her data were re-analysed using only the seven larger sites (i.e. >100 excavated artefacts). This work was done in relation to the excavation of UDM shelter and is reported in detail (Appendix 3).

This testing confirmed the general pattern of Attenbrow's results for artefact accumulation rates particularly in the most recent millennia (N.B. however the reversal indicated between Phases 1 and 2). As indicated by Attenbrow's results, artefact accumulation peaked in Phase 2 (particularly between 3,000 and 1,000 years ago), followed by a decrease in the last millennium.

However, it revealed very different patterns in terms of the habitation indices (Tables A3.22, A3.23; Figures A3.23, A3.24). The re-calculation of habitation indices, albeit now on a smaller number of sites, indicates that there was a low establishment rate up until c. 4,000 years ago, where it peaked. After the third millennium, no new shelters were established. The pattern revealed by number of habitations in use over time is more
like that achieved by Attenbrow, although there is no increase, by these re-calculations, in either the last 2,000 or 1,000 years. This index shows a consistent or stable use of the same shelters over the last three thousand years.

One of Attenbrow's most significant findings was the marked contrast between the substantial decrease in the local artefact accumulation rates during the most recent phase and millennium on one hand, and, the persistent increase in both the rates of occupation establishment and numbers of habitations used over time.

The re-testing of Attenbrow's data using only sites with reasonable sample sizes does not support this contrast. The pattern would appear to indicate a stability over the last 3,000 years in the habitation being used, while suggesting a decrease in habitation establishment and artefact accumulation in the established shelters, in the last millennium.

This pattern does not suggest the same degree of mobility or increase in the territorial range over the last 2,000 years as the occupation mosaic proposed by Attenbrow. It does however emphasise the decrease in shelter site usage, or at least the deposition of stone artefacts in these locations, in the last millennium.

Another of Attenbrow's important conclusions was the unsynchronised nature of changes in the occupation indices. There was no coincidence in the timing of the typological phases with either artefact discard rates or the numbers of shelter being used. The re-calculations done here, again, do not support this finding but rather shows a major coincidence in typological changes (to the Middle Bondaian) with an increased artefact discard rate and increasing numbers of shelters being used. The peak millennium for habitation establishment actually appears to be the fourth, predating the typological change and increase in artefact discard rate. But these different sources of evidence all appear to support a proliferation of activity and possibly a major social change at the beginning of the third millennium.

On the basis of these results the following model for the catchment is proposed.

The period of most intensive shelter usage in the valley appears to have been between 3,000 and 1,000 years ago, when enormous numbers of artefacts were deposited within shelters. The beginning of this major increase coincides very well with the beginning of the Middle Bondaian (Phase 3), when backed blade production was at its peak and the assemblages began to be dominated by bipolar flakes of, particularly, quartz. This peak period slightly postdates an increased habitation establishment rate, but coincides well with the beginning of a relatively stable period of shelter occupation.
The local artefact accumulation rate drops significantly in the last millennium, while the rate of habitation usage remains consistent, indicating that people continued using their established shelters - but that they were depositing less artefacts within these locations. All three indices suggest that over the last 3,000 years there was a continued use of established shelters. On the basis of artefact accumulation rates it would appear that the use of shelters as foci in the landscape, for stone tool manufacture or discard at least, declined in the last millennium.

These results suggest that local occupation patterns in the last millennium may have involved larger territorial groupings, and rockshelters may not have been able to provide the necessary curtilage for such a grouping. Such a model is supported by the finding of decreased site establishment rates and concomitant lower artefact discard rates. A comprehensive investigation of local open sites would be needed to test this model; difficult in UMCC given that Mangrove Creek Dam is now flooded.

4.4 The Cumberland Plain

The Cumberland Plain is of relevance to this thesis mainly in terms of identified regional patterns of social cohesion. The shale Plain is located in the centre of the region (Figure 2.1). While no sandstone, and therefore no art, occurs across this area, the Plain was inhabited at European contact by Darug speakers who also inhabited the sandstone country to its north and south (Figure 3.1) producing art in those areas. Stylistic cohesion amongst the Darug art is investigated in the synchronic analyses (Chapters 8 and 9) and thus the dynamics of populations living across this area requires comment.

As indicated above, this area has been the subject of doctoral research (Kohen 1986), planning studies (e.g. L. Smith 1989) and an extensive CRM project, the Rouse Hill Infrastructure Project (McDonald et al. 1994).

Kohen's (1986) model for the region was discussed above. His occupation indices across the Plain are based on limited stratigraphic (or contextual) sites with a large number of surface scatters of fairly small size i.e. <100 artefacts. The absence of backed blades amongst his assemblages, the basis for his chronology, is fraught with sampling difficulties (see discussion re Mangrove Creek).

The Rouse Hill project (McDonald et al. 1994) resulted in 38 open sites being excavated, and many preconceptions about the Cumberland Plain being overturned. A number of these open sites were found to be stratified, and several were dated to >4,000 years (ibid.:280). A number of lithic reduction strategies were defined, most of which were geared towards microblade production, and the technological similarities between these, and those found in the Hunter Valley region was noted.
The discovery of a heat treatment pit [dated to 1,070 ± 60 BP (Beta-66451)] is one such similarity (cf. Koettig 1992, Rich 1992). The processing of plant and animal material on several sites was documented, as was the processing of plant material using backed blades (McDonald et al. 1994:283-5). Quartz artefacts were found on many sites, albeit in small percentages. The presence of this material, however, indicates the movement of raw materials from the Hawkesbury Sandstone country (to the north-east of Rouse Hill), as would be expected given the linguistic continuities recorded at contact.

As a result of the Rouse Hill work, previous models for the Cumberland Plain (Kohen 1986, L. Smith 1989) are in disarray. Distinct territoriality between coastal and inland groups is still a valid model on the basis of distinct tool kits, and on linguistic and economic grounds. Territoriality is not incompatible with the shared cultural responsibilities suggested by ethnohistoric evidence (Chapter 3). This territoriality may extend further back than the last millennium (Kohen 1986), however. Silcrete sources (St Mary's formation) are known exist on the coastal strip e.g. at Newtown, inner Sydney (Byrnes 1982a) as does a basalt source (suitable for axe production) on Barranjoey Head (Peter Mitchell, Macquarie Uni, pers. comm., 1994).

Trade for raw material between the coast and hinterland may not ever have been necessary between the coast and the Cumberland Plain (cf. Ross 1976). The presence of quartz on the Rouse Hill sites can be explained by movement of Darug speakers around their territory. While raw material requirements need not have provided the stimulus for trade between the Darug and neighbouring groups on the coast, this does not mean that social contacts, including trade, did not take place for other reasons.

While dating of open sites on Plain has not been extensive, the early Rouse Hill dates (and see Kohen et al. 1984, McDonald 1986b, 1993a; Smith 1986) suggest that Cumberland Plain was not occupied later than the surrounding Hawkesbury sandstone country. The idea of the Plain providing a distinct and isolated cultural unit has no credence, and the movement of people to north and south of the Plain could be expected. Changing patterns of landuse into the last millennium are yet to be established by solid archaeological data. Given the absence of shelter locations in this area (cf. Shaw's Ck used by Kohen for context), this landscape should provide complementary material to the model suggested by the Mangrove Creek evidence; viz. a move into open locations3. At this stage, not enough open sites have been dated in this area to provide the necessary data for such a test.

3 More extensive sampling of open sites is required, such as was undertaken at Rouse Hill (McDonald et al 1994) and other sites on the Cumberland Plain (McDonald 1993a, 1993b), to provide sufficient data to combat the problem most frequently encountered with open sites - lack of context.
4.5 Summary

The Sydney Basin has been occupied since the late Pleistocene, but it has only been during the mid-to-late-Holocene that occupation increased in most part of the region, whereupon occupation patterns became much more complex. The stone tool sequence (ERS) defined initially by McCarthy has been refined by more recent research and CRM work in the region. Attenbrow's (1987) catchment analysis in Mangrove Creek provided a comprehensive re-analysis of phases within the ERS and established a chronology for application at the broader, regional, level.

The reworking of Attenbrow's evidence using only sites with larger assemblages (i.e. >100 excavated artefacts) suggests certain modifications to the details of Attenbrow's results. The period of most intensive shelter usage in Mangrove Creek appears to have been between 3,000 and 1,000 years ago, when enormous numbers of artefacts were deposited within shelters. The beginning of this major increase coincided with the beginning of Phase 3, the Middle Bondaian, when backed blade production was at its peak and the domination of assemblages by bipolar flakes of, particularly, quartz began. This culmination slightly postdated an increase in the habitation establishment rate, but coincided well with the beginning of a relatively stable period of shelter occupation.

The local artefact accumulation rate dropped significantly in the last millennium, while the rate of habitation usage remained consistent. This indicates that people continued to use their established shelters but deposited less artefacts within these locations. All three indices suggest that over the last 3,000 years there was a continued use of established shelters. Artefact accumulation rates indicate that the use of shelters as foci in the landscape, for stone tool manufacture or at least discard, declined in the last millennium.

These results could suggest a decline in the population during the last millennium. In the absence of open site data from this catchment, however, there is insufficient evidence upon which to base such a conclusion. It is proposed that in the last millennium that there was a change in local occupation patterns, and that the move away from rockshelters may have resulted from these being no longer suitable in terms of the necessary curtilage for local grouping. This model is developed further (Chapter 10) in light of the excavations done for this research (Appendices 1 to 3), and incorporating the results of the art analyses (Chapters 7 to 9).

The following chapter establishes the nature of the Sydney Basin rock art style. It also discusses the results of previous rock art research in the region.
Chapter 5

The rock art of the Sydney Basin

5.1 Introduction

This chapter describes the general characteristics of the two art contexts in the Sydney Basin: sheltered mainly pigment art and open engraving sites. There is not a strict division between pigment art and engravings, since the artistic repertoire of shelter sites includes both techniques. Medium in this instance is being broadly defined as the artistic environment, rather than in the stricter sense of the word where medium is defined as "the physical materials of which the artefact consists; or the techniques employed to produce the artefact" (Clegg 1977:260). This was done for practical and theoretical reasons.

The site loci here are the main criteria in defining the initial split of the art into media. This primary division is made according to context rather than technique. A shelter art site is defined as all the art which occurs within the dripline boundaries of a single sandstone outcrop. An engraving site is defined as all the art which is located across the limits of an open sandstone boulder/platform. This latter boundary is dependant upon the presence of a surrounding soil matrix and vegetation. This division of the data was made for practical purposes. It is also supported by a consideration of context. The site location (i.e. in the open or in a shelter) may well be a consideration in terms of the original function of the site (see Chapter 6). There is also a possibility that the different contexts make engravings within shelters not directly comparable with their open counterparts. That is, in some instances there may be temporal considerations. The engravings within shelters are largely different from those on open platforms. This will be discussed further elsewhere (Chapters 5 and 6). For various reasons then, engraved motifs within shelters will be considered as part of the artistic repertoire for that site type.

'Art' is defined loosely as all humanly made marks which occur in identifiable forms, which have resulted from the applied use of coloured or black and white pigments (for pigment art) or from the direct or indirect removal of the sandstone matrix (for engravings). The art assemblages are viewed in terms of motifs, the majority of which are recognisable as human, animal or inanimate objects, or can be categorised as geometric shapes (see below). The proportions of indeterminate (unrecognisable) or incomplete motifs, particularly in the shelter art assemblage, are high. These have been included in the initial analysis of the art assemblages, since they demonstrate more accurate assemblage census information as well as general technique information (in the
shelter art assemblage). The motifs classification is defined (see Appendix 4) and includes a taxonomy based largely on visually recognisable figurative forms. These have been given the names of the forms which they most closely resemble (e.g. macropod, fish, anthropomorph) and I have not used " ", x or ! (Clegg 1981) to demonstrate that I understand that these terms are analytical labels. It is (and should be) recognised that this classification is an heuristic devise to facilitate my analysis of the data. However, given that the art body in question is largely figurative, it would be ridiculous to give these motifs names which are not "value laden" [e.g. Clegg's (1977) knobs and bumps]. More is said of the problems of classification in Appendix 4.

Also discussed in this chapter, is the nature of the sample being used for analysis, including its biases and limitations. The methods used to overcome the recognised limitations of the data base are also discussed.

As well as describing in detail the data upon which the thesis is based, this chapter also briefly discusses how the art of the Sydney Basin conforms to previous and existing stylistic models, both pan-continentally and regionally (McCarthy 1979, McMahan 1965, Maynard 1979). Many of the predictions of these previous works are found to be considerably altered by the current research. It is necessary in some instances to propose replacement definitions and models.

5.2 Sydney Art in the general scheme of Australian rock art

While there is continuing debate with regard to the diachronic organisation of rock art styles across Australia (McCarthy 1988; and see scheme by Bednarik 1988), there has been little empirically based progress made on Maynard's (1976) tripartite model. This model sees a pan-continental, relatively homogenous (engraving) style - the Panaramitee - replaced by a series of more regionally diverse but simple (engraving and pigment) art styles, the Simple Figurative. The Complex-Figurative then follows, this being an areally restricted more complex (pigment and engraving) group of styles. Increasing difficulties are encountered by this model as the result of the proliferation of data (and dating evidence) from around the country.

Research increasingly reveals regional heterogeneity in the Panaramitee (Morwood 1979, Rosenfeld 1991, Rosenfeld et al 1981, Franklin 1988, 1991). The dating evidence, however, supports the general (late Pleistocene) antiquity of this style (Rosenfeld 1993). There is also, however, evidence for continuity of this tradition over time viz. some eastern Australian sites and central Australian pigment art and body painting (Rosenfeld 1991).
Research (particularly related to direct dating of pigments) reveals that some of the complex figurative styles also have considerable antiquity (Watchman 1993b; and see McDonald et al. 1990). This creates the most serious challenge to Maynard's tripartite sequence. The complex figurative styles of Kakadu (dynamic figures) and the Kimberley (Bradshaw figures) have recently been argued to have considerable antiquity (Chaloupka 1977, 1985, 1994; Haskovek 1991; Morwood et al. in prep.; Taçon and Chippendale 1993; Walsh 1994; Welch 1990, 1993), and some indeed have older than established Panaramitee dates (eg. Watchman 1993b). The idea that an older pigment tradition was practiced contemporaneously with the Panaramitee is not a new one - nor a theoretically difficult one to accept: it has merely been argued previously that pigment art is unlikely to have survived for as long as engraved forms. The real problem with the early dates for the complex figurative is in the model of diachronic change from an early, highly structured and non-iconic tradition to the later proliferation of figurative (iconic) styles, with increasing design complexity.

A vast number of regional art bodies in the Simple Figurative genre continue to be recognised and documented (Cole and Trezise 1992; David 1992; David and Cole 1990; Flood 1987; Gunn 1983; Hatte 1992; Layton 1992a; Officer 1984, 1992; Morwood 1984, 1988, 1992; McDonald 1985a, 1990b, 1992a), and internal variation in these (synchronic and diachronic) has been demonstrated. During a published debate on diachronic models, it was stated that Maynard's model is "so firmly entrenched..." that any possibility of chronology within regional styles is not being investigated (Bednarik 1988:36). While this criticism is patently untrue, it is true that for the main part, recent rock art research has been founded within the framework provided by Maynard's tripartite scheme. As Morwood (in that same debate) states:

"The real test of a rock art chronology is how useful (and used) it is as an explanatory mechanism, and most researchers on Australian rock art now take Maynard's (1979) three part sequence as a useful baseline for overviewing geographical and chronological change. ... Maynard's approach to chronology and research has provided a framework for subsequent developments in the archaeology of Australian rock art." (Morwood 1988:32-3)

The rock art of the Sydney Basin - while it does demonstrate certain internal variability (Chapters 7 and 8) - fits the definition for the Simple Figurative style (Maynard 1976, Franklin 1984). Maynard's definition of this stylistic phase provides a good general description of the region's art.

"the style is dominated by figurative motifs ... the majority of (these) ... conform(ing) to a pattern of crude naturalism. Whether the motif is engraved or painted, in outline or solid form, it usually consists of a very simple silhouette of a human or animal model. Most portrayals are strongly standardised. Human beings are depicted frontally, animals and birds in profile, snakes and lizards from above. Normally only the minimum visual requirement for recognition of the motif are fulfilled by the shape of the figure". (Maynard 1976:200-1)
Certain variations to her basic description are necessitated by the current research. For instance, human figures are sometime depicted in profile, while some animals (eg. the echidna) are not always (Officer 1984, McDonald 1987). Franklin's (1984) work which was aimed at quantifying Maynard's definition for regional Simple Figurative styles, has only slightly refined this definition for the Sydney engravings, based on largely the same data as that used earlier by Maynard (1976). One of Franklins' most important results indicates that Form, Technique and Motif contributed fairly equally in the multivariate analysis of style, or at least, in her case, in differentiating between the different regional Simple Figurative styles (Franklin 1984:89). By extension, this result could be interpreted as indicating that each of these aspects of an art assemblage is equally able to provide stylistic information (see also McDonald 1993a). This has significance when it comes to evaluating quantitative as opposed to qualitative data (viz. Ashton 1983), and in terms of the analyses undertaken for this research (see Chapters 1, 7, and 8).

While Maynard's model for diachronic change is considerably more shaky than when this research project commenced, her definitions for the Sydney regions' art are still pertinent to the current research. Her model of the art being a relatively recent phenomenon is supported by the regions' archaeological context and this research is accommodated by the existing stylistic framework.

While slotting into her broad scheme for the Simple Figurative, this current research indicates that certain modifications to the general definition are required. Certain fundamental elements, particularly in terms of internal stylistic development, also require elucidation.

5.3 Previous work in the Sydney region

The first major publication based on rock art recording the Sydney region was by W.D. Campbell (1899). Campbell recorded a vast number of the sites (mainly engraving) encountered during his duties as Government Surveyor. Many of Campbell's recordings were made from the back of his horse (1899:2), which could account for the excellent perspective generally achieved in his recordings.

From the early 1940's onwards, there was an increase in the publication of recordings made of (largely) engraving sites in the region. Fred McCarthy was the most prolific publisher of this type of data (see bibliography) over a forty year period (and see Higgenbotham 1985). Ian Sim was another prolific recorder with his published material being augmented by an enormous body of field notes and drawings, now archived by the NPWS as the "Sim Collection". (The late) John Lough also reputedly recorded a
large number of sites, many of these are re-recordings of earlier recorders. These however, have not been made accessible to subsequent researchers and very few are published.

While interpretations of the Sydney engravings were made by earlier recorders, based loosely on borrowed ethnographic material from other regions (McCarthy 1939, Elkin 1949) no systematic analysis of this body of art was undertaken until 1965 when Lesley Maynard (then McMahl) undertook her honours research (McMah 1965). Indeed this was the first quantitative analysis of any body of art in Australia.

McMah analysed 285 sites in the Sydney region, the aim being "(to) produce, first a typology of the engravings, and second, a spatial distribution of traits, based on the typology" (1965:7).

This analysis of engraving sites investigated whether these were a homogeneous artistic unit, and differences in style across the area were explored. It was postulated that large enough differences might indicate the existence of separate cultural areas within the Sydney/Hawkesbury area. The results of the analysis (which involved the use of hand-sorted punch cards) indicated the following:-

1) there are definite patterns of distribution in both north-south and east-west planes; and,

2) the differences between one end of the range and the other may be ascribed to cultural causes - except those obviously resulting from the stimulus of different environments. (1965:75)

McMah's geographic divisions were too coarse grained to allow more than a glimpse of trends from north to south. However, she did identify the presence of two distinct artistic units. One of these was located around the Upper Hawkesbury while the other comprised the suite of sites south of Botany Bay. She distinguished these areas by the presence of particular motifs, and by the lower site density in the latter area. The first of these broad style areas has not survived a proliferation of data, while the boundary for the second style area has been redefined as the Georges River (McDonald 1985a).

Research subsequent to McMahl's (1965) seminal work, has been directed at a localised assemblages. These projects have all been at BA(Hons) level and directed at more specific stylistic questions.
Konecny's (1981) work was concerned with both art components. The sample size used was quite small and dispersed (16 "painting" sites and 12 engraving sites from the Hawkesbury River to Woronora).

The aim of this research was to investigate the possibility of aggregation locales (viz. Conkey 1980) within the Sydney area. Konecny concluded that no aggregation locales - be this an individual or groups of sites - did exist but that functionally similar sites emerged from different areas and the different mediums. Given the dispersed nature and sample size used, this result is not surprising. It would be interesting to retest this question using a more complete sample.

Smith's (1983) work was concerned with identifying archaeological patterning across ethnographically reported tribal boundaries (Smith 1983:1). Her analysis was restricted to the Mangrove Creek/Macdonald River area, and again, involved both art components. Smith, however, appears to have misinterpreted the literature regarding the location of the posited linguistic boundary between the Darkung and Guringai groups, and tests a boundary based on Mangrove Creek, not Mooney Mooney Creek (Capell 1970:22; Map 1). Thus her analysis is probably not characterising differences across a tribal boundary but rather variation within a portion of one (see section 3.2). One hundred and eight shelter art sites and 77 engraving sites were used in this analysis. Spatial patterns were identified within the sample, some of which were attributed to a (mistaken) ethnic boundary. Topography was considered another 'causative' attribute.

Officer's (1984) research dealt with art of the Campbelltown area (SPG 1983) on the Georges River (Officer 1984:figure 5.26). The art here consists predominantly of shelter art sites, and a sample of 57 such sites was used. There were only seven engraving sites in this area although Officer did analyse both art components in his broader comparison.

The main aim of this research was to explore and describe the formal variability within a local body of art, both at a local and regional scale (ibid.:2). Officer formulated a hierarchical motif classification of outstanding objectivity (ibid.:Chapter 4). His analysis discovered that there was considerable heterogeneity in this art body, both in terms of motifs and traits present. Officer argued for both functional and "casual" interpretations of this finding. He also perceived an interrelatedness of motifs across the two art components in the region, and identified strong localised ties between the coast and hinterland, despite a linguistic boundary and other evidence for a cultural dichotomy here.
Franklin's (1984) work explored Maynard's (1976) definition of the Simple Figurative styles, and was thus only peripherally involved with the Sydney region (as well as regional assemblages from Port Hedland, Cobar, south-east Cape York and the Grampians). This analysis used mainly published data, confirming previous conclusions made by McMahan.

Little art research has been achieved in conjunction with Cultural Resource Management work, mainly because of overriding time constraints. In several cases, however, a research oriented approach was possible (McDonald and Smith 1984, McDonald 1988a), partly as a result of the Rock Art Project (McDonald 1985a, 1987, 1990b).

An analysis of engraving sites on the Berowra-Cowan peninsula was undertaken in conjunction with the extension to the F3 Freeway (McDonald and Smith 1984). This analysis was undertaken for the purposes of assessing the engraving sites within the impact area, and was facilitated by the presence on the peninsula and in surrounding areas more than 60 such sites. Multivariate analyses revealed that sites on the peninsula had certain stylistic characteristics in common with those of surrounding areas and that the sites to be destroyed within the study area were relatively 'common' on the peninsula.

The assessment of the proposed Warre Warren Aboriginal Place in McPherson State Forest (McDonald 1988a) provided another opportunity to analyse a large sample of art sites and to make significance assessments. In this instance no multivariate techniques were employed, but a large sample (63) shelter art sites was used (only two open engraving sites occurred within this area). The sites, while being confirmed as part of the major east-west stylistic cline across the north of the Sydney Basin (McDonald 1987) were demonstrated to be a major art focus. Several sites in this area were identified as having extremely high archaeological significance.

5.4 The Sydney Basin Art Style: a current definition

Details of the art will be presented according to the two art contexts. A comparison of the two art bodies will be made in conclusion, and discussed in more detail in subsequent chapters. It is necessary to define a few terms used and to describe the samples upon which the following statements and results are based.

Schema

The word "schema" is used to denote the manner of depiction (or abstraction) of an image from the object that is being depicted.
"A motif is a recurrent visual image which has a particular arrangement of components ... motifs are therefore the objectified expressions of schemata - the standardised pictorial forms which result from a consistent mental template (consistent with the cultural group of the artist)". (Maynard 1977:398)

The fact that the art style of the Sydney Basin is described as Simple Figurative, results from the high level of recognition possible (for us, as modern, etic observers) between the art and a "natural" assemblage (human figures, animals, birds, fish etc.). Simple Figurative also implies that the schema is not a complicated one, and that a minimum amount of detail, as required for recognition, is provided.

The schemata used for the two art components in the Sydney Basin are very similar. This is manifested in the Motif range used, in the Form of these and - in particular - the general Character of the regional motif assemblage (as defined by Maynard 1977). The main difference between the two components is of course Technique, but also Size. The last of these differences is mostly due to the differences in 'canvas' size (i.e. available rock surface); although extremely large motifs are occasionally found in the shelter art assemblage (eg. NPWS #'s 45-2-48, 45-2-118\(^1\)), as are very small motifs on open engraving sites (eg. NPWS #'s 45-2-224, 45-6-43).

There are also some differences in Form. While motif form for the shelter art assemblage comprises a variety of outline, infilled and combination forms, the vast majority (97%) of the engraved motifs are outline only. The only consistently infilled engraved motifs are culture heroes (and indeed this is one distinguishing criteria for this motif: see Appendix 4), and on the whole this infilling decoration consists of pecked lines of dots.

Officer (1984) analysed the formal variation present in the art corpus of the Campbelltown area. He argues that the shelter art in this area only partly conforms to Maynard's Simple Figurative definition, since 'the use of formal variation and forms that are outside "strongly standardised" patterns is integral to the character and significance of the style' (ibid.:82). Officer's analysis using an hierarchical classification is considerably more detailed than was possible on a regional assemblage. His analysis, however, provides an excellent localised picture of internal variability within the pigment art assemblage; and indeed demonstrates how overly simplistic the previous definition was for the Simple Figurative. While the form of this style is relatively simple, regional variability and stylistic information encoded in this is highly complex.

\(^1\) NPWS site identification numbers are used in the text in preference to the sample numbers used for sites in the multivariate analyses. This was done since this form of identification if potentially more meaningful to the reader, and because the site lists in Appendices 5 and 6 identify sites by both means.
Chronology

Some residual Panaramitee style sites (cf. Maynard’s 1976 definition) have been identified within the region (Maynard 1976, McDonald 1985a, 1988a, 1990a). These consist of assemblages comprising predominantly tracks and circles, manufactured in intaglio (i.e. solid infill) as opposed to outline form. Interestingly, these seem to occur almost exclusively within shelter sites (see below). It is possible that residual Panaramitee motifs are also located in open contexts, and that weathering and the association with figurative motifs is masking their presence (McDonald 1993b).

The Samples

The samples used in these analyses are based largely on records lodged in the Site Register of the NSW National Parks and Wildlife Service (NPWS). These samples were compiled in part during the three stages of the Sydney Basin Aboriginal Heritage Study: Engravings and Shelter Art Sites (McDonald 1985a, 1987, 1990a). The samples comprise largely the art assemblages of those sites which had been recorded in detail (i.e. their entire assemblages have been drawn) by other recorders, as well as those which have been recorded by me using the classification system devised for this work. These are not random samples, and they are not without inherent biases and inconsistencies.

The samples for the two art contexts comprise 717 engraving sites and 546 shelter art sites. These figures represent 39.5% and 32.7% (respectively) of the known sites in the region. Of the samples used, 167 shelter art sites (30.6%) and 61 engraving sites (8.5%) were recorded by the author. The majority of the biases were identified early in the Sydney Rock Art Project (McDonald 1985a) and these were addressed by subsequent fieldwork (McDonald 1987, 1990a). The reliability of the recordings made by previous recorders (which comprises the majority of the engraved sample) has also been assessed (McDonald 1990, 1994).

Most of the problems inherent in these samples result from the way the Register has accrued over time, and particularly in its formative years. The unreliability of many site locations is one problem which can often only be resolved by field relocation. Variation in recorder competence and consistency over time is another problem. Also, over the years, the definition of a site has undergone considerable change. What McCarthy described as a "group" in the 1940's may have stretched over several kilometres of ridgeline - and today be described as ten sites.
More than twelve weeks fieldwork was completed in the course of this research and for the Rock Art Project, mainly to address these problems. The major sampling problems identified were:-

- geographic representativeness;
- the unsystematic collection of the sample;
- sample size; and,
- different recorder methods and biases.

A detailed description of how these problems were addressed can be found elsewhere (McDonald 1990b). The use of only the drawn recordings by other recorders, and the exclusion of written descriptions only, was justified on the basis of the Stage II results (McDonald 1987). This work demonstrated the unreliability of written descriptions: it was found that assemblages sizes were often underestimated by as much as 400%.

One problem which has not been, and could not be, redressed is the unsystematic way that the samples were collected. A large proportion of the useable sites is close to European roads and access tracks, and only a relatively small number of sites has resulted from the few (small) areas systematically surveyed (eg. Attenbrow 1981,1987; Gunn 1981; Sefton 1988; McDonald 1986a, 1988a). The effect of this bias on the samples used cannot be quantified, but it is another shortfall in the data base which is recognised.

For both art components then, the following regional data is summarised:

- motif and technique information;
- average site (i.e. assemblage) size;
- topographic location;
- site associations;
- and,
- the unique or unusual aspects of each component (eg. engravings within shelters, the occurrence of open pigment art, vertical engravings etc.).

This information characterises the assemblages being used, and highlights the potential for stylistic information inherent in them. The multivariate analyses undertaken for this research make it possible to describe both art bodies on a regional scale as well as at a more localised level (see Chapters 7 and 8). Such descriptions provide insight into more localised trends within both art components, and provide the basis for statements on the differing stylistic trends across the region.
5.5 The Open Engraving sites

Assemblage Size

The useable sample indicates that the average (mean) engraving assemblage contains 10.9 motifs. The largest site in the region (Burragurra; NPWS # 45-3-404) contains 174 motifs; and there are many sites (137: 19.1%) with only one motif present.

The vast majority of sites (83.4%) have less than 16 motifs and about two-thirds (66.1%) have less than eight motifs (Figure 5.1). There is an extremely rapid decline in the frequency of sites with larger numbers of motifs, and only 61 sites (8.5%) in this component have more than 30 motifs present. Only four sites (0.6%) have more than 100 motifs present.

**Figure 5.1:** Engraving Sites. Percentage frequency of different assemblage sizes.

Site Nature and Topographic Location

The vast majority (97%) of open engraving sites are located on horizontal expanses of sandstone platform. Twenty-two open engraving sites have been identified on vertical boulders adjacent to waterways. These are usually engraved on a flat surface which faces the water. In some instances, engravings on vertical faces occur along low clifflines in a similar topographic location, and others are located on the outside wall of shelters. This category of engraving does not include those which are located inside sheltered locations.

One only open pigment site is known (#45-6-1411), and this consists of a red pigment drawing on an open cliff face which owes its protection from the elements to a slight
rocky projection. This motif is in association with vertical engravings, and is located on Berowra Creek.

The topographic information used here is fairly limited, being restricted to three broad categories: ridgertops, hill sides and valley bottoms. These three locations were defined originally by Attenbrow (1987) and remain unrefined. The cut-off points for ridgertops and valley bottoms is 5m in elevation below and above (respectively) the ridgeline and valley bottom. It is recognised that a certain amount of subjectivity enters into these classifications.

Distance from permanent drinking water was also recorded for each site, and again, certain problems were encountered in terms of continuity. While it was possible to assess in the field which creeklines appear permanent or at least semi-permanent, translating this information from maps is less certain. For this reason, the vast majority of sites had this figure rounded off to the nearest 50 m (i.e. ± 50% of the smallest interval on my measuring equipment, a 1:25,000 scale compass). Sites which were recorded by me during fieldwork were recorded in much greater detail. The majority of this type of data belies the presence of springs, rock holes and soaks which would have provided water, at least periodically, for the more knowledgeable Aboriginal inhabitants in prehistory.

The majority of engraving sites (401 sites: 55.9%) are located on ridgelines. Hill side locations are the next most common (296 sites: 41.2%) while valley bottom locations are relatively rare (20 sites: 2.8%). Approximately half (45%) of those in valley bottom locations consist of the vertical engraving sites, on boulders adjacent to major waterways (e.g. Berowra and Cowan Creeks). Slightly more than half (59%) of the vertical engravings, however, are located more than 5 m in elevation above the water and therefore in the hillside zone.

**Figure 5.2:** Engraving sites. Proportions of sites in the main topographic divisions.
The average distance to drinking water from any engraving site in the region is 650m. The minimum distance is 2m (on-site rockwells/creeklines on several sites); the maximum distance is approximately 3km (see Appendix 5).

**Site Associations**

Grinding grooves are the main site type association for open engraving sites. It had been previously thought that most open engraving sites were associated with grinding grooves. This was not found to be the case. Only 96 engraved platforms (13.4%) also having grinding grooves. Water channels (i.e. pecked and abraded lines - the function of which is apparently to direct water seepage around potholes present on the site: see McDonald and Smith 1984) occur on a relatively small proportion of engraving sites (22 - 3.1%). In all instances, these sites also had grinding grooves present. Of the sites which contain engravings and grinding grooves, 23% also have water channels.

Only a very small proportion of engraving sites have shelter art associated with them. By definition, this association can only occur when the open platform and shelter occur within the one outcropping of sandstone. Less than 10 (1.3%) such occurrences are noted within the sample used, making this an extremely rare association.

This does not indicate that the Aboriginal artists did not perceive of a contextual relationship between the two art forms. Rather, that the location for the production of the two were, by the nature of the two media, quite distinct. The presence of engraved motifs in association with pigment art within shelter art sites indicates that the two components were not strictly separated. This statement is discussed further below (Chapter 8).

Very few engraving sites in the useable sample (4: 0.6%) are associated with stone arrangements. It is interesting to note, however, that 17 such site associations do occur within the region (but the art assemblages of 13 of these have not been recorded and can thus not be included in the sample). While this makes stone arrangements unlikely to be found on an engraving site, it means that it is quite likely (21%) for a stone arrangement to have engravings associated with it.

Very few site records indicate other associated forms of archaeological evidence on open engraving sites (e.g. stone artefacts/occupation deposit). This may be largely due to recorder indifference (or ignorance) to this type of remains - but also to the exposed nature of this site type. The exposed location of the majority of these sites does not encourage the stratification of deposit. The author has observed at many sites, however, the presence of sparse scatters of lithic artefacts.
While open engravings have sparse associated evidence, the majority (>95%) of the vertical engraving sites, around the estuarine waterways, are associated with extensive (open) midden deposits.

Motifs

A total of 7,804 motifs were analysed from the 717 sites used in the sample (see Tables 5.1 and 5.2). The predominant motif in the region is the human footprint ("mundoe" - 17%), followed by unidentifiable motifs (15%) and fish (12%). Several other individual motifs figure reasonably strongly: bird tracks and macropods (7% each) and men (5%). The remainder, however, are present in relatively low percentages.

The clumped motif percentage frequencies (Table 5.2) clearly reveal the subject preferences of the region. These figures demonstrate that a refinement of Maynard's Simple Figurative definition for the region is required. For the purposes of this discussion the unidentifiable motifs have been deleted as these are an indication of incomplete/indistinct engraved remains, rather than motifs existing outside the motif classification (see Appendix 4).

The focus on tracks is very obvious, this being followed by a preference for marine animals, land animals, anthropomorphic representations and items of material culture (equally). Birds and "other" motifs (circles, complex-non-figuratives and contact motifs) occur less commonly (Plates 9-16).

Maynard's distinction between the Panaramitee and Simple Figurative styles is based not only on differing techniques and forms, but also on the basis of the motif range and dominance. Tracks, bird and animal, dominate the Panaramitee. Maynard places a figure of 60% on this motif type (1976:193), while the Simple Figurative was described as having predominantly figurative motifs (placed at 78% for the Sydney region; ibid.1976:193). In the Simple Figurative, the proportion of animal and human tracks was described as being "nowhere near as dominant as in the Panaramitee style" (ibid. 1976: 200-201). Maynard gives the figure of 5% for the track motif(s) in the Sydney region. Obviously, the current data refute those of Maynard, and while tracks in the Sydney Basin are not as predominant as in the Panaramitee, they are still the dominant motif type in the region.

The possibility that some of the Sydney region's macropod and bird tracks on open site are residual Panaramitee style is discussed below (in Chapter 8).
Plate 9

Plate 10
Engravings in Ku-ring-gai Chase. Fish and bird motifs, the latter transcending the natural tessellated canvas.
Plate 11  Large macropod engraving at Maroola, south of the Hawkesbury River. This macropod is being struck by two boomerangs. The row of pits crossing this motif traverses the entire site.

Plate 12  Engraved shield motif near Berowra Creek. The internal design on this shield matches early ethnohistoric descriptions of the St George Cross. (Design 2B in analysis of compositional details).
Plate 13  Devils Rock Maroota. Recording engravings in daylight. In foreground is a Blaime culture hero. The scale of this motif is indicated by size of the humans in the background.

Plate 14  Large emu with clutch of eggs and three tracks at Maroota. Note the outline form of these bird track motifs compared with the pecked intaglio version which is found in the region's rockshelters.
Plate 15  Macropod motif at Maroota which is superimposed by a post-contact sailing ship.

Plate 16  Engraved snake motif at Maroota which consists of five parallel zig-zag lines. The peck marks are clearly visible.
Table 5.1: The Sydney Basin Engraving component: motif frequency and \%f.

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<tr>
<td>26</td>
<td>complex-non-figurative</td>
<td>70</td>
<td>0.9</td>
</tr>
<tr>
<td>27</td>
<td>contact motif</td>
<td>36</td>
<td>0.5</td>
</tr>
<tr>
<td>28</td>
<td>Total</td>
<td>7,804</td>
<td>(99.8)</td>
</tr>
</tbody>
</table>

*Variable numbers are those referred to in subsequent analyses.

Table 5.2: The Sydney Basin Engraved Component: clumped motif frequency, \% frequency of totals and identifiable motifs.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Motif</th>
<th>Total</th>
<th>% f</th>
<th>% identif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anthropomorphic</td>
<td>798</td>
<td>10.2</td>
<td>12.1</td>
</tr>
<tr>
<td>2</td>
<td>terrestrial animal</td>
<td>911</td>
<td>11.7</td>
<td>13.8</td>
</tr>
<tr>
<td>3</td>
<td>birds</td>
<td>242</td>
<td>3.1</td>
<td>3.7</td>
</tr>
<tr>
<td>4</td>
<td>marine animals</td>
<td>1,344</td>
<td>17.2</td>
<td>20.3</td>
</tr>
<tr>
<td>5</td>
<td>material objects</td>
<td>798</td>
<td>10.2</td>
<td>12.1</td>
</tr>
<tr>
<td>6</td>
<td>tracks</td>
<td>2,112</td>
<td>27.1</td>
<td>31.9</td>
</tr>
<tr>
<td>7</td>
<td>other</td>
<td>415</td>
<td>5.3</td>
<td>6.3</td>
</tr>
<tr>
<td>8</td>
<td>unidentified</td>
<td>1,184</td>
<td>15.2</td>
<td>-</td>
</tr>
</tbody>
</table>

The Georges River style boundary

McMah (= Maynard) (1965) identified the presence of a major style boundary in the southern part of the region. The location of this boundary was more closely defined by
Stage I of the Rock Art Project (McDonald 1985a). The presence of localised motif preferences is addressed more fully in Chapters 7 and 8. However, several motifs appear to be restricted in geographical extent.

While some of these can be explained in terms of environment¹, several motifs have been identified as being restricted to one side or the other of the identified "style" boundary at the Georges River (McDonald 1985a), some being completely absent from sites south of the Georges River. It was also noted that the number and density of engraving sites diminished south of the Georges River (this finding is substantiated by Kelvin Officer's work further south of the Sydney Basin, where open engraving sites eventually disappear from the artistic repertoire: Officer 1992, 1993). These findings have not been altered by subsequent work and are summarised as follows.

South of the Georges River:

- there are no profile anthropomorphs; north of the Georges River there are no beaked anthropomorphs (i.e. frontally depicted anthropomorphs with just their heads in profile);

- there is a complete absence of culture heroes, emus and contact motifs;

- there is a much higher proportion of unidentified motifs;

- the proportions of tracks (particularly m undoes) are appreciably lower than to the north of the region;

- anthropomorphic, marine and terrestrial depictions figure more strongly in the art, commensurate with the reduced motif repertoire and lower number of tracks.

As well as these assemblage content differences, are the differences noted in the method of depiction - or the schema of the art north and south of this boundary.

Macropods and other quadrupeds remain the most obvious indicator of this. These motifs are depicted with all four legs represented south of the Georges River, but with only two legs to the north [there are two known exceptions to this: a macropod located

---

¹ Whales, for instance, are restricted to the coast and appear to be concentrated around Broken Bay. They occur no further west than Berowra Creek. These continue down the coastline, though in a much diminished and more restricted (geographic and stylistic) fashion. There is another small cluster of this motif type (6 sites: 8 whales) around the mouth of the Port Hacking, and the most southerly site with this motif type is located at Little Manley Head, just south of Bundeena.
just south of Port Jackson with four legs; and another near the Lane Cove River; pers. observ.]. Another example is that the whales south of the Georges River are less highly stylised than their northern counterparts, with few containing decorative infill or anatomical details (such as gills, eyes). Another difference in the method of depicting echidnae. North of the Georges River these are depicted in profile; to the south they are depicted from beneath (or above) as "pelts" (Officer 1984:49). Officer also makes the observation that there is similarly a mixed perspective ("simultaneous projection") demonstrated in the pigment art around Campbelltown (ibid. 1984:49). The beaked anthropomorphs are a good example of this stylistic convention (see Appendix 4).

These differences will be re-examined in Chapters 7 and 8 in more detail, and in light of the trends and patterns observed in the shelter art component (see 4.5 below).

5.5 The Shelter Art sites

Assemblage Size

The shelter art site sample indicates that the mean shelter assemblage contains 26.4 motifs. There were 14,424 motifs in the 546 site sample. The largest site in the Basin (Swinton's; NPWS # 45-3-252) contains 857 motifs. There are a number of sites (31: 5.7%) which contain only a single motif.

The majority of sites (478: 87.5%) have less than 30 motifs while (285: 52.2%) have less than 10 motifs. There are only 30 sites (5.5%) in the region which have more than 100 motifs, eight of these containing more than 200 motifs.

Figure 5.3: Shelter Art, Assemblage size information.
While indicating the same general pattern as the engraved assemblage - i.e. a proliferation of very small sites interspersed with varying numbers of mid-range sites and a few very large sites - the shelter art assemblages are on the whole slightly larger than their engraved counterparts. The average pigment assemblage is twice as large as seen in the engraved component, while largest shelter art site contains almost 5 times as many motifs as the largest engraving site.

Site Nature and Topographic Location

By definition, all of the art in this component occurs within sandstone overhangs or shelters. No deep caves (which have been decorated) occur in the region. The location of the art within shelters is commonly on the back wall of the shelter, but art often occurs on the ceiling and also on the inside lip of the dripline. The entire range of shelter sizes observed within the region have been decorated, although this is an aspect which has not been quantified. The smallest observed art shelter site was 'Little end shelter' near Warre Warren Creek (# 45-3-953; measuring 2.5m x 2.0m x 1.0m; containing six motifs). Entrance into this shelter is gained by crawling through a narrow opening. The physically largest observed art shelter is at 'Sphinx Trig', Ku-ring-gai Chase NP (#45-6-258) which measured 40m x 10m x 8m and contained 91 motifs.

Unlike the open engraving sites, the majority of shelter sites (69.6%) is located on the hillslopes, while the remainder are fairly evenly divided between the ridgetop zone (13.7%) and the valley bottom zone (16.7%).

Figure 5.4: Shelter Art sites. Topographic location information.

The average distance to permanent drinking water for this site type is 262m. The greatest distance from water recorded was 2 km (3 sites), while one site was recorded as having water permanently on-site (in the form of a creekline flowing over the shelter). Given the topographic locations for most shelter sites (largely on hillslopes and in valley

Chapter 5
bottoms) the greater proximity to water for this site type (cf. engravings) is not surprising.

**Site Associations**

The major association recorded for this site type was the presence of occupation deposit. This includes what has been described in the Register both as archaeological and midden deposits. Of the regional sample used, 138 sites (25.3%) were found to also contain surface evidence for occupation deposit. Of these sites, 19 (13.7%) also contained grinding grooves.

Differences were observed in sites either side of the Georges River. Art sites south of this River have a much lower association with deposit (25/181 sites: 13.8%), while in the more northerly sites, almost a third (113/365 sites: 31.0%) contain the combined forms of archaeological evidence. South of the Georges River, however, seven of the 25 sites with deposit also contain grinding grooves (28%), while north of the Georges River only 12 of the 113 sites (10.6%) with deposit also contain grinding grooves.

It is possible that observer bias is responsible for creating some of these differences, and that the proportion of shelters with both art and deposit is in fact much higher. Certainly, many of the sites recorded during Stages II and III of the Rock Art Project were found to contain signs of occupation deposit which had not been recorded on the original recording. Many art recorders, in other words have been interested in recording only the art and not other less obvious forms of occupation evidence. Of the 214 shelter art sites in the current sample recorded as a result of systematic and/or detailed survey (Attenbrow 1987, Gunn 1981, McDonald 1986a, 1987, 1988a, 1990b) 122 or 57% of the shelter art sites also have occupation deposit. Only 43 (20%) of these sites definitely have no occupation deposit (i.e. they have sloping rock floors), while 49 (23%) have floor's assessed by their recorders as having potential for archaeological deposit (PAD).

Taphonomic factors also contribute to this problem. Work by Attenbrow (1987) in UMCC testing shelters with PAD revealed that almost 90% of these actually contain subsurface deposits. The more limited systematic work (involving excavation of deposits) suggests a much higher figure for pigment art and occupation deposit correlations (Chapter 6).

The total number of shelter art sites which also contain grinding grooves is 26 (5%). Nine of these occur south of the Georges River, 17 of these to the north. The incidence of pigment art and grinding grooves without occupation deposit is thus quite rare.
Motifs

A very large proportion (41%) of the 14,424 motifs counted for this art component consists of unidentifiable motifs (Table 5.3). This finding reflects the nature of the art (complex, less formalised and often heavily superimposed). In many cases, the generally poor preservation results from the greater instability of the sandstone surfaces within shelters (Spate and Jennings 1983; although see Watchman 1994).

The average number of identifiable motifs per site in the region is 15.4. Swinton’s shelter as well as having the greatest number of motifs present, also has the highest number of identifiable motifs - 653. There are numerous sites (51) which contain no identifiable motifs. The vast majority of the unidentified motifs are depictive and in dry pigment. Some are painted and some are also stencilled (see below).

Of the identifiable motifs, stencilled hands and hand variations predominate, accounting for over 49% of the sample. This figure reflects the dominance of stencilling as a technique (see below), but also the nature of the depictive art - less formalised and often unidentifiable. It also reflects a certain level of unavoidable recorder bias: a partial hand stencil is still identifiable as the stencil of a hand, whereas the more rigorous identification requirements for the classification of depictive motifs require that incomplete motifs with insufficient diagnostic information must be classified as ‘unidentified’. A quadruped without all/both legs could be either a kangaroo or a dingo. It therefore must be recorded as unidentifiable (see Appendix 4).

Of the identifiable depictive motifs, macropods are the most dominant subject (9%) followed by anthropomorphs (7%) and other land animals (5.5%). Most other motifs are present in relatively small numbers/percentages.

All of the motif classes used in the engraved assemblage are also present in this component. Certain percentage differences between the two do occur (section 5.6, below). For instance, the presence of only two whales within the shelter site assemblage is very interesting. It would appear that it is not a medium-induced scale problem which causes this omission, but rather a real absence within the pigment tradition - the two whales recorded (within one shelter site on Gunyah Beach) consist of the miniature engraved variety.

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2 The term 'depictive' is being used to describe non-stencilled motifs, this including as it does, both figurative and non-figurative forms.
Table 5.3: Shelter Art component: summary motif frequency information.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Motif</th>
<th>Frequency</th>
<th>%f</th>
<th>%f identifi..</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>man</td>
<td>239</td>
<td>1.7</td>
<td>2.8</td>
</tr>
<tr>
<td>2</td>
<td>woman</td>
<td>107</td>
<td>0.7</td>
<td>1.3</td>
</tr>
<tr>
<td>3</td>
<td>anthropomorph</td>
<td>570</td>
<td>4.0</td>
<td>6.7</td>
</tr>
<tr>
<td>4</td>
<td>profile anthropomorph</td>
<td>88</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>culture hero</td>
<td>18</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>6</td>
<td>macropod</td>
<td>792</td>
<td>5.5</td>
<td>9.3</td>
</tr>
<tr>
<td>7</td>
<td>snake</td>
<td>176</td>
<td>1.2</td>
<td>2.1</td>
</tr>
<tr>
<td>8</td>
<td>other land animal</td>
<td>474</td>
<td>3.3</td>
<td>5.5</td>
</tr>
<tr>
<td>9</td>
<td>emu</td>
<td>36</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>10</td>
<td>other bird</td>
<td>317</td>
<td>2.2</td>
<td>3.7</td>
</tr>
<tr>
<td>11</td>
<td>fish</td>
<td>185</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>12</td>
<td>eel</td>
<td>161</td>
<td>1.1</td>
<td>1.9</td>
</tr>
<tr>
<td>13</td>
<td>whale</td>
<td>2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>14</td>
<td>other marine animal</td>
<td>32</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>15</td>
<td>shield</td>
<td>57</td>
<td>0.4</td>
<td>0.7</td>
</tr>
<tr>
<td>16</td>
<td>boomerang</td>
<td>184</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>17</td>
<td>axe</td>
<td>81</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>18</td>
<td>other material object</td>
<td>122</td>
<td>0.8</td>
<td>1.4</td>
</tr>
<tr>
<td>19</td>
<td>unidentified open</td>
<td>1,151</td>
<td>8.0</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>unidentified closed</td>
<td>4,770</td>
<td>33.1</td>
<td>-</td>
</tr>
<tr>
<td>21</td>
<td>hand</td>
<td>3,601</td>
<td>25.0</td>
<td>42.3</td>
</tr>
<tr>
<td>22</td>
<td>human foot</td>
<td>66</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>23</td>
<td>hand variation</td>
<td>588</td>
<td>4.1</td>
<td>6.9</td>
</tr>
<tr>
<td>24</td>
<td>roo track</td>
<td>87</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>25</td>
<td>bird track</td>
<td>24</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>26</td>
<td>circle</td>
<td>82</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>27</td>
<td>complex-non-figurative</td>
<td>129</td>
<td>0.9</td>
<td>1.5</td>
</tr>
<tr>
<td>28</td>
<td>contact motif</td>
<td>45</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>29</td>
<td>other</td>
<td>240</td>
<td>1.7</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>identifiable</strong></td>
<td><strong>8,503</strong></td>
<td><strong>59.0</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>14,424</strong></td>
<td><strong>(100.2)</strong></td>
<td><strong>(99.9)</strong></td>
</tr>
</tbody>
</table>

An inspection of the clumped motifs (into generalised subject groupings: Table 5.4) indicates that tracks (human hand, feet and animal and bird tracks) are predominant (51%), followed by terrestrial animals (17%) and anthropomorphic depictions (12%). There is a relatively low showing for birds, marine animals and material objects and a concomitantly high number of "other motifs" (6%). This latter category includes many circles and complex-non-figurative motifs, as well as a high number of other repeatable motif classes (i.e. simple-non-figuratives and many rare or isolated occurrences of special motif forms: see Appendix 4). This diversity in the motif classification was considerably more extensive than found in the engraved component.

Major differences in motif preferences can be observed between the sheltered and open art assemblages. These will be discussed in detail below.
Table 5.4: Shelter Art component: clumped motif frequency and % frequency.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Motif</th>
<th>Total</th>
<th>%f</th>
<th>% identif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anthropomorphic</td>
<td>1,022</td>
<td>7.1</td>
<td>12.0</td>
</tr>
<tr>
<td>2</td>
<td>terrestrial animal</td>
<td>1,442</td>
<td>10.0</td>
<td>17.0</td>
</tr>
<tr>
<td>3</td>
<td>birds</td>
<td>353</td>
<td>2.4</td>
<td>4.2</td>
</tr>
<tr>
<td>4</td>
<td>marine animals</td>
<td>380</td>
<td>2.6</td>
<td>4.5</td>
</tr>
<tr>
<td>5</td>
<td>material objects</td>
<td>444</td>
<td>3.1</td>
<td>5.2</td>
</tr>
<tr>
<td>6</td>
<td>tracks</td>
<td>4,366</td>
<td>30.3</td>
<td>51.3</td>
</tr>
<tr>
<td>7</td>
<td>other</td>
<td>496</td>
<td>3.4</td>
<td>5.8</td>
</tr>
<tr>
<td>8</td>
<td>unidentified</td>
<td>5,921</td>
<td>41.0</td>
<td>-</td>
</tr>
</tbody>
</table>

Technique

A general technique classification has allowed for the description of the principal techniques employed in this assemblage. The recording of technical information for unidentified motifs has a demonstrated worth in achieving a more complete understanding of the overall range of techniques employed in this art component. If only identifiable motifs had been used for these analyses, stencilling would have dominated the results to a greater extent than is a realistic indicator of prehistoric practice.

The majority of the art (66.1%) is depictive. Of the remainder, stencilling is a dominant technique (32.6%) while engraving is quite rare (1.3%).

Of the 9,527 depictive pigmentary motifs recorded in the sample, the vast majority (91%) are executed in dry pigment. Most of the remainder (8%) have been painted, while a small number (1%) are comprised of both techniques. The colour usage with these motifs is predominantly (93%) monochrome. Bichrome (i.e. two colour) motifs are relatively rare (7%), while polychrome (i.e. three or more colours) is even more rare (1%). While the majority of the polychrome motifs consist of three colours (usually red, black and white), several of the motifs in this category are comprised of four colours (i.e. yellow also). This is interesting in light of McCarthy's (1979, 1988) posited temporal sequence for the region where only one polychrome motif was identified and this was relegated into a separate, relatively late phase.

The way the overall database has been tabulated does not allow for the splitting of colour information according to stencilled or depictive motifs. The following colour summary is thus based on a combination of the two techniques.
Plate 17  Frieze of charcoal women and men motifs beneath a red outlined wombat. Hand stencils, white paintings and drawings and engraved macropod tracks also found in this shelter near Warre Warren Creek.

Plate 18  Black outlined and infilled turtle with linear infill positioned in an alcove. A faded, infilled snake motif runs below this alcove. Site in Warre Warren Ck.
Plate 19  Black infilled and white outlined dingoes and macropods on Yatala Creek near the Colo River. These motifs are large (top dingo 1.25m long). Water seepage is affecting these motifs, making the colour in some run.

Plate 20  Heavily superimposed art; stencils in various colours; red, black and white drawings in Swinton's shelter. Sequence in this shot ends with red horned anthropomorph motif, over white stencils.
Plate 21  Black and white bichrome goannas (Phase 3) over red painted goannas (Phase 2) at the northern end of Swinton’s shelter. Site in proposed Warre Warren Aboriginal Place.

Plate 22  Engraved bird and macropod tracks on shelf at back of shelter just above floor level. Three Birds Site in proposed Warre Warren Aboriginal Place.
Plate 23
White painted complex-non-figuratives (CXNF), hand and axe stencils. Cave's Cave near Putty towards the northern limit of the study area.

Plate 24
White painted anthropomorph and shield with internal design (2B). Painted over black drawings. Tic Alley near Warre Warren Creek.
Plate 25  
Stencilled fish tails. This site also contained two small engraved whale motifs. Site on Gunyah Beach, near the junction of Cowan Creek and the Hawkesbury River.

Plate 26  
Red kangaroo tail stencils. This site also has stencils of boomerangs, hands and a kangaroo skin bag. Boorai Creek, Wollemi National Park.
Plate 27  Site near Colo Heights. Panel of stencilled material objects including boomerangs, parrying shield, axe, woomera and large hand stencils.

Plate 28  Swinton's shelter. Pink and bichrome stencils of boomerangs, and other hand stencils. A red homed anthropomorph's hand is visible (bottom right) superimposed over stencils.
Despite the dominance of stencilling, black\(^3\) is the predominant colour used in the region, 
accounting for 46.2% of the pigmented art (Figure 5.5). White is the next most dominant 
(34.6%), followed by red (16.6%) and yellow (2.8%). These colour proportions vary 
significantly in localised areas of the Basin (see Chapter 9).

**Table 5.5**: Shelter Art component: summary technique frequency information.

<table>
<thead>
<tr>
<th>Variable number</th>
<th>Technique description</th>
<th>Frequency</th>
<th>% (total) frequency*</th>
<th>% internal frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>outline</td>
<td>3316</td>
<td>(67.4)</td>
<td>34.1</td>
</tr>
<tr>
<td>2</td>
<td>infill/solid</td>
<td>2747</td>
<td></td>
<td>28.3</td>
</tr>
<tr>
<td>3</td>
<td>outline and infill</td>
<td>3652</td>
<td></td>
<td>37.6</td>
</tr>
<tr>
<td>4</td>
<td>dry pigment</td>
<td>8637</td>
<td>(66.1)</td>
<td>90.6</td>
</tr>
<tr>
<td>5</td>
<td>wet pigment</td>
<td>771</td>
<td></td>
<td>8.1</td>
</tr>
<tr>
<td>6</td>
<td>wet and dry pigment</td>
<td>119</td>
<td></td>
<td>1.2</td>
</tr>
<tr>
<td>7</td>
<td>linear infill</td>
<td>244</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>8</td>
<td>stencil</td>
<td>4709</td>
<td>32.6</td>
<td>32.6</td>
</tr>
<tr>
<td>9</td>
<td>1 colour</td>
<td>8827</td>
<td>(66.1)</td>
<td>92.7</td>
</tr>
<tr>
<td>10</td>
<td>2 colours</td>
<td>647</td>
<td></td>
<td>6.8</td>
</tr>
<tr>
<td>11</td>
<td>3 colours</td>
<td>53</td>
<td></td>
<td>0.6</td>
</tr>
<tr>
<td>12</td>
<td>black pigment</td>
<td>6921</td>
<td>98.7</td>
<td>46.2</td>
</tr>
<tr>
<td>13</td>
<td>white pigment</td>
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<td></td>
<td>34.6</td>
</tr>
<tr>
<td>14</td>
<td>red pigment</td>
<td>2487</td>
<td></td>
<td>16.6</td>
</tr>
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<td>15</td>
<td>yellow pigment</td>
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<td>2.8</td>
</tr>
<tr>
<td>16</td>
<td>engraving</td>
<td>188</td>
<td>1.3</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>Total motifs</td>
<td>14,424</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Total recognisable motifs</td>
<td>8,503</td>
<td>59.0</td>
<td></td>
</tr>
</tbody>
</table>

* Percentages in brackets represent the proportion of the data base for which this information was 
countable i.e. the engraved motifs did not have colour information; variables 1 - 3 include pigmented and 
engraved motifs (but not stencils); variables 4 - 6 and 9 - 11 refer only to pigmented depictive motifs (and 
not stencils or engraved motifs). The variable # on this table indicates the numbering system used in 
subsequent quantitative analyses.

The use of colour with the stencilling technique is predominantly restricted to white and 
red. Yellow stencils occur in localised areas, and black stencils (although rare) have 
been recorded. The use of two colours within one stencil has also been recorded, as 
has the mixing of colours to achieve non-primary colours - specifically, the mixture of red 
and white pigment to make pink. Off-white (cream) stencils have also been recorded, 
but these are more likely to have resulted from the use of less pure pipeclay. The

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\(^3\) Black stencils have been recorded at Yengo 1 (see Appendix 1) and are reported to exist in one site in 
the Woronora catchment (Caryll Sefton, pers. comm.). It is thus extremely rare for black pigment to be 
used for stencilling.
presence of "bichrome" and black stencils (see Appendix 1) within the region had not been noted prior to this work.

**Figure 5.5:** Shelter art assemblage: proportions (%) of colour usage.

![Pie chart showing colour usage percentages]  
- black: 45%  
- white: 35%  
- red: 17%  
- yellow: 3%

Of the 9,715 depictive motifs (engraved and pigmented), most have been executed in outline and infill form (38%), although outline-only forms are nearly as common (34%). Solid infill motifs are slightly less common, representing 28% of the assemblage (Figure 5.6). The use of linear (geometric or patterned) infill in depictive motifs is unusual, only 2.5% (244 motifs) have this type of infill (Plate 18).

**Figure 5.6:** Shelter Art assemblage. Proportions (%) of different forms present.

![Pie chart showing form percentages]  
- outline: 34%  
- outline + infilled: 38%  
- infilled only: 28%

As mentioned earlier, there are 57 shelter site assemblages which include engraved motifs. While the proportion of engraved motifs within the entire shelter art assemblage is fairly low (a little over 1%), the percentage of sites at which this technique has been employed is fairly high - representing as it does more than 10% of the regional sample. This is particularly interesting since prior to this research, the extent of this art form within the shelter art component was largely unrecognised. Three shelter sites in the region with engraved tracks were identified by Maynard (1976) as being Panaramitee outlier
site. Attenbrow (1981) and Gunn (1981) recorded a few similar sites in Upper Mangrove Creek Catchment.

The presence of engravings within shelter sites is another feature which separates the sites north and south of the Georges River. While there is not a complete absence of engravings from the sites south of the Georges River, the proportions are significantly different. There are only two such sites (out of 181 sites: 1.1%) south of the Georges River, while the other 55 sites (/365 sites: 15.4%) are located north of Port Jackson and the Parramatta River.

Most of these engraving are pecked tracks or circles. However, three distinct types (styles?) occur amongst the art (McDonald 1991). These are (Plates 22, A3.4, A3.7):

1) fully pecked, intaglio motifs; usually of circles, or bird and/or kangaroo tracks;

2) miniature Sydney style engravings; these are the same form, character and technique as the open engraving site variety, but in miniature (i.e. < 20cm max. dimension); and,

3) incised or scratched motifs, usually incorporated with pigment motifs. This type has the same motif character as figurative pigment motifs.

The use of the engraving technique within the shelter art assemblage will be discussed further (Chapters 5 and 6).

5.6 Comparison of the two art contexts: Sheltered and Open Art Sites

The Sydney Basin is unique in that there are two synchronous art forms within the region. In no other area of Australia does this occur to the same extent. In most regions one medium has been developed to the seeming exclusion of the other (e.g. Cobar, Laura), or the two are diachronically distinct (western NSW, central western Queensland).

The two overriding assumptions about the Sydney region art components are that;

1) they are relatively recent; and,

2) they are roughly contemporaneous.

Given the assumption of contemporaneity, the presence of the two art components allows the asking of quite specific questions of comparison. These questions can be at a very simple level. For example,
How do the two components compare in regard to the motifs used? and,

What are the inherent patterns in one component, and how do these compare with the other component? and, so on.

The questions can also be asked at a more sophisticated level, whereby recognisable patterns of stylistic difference/similarity may be attributed to spheres of mediation within the society which produced them. This is not to suggest that the meaning of the art can be explored: the opportunity to do this died with the disruption of prehistoric culture in the region c.200 years ago. However, by establishing certain parameters, it is felt that the analysis of two components will enable a much more detailed picture to emerge of how the art may have functioned across the region. This will be pursued further (see Chapters 2, 9).

The more general comparisons will be made here.

**Assemblage Size**

On average, sheltered art assemblages are larger than open art assemblages. The average shelter site assemblage is 2.5 times bigger than the average engraving site. The largest pigment site contains 5 times as many motifs as the largest engraving site.

It is interesting to speculate on the possible reasons for this difference. Perhaps it is due to the fact that average engraving’s production time would be significantly greater than that for any pigment motif (Clegg 1981). As a result of this, the difference in totals would not reflect a greater amount of artistic activity in shelters, but perhaps a commensurate amount of effort.

An interesting similarity between the two components is that both demonstrate a relative infrequency of very large site assemblages, but a proliferation of small, perhaps single episode, "one-off", sites. Such a finding suggests that there are particular art foci around the region, and that these may represent a different type of activity to the interspersed sites with less intensive art production.

**Topographic location**

It had usually been assumed that Sydney engravings were located on ridgelines while art shelters were located in valleys. This division is not substantiated by the current work. Certainly, only a small proportion of the shelter art sites are located on ridgelines, but relatively equal proportions of engraving sites occur on hillslopes and on ridgelines.

*Chapter 5*
A comparison of the engraving sites on ridgelines with those on hillslopes and in valley bottoms, is undertaken to determine the relative stylistic homogeneity of these (section 8.3). This is undertaken in a sample area where the topographic diversity is pronounced (around Ku-ring-gai Chase National Park), and where there is a high number of engraving sites generally. As well as the commonly recorded form of open engraving sites, the engraving sites in this area also occur on vertical surfaces close to the water's edge. The results of this analysis confirm stylistic differences which can be explained on the basis of topographic location and social context.

The distance to drinking water from the average sheltered sites is considerably less than from the average open site. The greater association between art and occupation evidence in shelter contexts is one possible explanation for this, especially since the contemporaneity of art and occupation can often be demonstrated (Chapter 5). The fact that more shelter sites occur in valley bottom and hillside locations (and therefore are geographically closer to creeklines) could also explain this finding.

Motif

It is possible to compare the motif range and preferences demonstrated by the two Sydney art components. This has not been done by previous research in the region (Franklin 1984, McMahan 1965, Maynard 1976, Officer 1984, Smith 1983) and nor is it possible to the same degree in any other art regions in Australia.

This can be done at a gross level (Tables 5.1 and 5.3; Figure 5.6 and 5.7) and on the basis of the variance described by multivariate analyses (Chapters 9 and 10).

At a gross level, there are obvious similarities and differences between the two components in terms of their respective motif assemblages. In both components, tracks dominate the identifiable motifs (Tables 5.2 and 5.4). With the shelter art sites, this is due to the overall predominance of hand stencils; in the engraving component it results from the predominance of human tracks ("mundoes") and to a lesser extent, bird and macropod tracks. Given the possible interpretations given to stencils as individual or personalised markers (Moore 1977), and the fact that this type of art places the artist very firmly amongst the art, the presence of human tracks in great numbers amongst the engravings is an interesting similarity. Is it a coincidence? Engraved mundoes are not in the same representational class as stencilled hands? One is conventional and the other is replication. The dominance of this motif, and the injection of a human component into both art assemblages does suggest some semiotic significance.
Figure 5.7: Motif preferences for the two art contexts. Motif classification excluding unidentified motifs.
Figure 5.8: Subject preference for the two art contexts. Clumped motif classes excluding unidentified motifs.

Other similarities between the two components are the proportions of anthropomorphic depictions, birds and (to a lesser extent) terrestrial animals. Here the similarities cease however.

The major difference between the two components is in the frequency of marine depictions and material objects (high in engraving sites; low in shelter art sites). The greater number of "other" motifs in the shelter art assemblage in contrast to the engraved one is indicative (in part) of the more 'stylistically unfettered nature' of this medium (Officer 1984:72).

The proportion of unidentifiable motifs within the shelter art component is significantly greater than that found in engraved sites (41%:15.2%). This is felt to be indicative both to the nature of its production and to the more fragile nature of the shelter art generally. Pigment art appears to have a greater susceptibility to natural deterioration (e.g. surface exfoliation, pigment flaking etc.) in many of sandstone shelters [Hughes 1978, although cf. Watchman (1994) which indicates that sandstone shelters walls, particularly with silica coatings, may be extremely stable]. The high proportion of unidentifiable motifs

Comparison of the two media...
may also be due to a more *ad hoc* approach to pigment art production (i.e. freehand drawing using unprepared surfaces/pigments). Further, superimpositioning of motifs is more common in these sites then on open engraved ones.

**Composition**

It is not always possible to assume (or observe) that the assemblages of rockshelters or engraving sites are contemporaneous. Many shelters indeed suggest the presence of several artistic phases (Chapters 6 and 7). In some instances, however, the compositions present in a shelter (or open engraving site) indicate that the assemblage was probably produced in one episode. Such indications are present in both site types with recognisable "scenes" (hunting, fishing, corroborees etc.) or repetitive designs (using combinations of motifs, often stencils).

Most of the open vertical engraving sites consist of complex compositions involving the sharing of internal lines/features for decorative effect, and a positioning of the design relative to the shape of the available surface. While composition is often recognisable in open engraving sites, by association and positioning of motif type (e.g. the Ku-ring-gai Fish Shoal site: Figure 5.8) it is never as conclusively so as in the vertical sites (Figure 5.9).

Compositions also occur within the shelter art assemblage. These take the form of obvious motif organisations [e.g. Native Animals (McDonald et al. 1990:Figure 5.2), Dingo and Horned Anthropomorph (Maclellan 1965:Plate 1)], as well as the positioning of hand and other stencils to make patterns or repetitive designs (e.g. Devils Hole, Cafe’s Cave, Swinton’s: Plates 23,27). These types of compositions are the best indications for the simultaneous production of many sites’ assemblages.

**Summary**

This chapter has described in detail the characteristics of the art across the region in its two contexts. It has highlighted areas of potential interest for subsequent analyses, and outlined the assumptions which are directing this research.

In the next chapter, one of these assumptions is explored in more detail. This assumption, i.e. that most of the art in the region is relatively recent, is grounded in the belief that the artistic evidence in the region is contemporaneous with occupation evidence generally.
Chapter 6

The Contemporaneity of Art and Deposit

6.1 The problem, previous approaches, current aims

We can ... base a dating system on clearly defined stylistic conventions which encompass a whole system of reference and through which secure bonds may be established between stratigraphically dated mobile art objects and parietal works, the latter generally lacking a datable context. (Lorblanchet 1977:56)

The contemporaneity between different archaeological elements in shelter art sites is explored in this chapter. Here, the assumption that occupation evidence and art were produced at the same time, and indeed that the two are complementary forms of evidence for the group(s) which produced them, is addressed. This assumption is not a new one, and indeed it has formed the basis for many preceding analyses both in Australia and overseas. The age of European Palaeolithic art has long been based on the dates retrieved from excavated deposits. In various regions of Australia the assumption has often been explicit (or even implicit) in more generalised analyses (e.g. Chaloupka 1977, 1994; Morwood 1979, 1992; Taçon 1989, Taçon and Chippendale 1993). While being a common assumption, the contemporaneity of art and occupation evidence has rarely been extensively investigated on a regional scale.

Previous approaches

Many of the stylistic analyses and resultant social models for the Palaeolithic are based on an assumed contemporaneity of the parietal art with the excavated occupation remains. This contemporaneity is often based on the stylistic similarity between mobiliary and the parietal forms (e.g. Cartailhac and Breuil 1906), on the association between fauna depicted and environmental phases (e.g. Gonzales Echevaray 1974), on associations between species depicted and excavated faunal remains, or on the basis of stylistic similarity between parietal and mobiliary forms (Lorblanchet 1977). Species depicted in a parietal context have also been matched with dated mobiliary items depicting the same species (e.g. Begouen and Clottes 1985). Occasionally engraved parietal art has been exposed by excavated (and dateable) deposit and similarly there are instances where fragments of decorated art have fallen and been buried by dateable deposits (Bahn and Vertut 1988). Most often, however, dating is more rudimentarily based on site association and the age of the excavated deposit (Conkey 1978:627).
Interpretative theses about Palaeolithic societies have been predicated on the implicit assumption of contemporaneity, and a range of models which have resulted from this broadly untested assumption and generally 'weak data' (Conkey 1987). For instance:

Gamble's (1982) model of open interaction networks across Europe functioning during environmentally difficult times, was based on excavated Venus figurines. The replacement of these by a different adaptation - the addition to the artistic repertoire of painted and engraved caves - was seen as evidence for a closure of these networks. It was argued that parietal art, restricted to south west Europe in the late glacial (from 17,000 to 10,000 BP), was a response to less severe conditions, and a resultant contraction in the extent of the social networks required for survival (Gamble 1982:97).

Hayden et al. (1987) while arguing that salmon was not an important resource in southwestern France until the end of the Pleistocene (cf. Jochim 1983), state that 'although the precise conditions are yet to be definitively established, there seems to be little doubt that some relationship does exist between artistic elaboration and the nature of the resource base' (Hayden et al 1987:279). Systematic (as opposed to ad hoc) fishing of salmon, and the social mechanisms which would allow such an evolution, are linked with the proliferation of Magdalenian art - which includes depictions of salmon and harpoons (ibid. 1987:289).

Contemporaneity is also assumed by various North American archaeologists (Geib et al 1986, Gunnerson 1969, Lipe 1970, Lister 1964, Talbot and Wilde 1989), some of whom consider that 'rock art is at least as significant as other material remains for defining cultural commonality' (Schaafsma 1985:267 and see Geib and Fairley 1992). Most of the American analyses, are confined to smaller scale problems, and thus compared to the European Palaeolithic, the problems that Conkey (1987:71) describes as 'big model-weak data' and 'big model-undeveloped test implications', have been avoided.

In Australia, there has been general acceptance of this assumption. Maynard's (1976) model for a relatively homogeneous pan-continental style of some antiquity being replaced by a proliferation of regionally distinct Simple Figurative styles in the recent past, was based on an understanding of parallel broad changes in stone artefacts from the Core Tool and Scraper Tradition to the small tool traditions (Gould 1977, Lampert 1971a, McCarthy 1964, Mulvaney 1977) and the putative association of rock art with artefact assemblages.

A number of regional studies, particularly since Maynard's (1976) classification, have worked within a framework which accepts a general chronological context being applied to regional art assemblages.
Such archaeological excavations as have been carried out and supported by radiocarbon dating, indicate human occupation and creative activity in the [Arnhem Land Plateau] region over 10 000-25 000 years. ... these sites ... represent the oldest evidence in Australia of the attainment of aesthetic perception by prehistoric man. (Chaloupka 1977:245)

A number of Australian shelter sites have been excavated with the expressed purpose being to indirectly date the art. Specific chronologies have then been extrapolated to other sites or broader regions on the basis of stylistic criteria and comparison (e.g. Beaton 1991b, David 1994; Flood and Horsfall 1987; Frost et al. 1992; Morwood 1979, 1986, 1992; Rosenfeld et al. 1981; etc.). Some shelter art sites have been excavated in order to characterise their lithic assemblages, and it has been assumed that the art and the deposit were contemporaneous phenomena (e.g. Mulvaney 1975, Quinlenn 1976, Wright 1971). Still other art sites have been excavated and little or no effort has been made to marry the art with the deposit (e.g. Attenbrow 1987; Attenbrow and Negerevich 1981, 1984; Beaton 1991a, 1991b; Cox et al. 1968; Mulvaney and Joyce 1965; White and Weineke 1975).

While the assumption of contemporaneity and occupation evidence is broadly based, there is not a definitive correlation between the production of art and the use of shelters for general habitation.

In some contexts, art and its production take place in the ritual sphere. In such situations, a correlation between domestic debris and art would not be expected (viz. sacred vs. secular). This has been archaeologically demonstrated in certain instances, e.g. through the association of art with mortuary practices in central Queensland (Morwood 1979). Alternative models have been proposed where an inverse relationship is recognised between art and occupation deposit. Morwood (1986) suggested that a proliferation in art production in south-eastern Queensland was linked to a decline in the usage of shelters for habitation, as art in the region took on an important social function of broad scale communication. Thus while being a widely accepted relationship, there are definite instances where contemporaneity would not be expected.

Many of the shelters around Sydney, have been described as 'important ritual galleries' (Elkin 1949, McCarthy 1961) with the accompanying interpretation being that these were of restricted access to certain parts of the population (on the basis of age and gender). There is no ethnohistoric evidence about the character or social context of the prehistoric art in the Sydney region at contact (Chapter 3). In the absence of traditional knowledge about its functions and production, the possibility of art having either and/or both ritual and secular functions thus requires consideration.
The fact that over 65% of shelter art sites also have recognisable occupation deposit (i.e. from surface evidence\textsuperscript{1}) provides strong support for the pigment art having a domestic function, if the assumption of contemporaneity is valid. The model proposed in this thesis is then that because the shelter art has a greater visibility to a broader Section of the community, it had the potential to function in a different fashion to the engraved art of the region which is not associated with habitation debris.

In many ways, the issue of contemporaneity will only be resolved through a comprehensive effort to obtain direct dates for the pigment art at a number of sites, using AMS radiocarbon and companion techniques (e.g. Watchman 1994). There is no other way to confirm beyond doubt that the two sorts of evidence were produced at exactly the same archaeological time (see discussion Chapter 7).

Soon after this research commenced, the opportunity arose to commence such a project (McDonald et al. 1990, in prep.) and a number of motifs have been dated using AMS. Progress has been slow, due largely to restricted funding, technical problems in setting up facilities in Australia and the myriad of potential sampling problems and interpretative pitfalls induced by the still experimental nature of these techniques. A small number of sites have been dated by this process in the greater Sydney region. One of these sites was the UDM shelter excavated for this research, which is discussed more fully below. The preliminary results of this dating project, and the significance of the results achieved for dating the art sequences are discussed elsewhere (Chapter 7).

In the absence of sufficient uncomplicated data, this Chapter demonstrates a methodological approach to investigating the assumption of contemporaneity of habitation and art production both at the site specific, and then at regional levels.

**Current Aims**

Because of the general characteristics of the art (Chapter 5) it is widely agreed that the two art components are both relatively recent and roughly contemporaneous. Based on patterns identified in the occupation indices of this region (Chapter 4), it can be assumed that the majority of the Sydney Basin art similarly dates to within the last 3,000 years.

It follows that both forms of art were broadly speaking being produced by the same group(s) of people, over the same period. Implicit here is the concept that occupation evidence and art are different components or attributes of the same culture. The material

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\textsuperscript{1} These figures are based on NPWS site records. CRM work in the Sydney region has demonstrated through test excavation programmes of shelters (and open areas) with Potential Archaeological Deposits (PAD) that more than 80% of shelters with no visible (surface) archaeological remains are indeed archaeological sites once excavated (Attenbrow 1981,1987, Attenbrow & Negerevich 1991, Koettig 1985, McDonald 1985b, McDonald & Rich 1993).
evidence (lithics etc.) which dates and demonstrates patterns of landuse (population presence, increase, change over time, and so on) should be indicative of general social trends. Thus, patterns in art production (changes in style, function, and etc.) should also reflect overall occupation trends in the region (cf. Attenbrow 1987). The ramifications of these assumptions are addressed in this Chapter, which is preliminary to more detailed analyses of diachronic change within this time frame of production (Chapter 7). Sheltered art sites are the focus of this analysis since these are the locations which provide the dual forms of artistic and occupation evidence in close proximity and in potentially correlatable positions.

Four shelter art sites were excavated for this research specifically to test the relationship between their art and deposit. The interpretations of these excavations are outlined (Section 6.2) with the results being presented in detail elsewhere (Appendices 1-3). As well as in diverse geographic locations, each of these sites contained art in different specific contexts. The assemblages of each site provided different forms of evidence which could be used in the testing of this issue.

There are many problems inherent in the assumption of contemporaneity being applied on a regional scale. In many sites it is difficult to prove the assumption either through the absence of necessary datable evidence, or conversely, by the absence of pigment in a dated sequence. Sometimes, the location (spatial context) of the art in a site is such that its relative age cannot be argued - e.g. engravings located on the base of sloping shelves but not covered by deposit. There are also art assemblages which create analytical difficulties in broader terms. These include sites which have:

- only one phase of occupation evidence but several phases of art present - either stylistically distinct or obviously episodic;

- several phases of occupation evidence but only one art phase present;

- artistic evidence which demonstrably postdates the occupation evidence; or,

- obviously ancient art which is "associated" with recent occupation evidence.

The general problem here may also be that archaeological phases or cultural periods 'collapse' very long periods of time in terms of the individual or even social generations. Direct correlations between 'an individual site occupation' and 'a specific artistic production episode' could not ever be expected [although see the relatively unique opportunity provided by Cosquer cave (Clottes and Courtin 1993, d'Errico 1994)].

The contemporaneity of art and deposit ...
General artistic trends over centuries or even millennia are the most usual time frames involved in prehistoric art analyses, although the successful application of AMS dating may well alter this situation (Clottes and Courtin 1993, Cole et al. 1994, Geib and Fairley 1992, McDonald et al. 1990, in prep.).

There is also the problem, ably identified by Conkey (1987), that regional patterning operates multifariously, 'many important processes and institutions operated at and should be understood at a variety of scales of inclusion' (ibid.:70). We need to understand the complexities of intrasite patterning and the evidence from individual sites, as well as the regional patterning which results from viewing the material at this broader perspective.

By searching for regional patterning, the assumptions of this thesis are intentionally 'telescopic'. The intent of this chapter is to address these assumptions on a finer scale and to identify the potential for flaws (anomalies or persistent patterns, etc.) in the regional trends. The sites which have been purposively excavated to test this problem represent but a minute sample of sites in the region. However, the results of these excavations, in tandem with other excavated (and dated) art shelters not explicitly excavated for the purpose, can be used to predict how reliable such an approach might be and where its inherent biases might lie.

A review and analysis of previously excavated shelter art sites in the Sydney region (Section 6.3) follows the discussion of the detailed excavations undertaken for this research (Section 6.2). These sites, with one exception, were not excavated to investigate the art. However, in many of these sites contemporaneity can be argued using similar arguments to those forwarded in Section 6.2.

While demonstrating that contemporaneity can often be argued, there are obvious anomalous or problematic instances, such as those foreshadowed above, where the assumption requires further testing. Some exceptions must be made, and explanations for these are proposed. General regional patterns in shelter site usage are identified and the ramifications of these discussed.

Conclusions are drawn and an assessment of the validity and utility of the assumption of contemporaneity are discussed (Section 6.4). An approach to a broad scaled testing of this model is proposed.
6.2 Testing the cultural duality of art and occupation

Four shelters were specifically excavated for this research to investigate the contemporaneity of their art assemblages and occupation deposits. All four sites, located in various geographic zones (Figure 6.1), presented very different art assemblages and opportunities for addressing this issue.

Figure 6.1: The four shelter art sites excavated for this research.
The four sites were the Great Mackerel rockshelter overlooking Pittwater; Upside-Down-Man shelter (in the lower reaches of the Mangrove Creek catchment) and the Yengo 1 and Yengo 2 shelters (in the upper reaches of the Macdonald River catchment). All shelters contained evidence for the episodic production of the pigment art. The main site near Mount Yengo (Yengo 1) also contained an engraved panel partially covered by occupation deposit. The two Yengo sites, located less than 10m apart contained very different art assemblages.

The sites presented different degrees of association between the art and the deposit, and through the processes of direct and indirect association the relationship between these different elements have been demonstrated. The details (methodology and results) of the excavation of these sites are presented Appendices 1-3. The general results and relevant methodological and interpretative issues raised by each site are discussed here.

6.2.i) Yengo 1 and Yengo 2

These two sites are located to the east of Mount Yengo towards the north of the study area (Figures 6.1, A1.1).

Yengo 1

This site contains an extensive pigment assemblage on the ceiling and back wall of the shelter. It also contains a large boulder at the front of the shelter which has a number of pecked circles, bird and macropod tracks (Figure A1.4). The sloping back wall at the southern end of the shelter also contains numerous grinding grooves (Figures A1.2 and A1.5).

The pigment art at Yengo 1 consists of stencils, paintings and drawings in white, red, yellow, pink and black pigment (Table A1.1, Plates A1.3-A1.6). The assemblage is the second largest recorded in the Sydney Basin (McDonald 1987, 1990a). The predominant motif is the hand (mostly white stencils) and there are numerous hand variations (hand and arm, hand and wrist, finger manipulations) present. The predominant colour used in the pigment art at the site is white, followed by yellow, black and red. Stencilling is the predominant technique used at the site followed by engraving, drawing and painting.

The site has several interesting and unique features.

This is the only known site in the region where a paint wash has been used in various locations across the rock surface either to cover pre-existing art or to prepare the surface.
for stencilling. There are also a number of black hand stencils present. These are a rare form and the only others recorded are in the south of the region: Caryll Sefton, pers. comm. 1988). Also present at this site are bichrome stencils, and hand prints (yellow and tan). Non-primary colours, or at least of mixed pigments have been used at the sites. These included pink (presumably red and white mixed) and orange stencils.

The range of hand sizes present indicates that an ambiguous population group including children, adolescents and adults participated in the production of the stencil art at this site.

A total of 55 grinding grooves, two areas of abrasion and one abraded groove were recorded, as were five discrete areas of battering/pounding and numerous pecked marks (Table A1.4, Figure A1.5, Plate A1.7). The five areas of pounding (bruising or battering of the surface) occur on the relatively flat back ledge. The areas of pounding appear to predate the grinding grooves. Several of these areas have been affected by exfoliation of the case hardened surface in this area, as have several grinding grooves. There are a number of discrete pecked dots as well as clusters of dots scattered across the back wall area. None of these features were not covered by deposit.

On the bedrock surface beneath deposit in squares 2 and 3, five more pecked dots were also discovered (Figure A1.5). This indicates that this type of activity, and perhaps that on the back wall, may predate the site's most intensive occupation period. These may be related to the production of the pecked art on the shelter's boulder as pecked dots are a common component of the Panaramitee (Clegg 1981, Edwards 1971, McDonald 1993a).

The major findings at this site were:

a) the engravings continue beneath the deposit and a date ante quem for these can be inferred;

b) the occupation deposit varies in nature and intensity over time;

c) on the basis of stratigraphic evidence the relative age of both the engraved panel and the pigment art can be argued; and,

d) on the basis of the excavated assemblage, the relative age of the grinding grooves can also be inferred.

The seven stratigraphic units identified at the site were interpreted as demonstrating four cultural phases. These four phases of occupation accorded well with those identified by Attenbrow (1987 Table 4:7 in Mangrove Creek (Chapters 4, 7). The dates achieved
for the Yengo 1 site were also in general accord with Attenbrow's dates (1987:189), with the exception of the third phase (Middle Bondalian) which continued after 1,600 years BP to around 550 BP. The dates at Yengo 1 were:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Date Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>c. 6,000 - 4,600 years BP</td>
</tr>
<tr>
<td>Phase 2</td>
<td>c. 4,600 years to c. 2,850 years BP</td>
</tr>
<tr>
<td>Phase 3</td>
<td>c. &lt;1,950 years to &gt;540 years BP</td>
</tr>
<tr>
<td>Phase 4</td>
<td>c. &lt;540 years BP</td>
</tr>
</tbody>
</table>

A relatively wide variety of mammalian species are represented within the identified sample at Yengo 1. Preservation conditions for faunal material were good and a minimum of 20 species were identified.

Very little bone was deposited prior to c.1,500 years ago and the peak deposition period appears to have been between this time and c.500 years ago (cf. Figures A1.23, A1.40). This vertical patterning does not match that found for the lithic material. The peak of the faunal material post-dates the most intensive period of artefact accumulation. Over the period of this deposition, there appears also to have been a change in the focus from larger animals to a proliferation of smaller species from a range of habitats. This is a similar pattern to that observed by McBryde (1976) in the New England region of New South Wales and by Morwood in south-east Queensland (1986). This pattern has been interpreted elsewhere (e.g. Morwood 1986) as evidence for changing site function over time.

**Yengo 2**

The art assemblage in this site is very different to that found in the main shelter site (Table A1.5) which is located 10m to its south. It comprises co-dominantly drawings and stencils with paintings representing a larger proportion of the assemblage (Plates A1.9, A1.10). White pigment dominates, but not to the same extent as found in Yengo 1. Black is the next most commonly used colour, followed by red and yellow.

Stencils do not dominate in this site. Depictive motifs account for more than half of the assemblage, and the majority of these are identifiable and figurative. The subject range includes mainly anthropomorphs and macropods and there are a variety of land animals depicted.

A sequence was identified at the site on the basis of superimposition of technique, colour and form:

**Earliest**
- dry black solid
- dry red or pink solid and/or outline
- dry white outline and infill
- dry black outline and infill
wet white outline  
black and white bichrome (some wet/dry combination)  

Latest  
white hand stencils  

There is some suggestion of motif preference changes with these artistic episodes. Most of the earliest art consists of small anthropomorphs while the middle phase consists of a wide range of subjects. As indicated above, stencils appear late in this art sequence. All of these stencils are adult sized.

The excavation questions for Yengo 2 site had a somewhat different orientation to those in the larger site. These were based on the fact that the art assemblage in this shelter was markedly different from that in the main shelter, and the fact that there was no surface evidence for occupation in this site. Considering the proximity of the two sites, establishing the contemporaneity of use for the two sites, particularly if this could pinpoint the likely age of the art's production, was of some interest.

Sparse occupation deposit was recovered from this shelter and it was discovered that the majority of the sedimentation at the site was through natural processes. The small amount of material retrieved from this site unfortunately went astray in the Department at ANU before it was analysed (Appendix 1).

While the absence of this analysis is regrettable, it is felt that the missing data, with the exception perhaps of the one charcoal feature, was relatively uninformative to the general questions which arise from this site's art assemblage, being as it is both widely disparate in composition and form to the main shelter, but in very close (geographical) proximity. The sparsity of occupation deposit can be explained by the unpleasantness of the shelter for camping at any time other than on the hottest day. It is dark, dank and the deposit and sloping back wall is extremely damp. No pigment was found in the deposit and no correlation between the art and deposit could have been established.

The question which lingers tantalisingly is, however, why was art produced in this shelter. Given the evidence for occupation of the shelter was sparse, does this pigment art represent a different focus (function?) to that found in the larger shelter, which also has abundant evidence for extensive domestic uses. The several episodes of art production at this site indicates that, like Yengo 1, this was perhaps used over a considerable time period.

**The Age of the Yengo Art**

The engravings at Yengo 1 were found to extend some 35cm below the current ground surface. The engravings' location on the boulder outside the shelter's dripline caused
problems for interpreting their age. The deposit adjacent to the engraved boulder is affected by considerable water percolation, while the depositional processes at the front of the shelter are different from those operating at the back of the shelter (Appendix 1; Section A5.1).

On the basis of the stratigraphy identified in the trench perpendicular to the boulder and from a date received from close to the boulder it was concluded that deposit dating to older than 2,800 years ago resulted in the base of the engravings being covered. The engraving’s production conclusively predates the main occupation of the shelter (Figures A1.14, A1.15 and A1.18).

It would seem likely that the engravings also predate the Early Bondaian phase of site occupation, since the layer of deposit associated with this lithic assemblage decreased the floor height below the circles sufficiently to have made their production difficult. On this basis, it is argued that the engravings are Pre-Bondaian in age.

Pecked dots were discovered on the sloping bedrock floor beneath the deposit in square 2A. These are covered by Early Bondaian deposit, and therefore definitely predate some of the earliest occupation deposit at the site.

It was concluded that the engraved circles, dots and kangaroo tracks were probably produced during the earliest occupation of the shelter, between 5-6,000 years ago. The conservative minimum age proposed for their production is older than c.3,000 years. This is a terminal date for Layer V, the base of which initially covered the engravings.

Stylistically, the engraved panel and pecked dots have more in common with the pan-continental Panaramitee style, than they do with the Sydney Basin engraving style. The former has a more restricted figurative range and a concentration on pecked geometric designs (such as circles) and kangaroo and bird tracks (Clegg 1987, Maynard 1979, Franklin 1991, McDonald 1993a, Rosenfeld 1991, Rosenfeld et al. 1981). The engraving style in the Sydney region is predominantly figurative (animals, birds, human figures etc.). Although tracks are not uncommon, human tracks predominate in this style, and circles are rare (Chapter 5). Further, the technique employed in the Sydney Basin style is primarily pecked and abraded outline, as opposed to the Panaramitee technique which consists of pecked intaglio (solid) motifs.

The Panaramitee was originally perceived as being of great antiquity (although see McCarthy 1979, 1988) based on the identification of extinct megafaunal tracks and animals (Basedow 1904, Mountford and Edwards 1963). Edwards (1971) recognised that Panaramitee art appeared to be associated with the 'core tool and scraper tradition',

Chapter 6
and that most of these art sites were deeply patinated. Maynard (1979) put an age bracket of between 7-10,000 years on this art form.

More recently there have been numerous attempts to date the Panaramitee and its regional variants. Much of this effort has been directed at sites where these engravings are found in rock shelters with associated occupation deposits (e.g. Flood and Horsfall 1987, Morwood 1992, Rosenfeld et al 1981). These sites have provided dates ranging between 1,570 ± 60 BP (Beta-3777) at Green Ant and 13,200 ± 170 (ANU-1441) at Early Man (both in north Queensland). Efforts in the arid zone with open sites and a range of dating techniques have provided wide ranging results. Dates of between 1,400 and 35,000 years were obtained using cation-ratio dating (Nobbs and Dorn 1988), indicating problems of sampling as much as the likely age bracket for this style (Watchman 1992). A date of c.10,000 years for this art style at Sturt's Meadows was obtained using AMS on charcoal from carbonate crusting (Dragovich 1986).

Rosenfeld (1993) argues cogently for this style being no older than the terminal Pleistocene.

an age greater than the terminal Pleistocene cannot at present be upheld for referential rock art. ... the integration of features of the landscape into a corporate symbolic system is entirely consistent with a model of tightened social and territorial organisation at the close of the Pleistocene. (Rosenfeld 1993:77)

Some have questioned whether those sites in the coastal or montane regions of Australia where Panaramitee-like engraving occur are in fact part of the Panaramitee tradition (Rosenfeld et al 1981:88-9, Rosenfeld 1991; cf. Morwood 1984). Indeed, many of the regional variants contain more variable motif assemblages, and certainly cannot be called classic Panaramitee². A recent analysis by Franklin (1991) has indicated that there is:

variation within the Panaramitee style both in the arid zone and outside it. The Panaramitee style therefore cuts across environments, ... emphasis[ing] its widespread nature, ... there are similarities between engraving sites across the continent, but ... individual regional manifestations also occur. (Franklin 1991:132)

The engraved panel at Mount Yengo would appear to be a regional variant of the Panaramitee. It is clearly of a different style to the majority of the engraved art found in the Sydney Basin. The probable pre-Bondaian age for this engraved panel supports the general contention that this art style predates the proliferation of Simple Figurative styles around Australia during the Holocene (cf. McCarthy 1988:39).

² An explanation for the greater heterogeneity in this style in the montane and coastal zones can be found in information exchange theory, with the differences in environment (and thus population) in these two contexts.
The production of the pigment art, primarily white stencils, in Yengo 1 appears to have coincided with the most intensive period of the site's occupation for camping and making stone tools. The following points were crucial to this conclusion.

1) Much of the ceiling is beyond easy reach of anybody standing on the sloping floor of the shelter, prior to the accumulation of c.30cm of deposit. While the art on the rear wall and back ledge of the shelter could be reached easily at any time, this part of the assemblage shows the same characteristics as that on the ceiling. The pigment art in the various contexts is argued to be roughly contemporaneous.

2) White pipeclay is found only in the top three Layers of the deposit, and there is no increase in acidity with depth which might account for a lower survival rate in the lower layers. Most of the ochre and pipeclay occurs in Layer 3.

Small quantities of red pigment were found in the lowest units of the deposit. The relative absence of this material amongst the pigment art may indicate that ochre was being used here for purposes other than the production of parietal art (e.g. body painting) from the earliest times of the site's usage. It is interesting to note the relatively early use of red pigment in the art sequence of the Yengo 2 site, for which we have no dates at this point. Elsewhere in the Sydney Basin the early use of red pigment in shelter art sites has been identified, e.g. at UDM shelter and Great Mackerel, as it has elsewhere across the continent (Cook et al 1990).

The Yengo 2 site contains a mainly depictive assemblage, using red and black pigment. Given the absence of excavated pigments in the Yengo 2 deposits, and the presence of red pigments in the earlier layers at Yengo 1, it is reasonable to suggest that the depictive assemblage in Yengo 2 may be older than the stencilled art assemblage in Yengo 1. Certainly the white stencils in the Yengo 2 site all post-date the remainder of the assemblage. In the absence of dating evidence from Yengo 2 deposits or motifs, this suggestion cannot be confirmed.

The stencilled assemblage can be used to infer a number of things about the population which took part in its production. The range of hand sizes, for instance, indicates an entire community, i.e. men, women and children. The stencilled material objects are primarily identified as men's tools (e.g. axes, clubs and boomerangs). Four straight sticks, however, while lacking any diagnostic features, are compatible in size with women's digging sticks.

On the basis of the distribution of ground edged fragments throughout the excavated assemblage (see Appendix 1; Section A5.4), it was concluded that the grinding
grooves, like the pigment art, coincide with the later, most intensive usage of the shelter. The pigment art in the two sites also contains nine stencils and/or drawings of hafted axes. The presence of these implements in both art and deposit is further indication for the contemporaneity of the various activities demonstrated by this site’s evidence.

6.2.ii) The Great Mackerel Rockshelter

Great Mackerel Beach is on the eastern side of Pittwater, towards the northern extent of the Ku-ring-gai Chase National Park (Figure 6.1, A2.1). There is a large art assemblage at this site, the majority of which is stencils. Two artistic episodes are indicated. The earlier episode consists of red hand stencils only. All of these were superimposed beneath white stencils, and were considerably more weathered looking. The later phase includes white stencilling of hands and other objects, white drawing and painting, and charcoal drawing. Surface exfoliation was recorded post-dating the red stencilling but pre-dating the later phase. No surface exfoliation has occurred since the later art phase was produced.

Compared with other shelter sites in the Guringai area there are few recognisable motifs at this site. Given the complexity of the assemblage, this is unusual. This motif clarity, combined with the absence of subsequent exfoliation, suggested that the later phase of art may be relatively recent in age.

An analysis of stencil characteristics suggests the presence of a mixed family group. Several white stencil compositions indicate the presence of men and women, both in terms of the hand sizes present and the different items of material culture which have been stencilled. There are four stencil compositions with a baby’s hand in direct association with a medium sized (mother’s?) hand and a composition of stencilled, pointed items which are interpreted as women’s digging sticks. There is also a stencil composition of a large symmetrical boomerang held in place by two very large hands.

The aims of the excavation were threefold. It was hoped to determine the nature of the occupation evidence at the site, and, in particular whether there were two phases of occupation at the site, as suggested by the art assemblage. It was also hoped to find evidence to indicate if the art was contemporaneous with the occupation deposit.

These aims were achieved by the excavation and, on the basis of the excavated evidence, it is possible to estimate the age of the art.
Two phases of occupation were identified at the site, an early Bondaian phase with no shell (dating from around 3,670 ± 150 BP [ANU-6615]) overlain by a late Bondaian midden associated layer, dating to between 560 ± 160 BP and 220 ± 120 BP [ANU-6373 and ANU-6370].

The Age of the Art

A minute quantity of white pipeclay was recovered from the midden layer. This is interpreted as indicating that the most recent phase of art at the site, predominantly white stencilling, coincided with the most recent occupation. This art and occupation activity took place from 600 years ago until just prior to contact. While there are problems in firmly correlating the occupation deposit with the art, i.e. the lower deposits provided a poorer preservation environment, support for this interpretation is found in a comparison of the contents of the excavated assemblage and the nature of the more recent art assemblage. The cultural remains in the midden layer, i.e. the presence of fishhooks, ethnohistorically reported to be women's fishing apparel, shellfish, fish and small land animals is interpreted as indicating the presence of women at the site. The more recent art phase, which includes stencil compositions of women's and baby's sized hands and pointed digging sticks, also suggests the presence of women.

The much older occupation layer represents very sporadic use of the shelter and may well indicate a different pattern of land use. This earlier occupation post-dates the eustatic sea-level rise and the environment during all phases of the site's occupation can be considered comparable. Explanation for the absence of organic remains in the deeper deposits is inconclusive, given the acidity of these layers. The differences in the stone artefact assemblages in the two periods, however, are quite clear. Possibly this site was first used as a shelter by men, while hunting on the ridgetops. It is tempting to align this earlier occupation which comprises stone tools only with the older phase of art at the site, which consists only of very large (men's?) red hand stencils.

I have discussed elsewhere the possible functions of this site (McDonald 1992b). Whatever these may be, two forms of archaeological evidence, art and occupation deposit, indicate the presence of women occupants in the more recent phase, and their apparent absence in the earlier phase. On the basis of this, contemporaneity of the most recent art and occupation layers is concluded. Direct (AMS) dating of certain charcoal motifs amongst the most recent assemblage could test this contemporaneity.
6.2.iii) The Upside-Down-Man (UDM) Shelter

This site is located in the lower reaches of the Mangrove Creek catchment (Figures 6.1, A3.1). The evidence at this site includes art (engravings, paintings, drawings and stencils) and occupation deposit (lithics, ochre, faunal and floral remains, shellfish and charcoal). There are also grinding grooves and an engraving on the roof above the shelter.

A very large assemblage of 274 motifs were recorded within the shelter, the majority of these being black, red and/or white drawings (Table A3.1). A complex range of artistic techniques have been employed at the site. Three pecked engraved figures were located at the site, low on the back wall and ledges. Several incised macropods were recorded on one of the art panels (Figure A3.2).

A total of 55 stencils were recorded amongst the UDM assemblage. The majority were white, with the remainder being red and yellow. The nature of the largely indeterminate red stencils at this site is felt to indicate a greater antiquity for this colour stencilling. In all instances, the pigment in these stencils has bonded with the rock and there is no loose surface pigment visible. The red hand stencils are also consistently found beneath white hand stencils and other techniques where superimposition relationships occur.

Of the eight engravings at the site, five incised motifs have been incorporated into a pigment panel. Superimpositioning reveals that these occurred fairly late in the site's art production and post-date earlier charcoal motifs.

The engraved motifs at the base of the back wall cannot, because of their locations, be directly correlated to the pigment tradition. Two of these motifs are pecked, and the other is a miniature pecked and abraded outline engraving (Figure A3.5). The pecked male figures, by dint of the intaglio technique, would appear to be examples of the regional Panaramitee phase of production. Examples of this earlier art style have been recorded in the Mangrove Creek area at eleven sites. However, in all other instances this art form consists of bird or macropod tracks (eg. Plate # 22), circles, and pecked pits or dots.

The UDM examples are not within the usual range of motifs found in this earlier style. It is possible that these represent a transitional phase of art production, the use of the older technique but the newer schemata. The inverted man (beneath Panel 1) has an infilled circular head and stick body and limbs (Figure A3.5). While the feet are depicted as open ovals (mundoes?), both hands have three fingers, like bird tracks (Plate A3.4). Similarly, some of the early red wet infilled anthropomorphs also have these three
'fingers' on their hands. The other pecked male figure also has a solid circular head, but no digits appended to the limbs (Figure A3.5).

Surface exfoliation as well as superimposition evidence at the site indicates several pigment production episodes. While the pecked and outline engravings cannot be directly related to any particular phase of pigment art production at the site, there are several pigment techniques, and motifs, which are consistently beneath others and are interpreted as being older than the majority of the art. Incised motifs, as indicated above, appear relatively late in the production sequence.

The technique classification applied to the detailed diachronic experiment (Chapter 7), was used at this site to investigate site specific diachronic variability (Table A3.2), and the general sequence identified for the Mangrove Creek area was supported by the UDM sequence (Table A3.4).

White hand stencils provide the best evidence either for the contemporaneity of much of this assemblage, or the pervasiveness of this technique over time. On the basis of field inspection, however, these would all appear to be generally contemporaneous. They all appear to be of roughly the same coloured pigment, and the expertise indicated by the user(s) of the technique across the site is consistently good. Pigment condition varies slightly across the site, but in the main this results from the varying degrees of protection afforded by the different art panels.

On the basis of this analysis, the pigment assemblage at UDM is interpreted as consisting primarily of elements from two distinct phases (Chapter 7). The pecked motifs may or may not be an earlier episode. The majority of the art falls in the most recent phase at the site. Given this sequence, the investigation of the occupation deposit at the site was aimed at determining the nature and timing of the occupation evidence at the site; and, whether there were two or perhaps three phases of occupation evidence at the site, as suggested by the art. It was also hoped to determine whether the art was contemporaneous with the occupation deposit.

Of particular interest was whether this evidence indicated domestic use of the shelter. Only one site with a large art assemblage had previously been excavated in the Mangrove Creek valley (Macleay 1965). All of Attenbrow's 31 sites had no art or

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3 Stencilling techniques in Mangrove Creek are quite variable, ranging from an even consistent spray to a blotchy and uneven techniques where individual 'mouthfuls' of pigment can be discerned (e.g. Plate 20). These blotchy stencils often occur late in superimposition sequences, and Pat Vinnecombe suggested (pers. comm. 1984) that these stencils may be very recent examples, and represent the disjunction to Aboriginal society in the contact period. She argued that these stencils were produced by people not skilled at the technique, perhaps after the smallpox epidemic (1789) had severely reduced the population.
minor art assemblages. Thus it was of interest to characterise the occupation debris at a major art site, such as UDM.

A total of 3,550 artefacts were retrieved from the five test pits here, making this the third largest lithic assemblage excavated in the Mangrove Creek Valley (cf. Attenbrow 1987:Table 5.6).

The initial occupation at UDM took place around 4,000 years BP. This appears to have been relatively ephemeral with low artefact deposition rates. Later occupation was more intensive and is marked by the introduction of backed implements, and a focus on the bipolar knapping technique and quartz. Backed implements were in use throughout the more recent occupation of the shelter, which appears to have ceased before the start of the last millennium.

On the basis of the assemblage's typological characteristics, the earlier occupation appears to have taken place during the Pre-Bondaian, while the main site occupation took place in the Middle Bondaian (cf. Table A3.21 with Figures A3.12, A3.13, A3.14 and A3.16). The period of lower occupation between these two 'phases' may represent a hiatus in site usage, but could also be interpreted as Early Bondaian (Attenbrow's Phase 2⁴). There is no Late Bondaian assemblage. The terminal date for the site, from an intact hearth (at 6.5 cm depth), was 1,220 ± 120 BP.

The Pre-Bondaian material at the site appears much more recent, by at least a millennium, than any Phase 1 material excavated by Attenbrow. Similarly, the Phase 3 (Middle Bondaian) assemblage fits better into the time frame for Attenbrow's Phase 4, starting after Attenbrow's Phase3:4 transition date of c.1,600 BP and continuing to c.1,200 BP.

Very little ochrous material was retrieved from the site. Red ochre and white pipeclay was found only in the top three excavated spits. None of this material showed evidence of striations or other usewear patterns, probably due to its extremely small size.

The absence of usewear evidence on this ochre and pipeclay makes definite art and deposit correlations problematic. Certain points are relevant, however.

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⁴ The general trends in occupation indices for the Mangrove Creek area indicate that artefact accumulation rates were the lowest in Phase 2 (see Appendix 3).
1) none of the excavation squares were directly below art panels. The presence of art producing material therefore may be considered fortuitous, and less likely, than in immediate proximity to the art panels.

2) this material does not occur naturally in the shelter, and therefore must have been brought to the shelter during its occupation history.

3) all possible art producing material is confined to the top three spits of the deposit.

4) ochre has only been recovered from one other shelter in UMCC, and this site has no art (Attenbrow 1987:Table 5.5).

While there is inconclusive evidence that the pipeclay and red ochre were used in the production of parietal art, this conclusion is not unreasonable. Both colours are found amongst the motifs. The two pigment fragments in 4D/1 produce the same colour red (SR 3/6) as the painted boomerang and anthropomorph (stick figure) on Panel 1 and the red outlined macropod on Panel 5. All motifs using this colour occur towards the upper levels of the art sequence. Superimposition analysis suggests that the production of art using this colour took place towards the last and most prolific art phase. The location of these ochrous fragments in the top spit of square 4D also places the use of these colours as very late in terms of overall site usage.

White pipeclay appears to have been used throughout the main period of art production. It is found as an outlining material to both black and red bichrome motifs; in the white hand stencils and the white paintings. The four fragments of this material found in square 6B/3 are from directly below the hearth dated to 1,220 ± 120 BP. The use of this material is firmly placed within the most intensive period of site usage.

The depiction of an axe on Panel 1 and the presence of ground edged fragments in the upper units at the site provides another correlation between elements of the art and features of the occupation deposit. No such correlation is provided by faunal remains at the site. There are not, for instance, any large, medium or even small macropod bones present amongst the faunal remains, such as would 'match' the depiction of such species amongst the art. Other than stone tool production, the deposit provides scant insight into the economic activities of the site's occupants. The plant remains suggest both medicinal uses and food remains.

5 Placement of the pits was restricted by the shelter's morphology, in particular the shallow grade of the sandstone bedrock adjacent to much of the back wall (Plate A3.1). N.B however, the proximity of Panel 1 to square 4.
A direct link to the people who created the art is provided by the hand stencils. These filled a range of sizes which included children, adolescents and adults. From this information, it would appear that the site was used by a mixed population group.

**Correlating the art and the deposit**

As at Yengo 1, the earlier pecked art in the Mangrove Creek valley, is interpreted as being a regional variant of the Panaramitee (Chapter 7), and predating the main period of art production in the Sydney Basin. At Yengo 1, a date of between 5,000-6,000 years BP is argued for this art style, while a pre-Bondaian date has also been inferred for a pecked emu track assemblage in Upper Mangrove Creek (following Attenbrow 1987; and see Chapter 7). The pecked anthropomorphs at the UDM site, by their motif range, suggest a transitional art form. Similarly, the late date at this site for the Pre-Bondaian artefacts would support such an interpretation, assuming a contemporaneity between this art and that earlier occupation.

The earlier pigment art at the site may be correlated with either of the earlier occupation periods, although there is little actual evidence in the deposit for such a correlation. Similar trends across the region would tend to suggest that such a correlation would not be unreasonable (e.g. Great Mackerel). This earlier art comprises mainly red pigment paintings and stencils. Other pigments may have contributed to this earlier art phase, but it has been argued that these may not have survived as successfully as red, which impregnates the sandstone matrix (Cook et al. 1990, Chaloupka 1977, Lambert 1990, Lewis 1988).

The main art production period at the UDM site is the most recent. It represents an 'explosion' of techniques and colour usage, and a broadening of the motif range. The presence of white pigment beneath the hearth (c.1,200 yrs ago), suggests for this art phase was produced at the same time as the main occupation of the shelter. The red pigment in square 4D, suggests that art continued to be produced late in the shelter's occupation.

The absence of contact motifs in the art and the terminal occupation date of c.1,200 yrs ago, argues for an abandonment of this shelter for both art and occupation during the last millennium.
The AMS samples

Four samples from two charcoal macropod drawings were collected for AMS dating (Figure A3.6). The black outline macropod motif (motif #1) on Panel 1, from which three AMS samples were collected is clearly superimposed over the red art on this panel. From analysing the superimposition on this Panel, it would appear that this was one of the final motifs created amongst the assemblage. The dates from this motif then should give a date for the terminal use of the site for art production.

The other motif, identified here as #2, from which one sample was collected is not in direct association with any other techniques/motifs. It is, however, one of panel of similar motifs (Plate A3.8), others of which are beneath both the incised motifs, white hand stencils and white outlined motifs. This motif, based on its faded and partly exfoliated condition and the superimposed sequence would appear to have been executed early in the main art production phase.

At the time that this thesis was submitted, only preliminary age determinations had been received from ANSTO (Table A3.7). Unfortunately, these are inconclusive as to the age of the motifs in question, and suggest problems with the field sampling procedure (McDonald et al. in prep.). One sample from the outlined macropod (motif #1; UDM-S1) returned a date of c.480 ± 80 BP. The two other dates from this motif, as with the date for Motif #2, were indistinguishable from the modern standard. Possible explanatory scenarios are discussed in Appendix 3.

The contradictory nature of these results makes it difficult to make firm conclusions about the production date of the outlined charcoal macropod. The use of the AMS radiocarbon technique at UDM shelter has not provided confirmation on the terminal date of art production as had been hoped.

At this stage the conventional results achieved, through associating excavated evidence and the analysis of the art assemblage must be emphasised. These suggest that the main art production phase coincided with the main occupation phase at the site. From the presence of red pigment in the top spit of square 4D it is possible that this art production continued beyond the main occupation phase and possibly after use of the shelter for habitation ceased. The AMS dates are suggestive that use of the shelter for art production continued into the last millennium.
6.3 The Sydney region: seeking regional patterns

The main problem generally with demonstrating contemporaneity between art and deposit relates to the fact that pari etal art cannot be directly dated. Early work using AMS radiocarbon dating has demonstrated that there is no simple solution to this issue, and that much more testing will be needed before this approach can be reliably applied (McDonald et al. 1990, in prep.; Watchman 1994). In the absence of direct dating, the association between occupation evidence and the pigment and/or engraved art is often not easily demonstrated. Direct associations (e.g. art being covered by dateable deposit; art detached from the wall and buried) are rare and indirect associations (such as the presence of pigments in occupation sequences: see discussions above) can be tenuous.

Sites with deposit providing contextual information for art in the Sydney region are extremely rare, and have so far has been restricted to engravings. The art covered in this fashion is not representative of the majority of the engraved art in the region, let alone the pigment component. Pigment art has not been found to be preserved below deposit usually because of the acid conditions.

There is one known shelter art site on Cowan Creek (McDonald 1987) in which several metres of midden deposit has built up to within a metre of the roofline. Stencils occur across the back wall very close to the current surface of the deposit and clearly must have been executed before the deposit accumulated to its current level. There is a possibility that pigment art exists below the deposit in this shelter, preserved by the alkaline deposits and that an association could be achieved in this location.

Indirect associations in the region between pigment art and occupation deposit are difficult to demonstrate, partially as a result of the generally acidic deposits and resultant poor preservation conditions.

Another factor in this problem arises from the drawing technique which predominates in the region. This does not involve the complex preparation of pigments, but the use of dry pigment as a crayon. This technique is considerably more ad hoc than the complex preparation of paints, which involves grinding, use of binders, mixing and so on. The lack of preparation suggests that the residues of such activity might not be expected in the deposits to the same degree as in regions where painting predominates (e.g. Arnhem Land, Laura). Ochrous material used as a crayon would occur in a much less predictable manner, i.e. as a result of being dropped or fragments breaking off during the act of drawing, or material perhaps being cached. Further, the ubiquitousness of charcoal in Sydney pigment art production means that any large pieces of charcoal in
the deposit had the potential to be used for drawing. This factor, while increasing greatly the chances for a successful dating project using AMS means that dating by association, with pigment in the deposit, is difficult.

Whether lack of pigment preparation or taphonomic factors are the cause, very few excavated shelters (art or otherwise) in the region have provided evidence which assists in the indirect dating of art production. Of the 31 shelters excavated in Upper Mangrove Creek, only one revealed the presence of ground ochre. And this shelter had no art on the walls (Attenbrow 1987:Table 5.5).

It is possible that excavated ochres may not be recognised by archaeologists who are excavating without an art research focus, particularly since these types of remains, when they are found - have been highly fragmentary. Further, much of the red and yellow pigment which is found in shelter sites is only gradationally finer in grain size and friability than natural ironstone which is ubiquitous across the Sandstone Formation (pers. observ.). A lack of interest in art related research questions, combined with the fragmentary nature of this evidence, may have resulted in such material being overlooked. It is interesting that the shelters excavated for this research all contained buried pigments (either pipeclay or ochre). Perhaps this can be attributed to the fact that these sites were all major art sites, and thus perhaps provided a greater chance for this type of material to be deposited, and thus recovered.

Prior to this research a total of 35 art shelters in the Sydney region had been excavated either for research purposes or as a result of cultural resource management work (Attenbrow 1987, Attenbrow & Negerevich 1984, Clegg 1981, Cox et al. 1968, Koettig 1985, Maclntosh 1965, McDonald 1992a, Menses (in) Miller 1983, Moore 1970, 1981, White and Weinerke 1975). While many of these authors discuss the art located in these excavated shelters, only one of these excavations was completed with the aim of placing the art into a chronological context (Maclntosh 1965).

By far the majority (78%) of these art sites were excavated for EIS and/or salvage purposes (Table 6.1). Eighteen of the 25 salvaged art shelters were excavated in the Upper Mangrove Creek catchment (UMCC) in a project which was instigated by salvage requirements and then subsequently developed into a research project (Attenbrow 1981, 1987, Gunn 1979). These have been grouped in the salvaged sites since the requirements of salvage dictated to some degree the locations chosen and the general questions asked.

Two of the art shelters excavated in the region (6%) were investigated for management purposes (Clegg 1979, Menses 1970's in Miller 1983), but no detailed excavation report for either site exists. Charcoal samples, however, were submitted from both of these
Table 6.1: Shelters with art in the Sydney region that have been excavated.

<table>
<thead>
<tr>
<th>NPWS #</th>
<th>Site Name</th>
<th>Published</th>
<th>Dates</th>
<th>Lab-Id</th>
<th>Art details</th>
<th>Sequence?</th>
</tr>
</thead>
<tbody>
<tr>
<td>52-2-37*</td>
<td>Bull Cave</td>
<td>Miller 1983</td>
<td>1,820 ±90 &lt;1,050 ±90</td>
<td>SUA-2106</td>
<td>white stencils, black &amp; red drw'g</td>
<td>b/r/w</td>
</tr>
<tr>
<td>52-3-30*</td>
<td>Audley</td>
<td>Cox et al. 1968</td>
<td>no (midden/occ)</td>
<td></td>
<td>w &amp; r stencils, b, r &amp; w drw'gs</td>
<td>str/tw</td>
</tr>
<tr>
<td>BC1</td>
<td>Attanbrow &amp; Negrevich 1984</td>
<td>no</td>
<td></td>
<td></td>
<td>b drw'g</td>
<td>no</td>
</tr>
<tr>
<td>BC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>blk, r &amp; w drw'g + y paint + prints</td>
<td>y/red</td>
</tr>
<tr>
<td>BC5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>blk drw'gs</td>
<td>no</td>
</tr>
<tr>
<td>BC9</td>
<td></td>
<td></td>
<td>1,630 ±90</td>
<td>SUA-1746</td>
<td>black drw'gs</td>
<td>no</td>
</tr>
<tr>
<td>52-2-1031*</td>
<td>M11</td>
<td>Koettig 1985</td>
<td>480 ±70, 1,520 ±70, 2,220 ±70</td>
<td>SUA-2255, SUA-2256, SUA-2257</td>
<td>w stencils</td>
<td>no</td>
</tr>
<tr>
<td>45-6-602</td>
<td>HLD</td>
<td>White &amp; Weineke 1971</td>
<td>5,240 ±100, 870 ±95</td>
<td>SUA-60</td>
<td>red h stencils</td>
<td>no</td>
</tr>
<tr>
<td>Bindea Rd</td>
<td>Attanbrow &amp; Conyers 1983</td>
<td>2,340 ±100</td>
<td></td>
<td>Beta-5887</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>37-5-1*</td>
<td>Yengo1</td>
<td>McDonald 1991</td>
<td>5,980 ±290, 4,590 ±300, 2,750 ±220, 1,950 ±400</td>
<td>ANU-6059, ANU-6055, ANU-6215, ANU-6054, ANU-6058</td>
<td>engraving, w, r, b drw'g + paint, w, y, r, b stencils</td>
<td>yes</td>
</tr>
<tr>
<td>37-5-2*</td>
<td>Yengo2</td>
<td>1988</td>
<td>still to come</td>
<td></td>
<td>w, b, r = y drw'g + paintings + stencils</td>
<td>yes</td>
</tr>
<tr>
<td>37-6-349</td>
<td>Big L</td>
<td>Moore 1970</td>
<td>2,495 ±105, 930 ±50</td>
<td>SUA-387, SUA-564</td>
<td>w stencils + paint</td>
<td>no</td>
</tr>
<tr>
<td>45-3-317*</td>
<td>Dingo &amp; Horned Anthropomorph</td>
<td>MacIntosh 1965</td>
<td>581 ±120, 144 ±125</td>
<td>GX-70, GX-69</td>
<td>r/w, r, y &amp; b drw'g, w stencils</td>
<td>yes</td>
</tr>
<tr>
<td>45-3-787*</td>
<td>Black hands</td>
<td>Attanbrow 1987</td>
<td>3,040 ±85</td>
<td>SUA-932</td>
<td>b, w, r + w stencil + polychrome</td>
<td>yes</td>
</tr>
<tr>
<td>45-3-1207</td>
<td>Dingo</td>
<td>Attanbrow 1987</td>
<td>1,840 ±60</td>
<td>SUA-2166</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>45-3-1528</td>
<td>Elongated Fig</td>
<td>Attanbrow 1987</td>
<td>1,810 ±80</td>
<td>SUA-2170</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>45-3-789*</td>
<td>Roo + Echidna</td>
<td>Attanbrow 1987</td>
<td>6,700 ±150</td>
<td>SUA-2172</td>
<td>b drw'g</td>
<td>no</td>
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<tr>
<td>45-3-776*</td>
<td>Loggers</td>
<td>Attanbrow 1987</td>
<td>530 ±85, 2,480 ±60, 11,050 ±135</td>
<td>SUA-1124, SUA-2165, SUA-931</td>
<td>b, r, w, b + w, incised engraving</td>
<td>yes</td>
</tr>
<tr>
<td>45-3-1165*</td>
<td>White Figure</td>
<td>Attanbrow 1987</td>
<td>5,230 ±70</td>
<td>SUA-2167</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>45-3-1159*</td>
<td>Wolloby Gully</td>
<td>Attanbrow 1987</td>
<td>400 ±60</td>
<td>SUA-2168</td>
<td>b, w, engraving</td>
<td>yes</td>
</tr>
<tr>
<td>45-3-1179*</td>
<td>Emu tracks2</td>
<td>Attanbrow 1987</td>
<td>3rd - 1st mill</td>
<td>SUA-2168</td>
<td></td>
<td>no</td>
</tr>
<tr>
<td>45-3-1164</td>
<td>One tooth</td>
<td>Attanbrow 1987</td>
<td>2nd? - 1st mill</td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>45-3-1161</td>
<td>Low frontage</td>
<td>Attanbrow 1987</td>
<td>1.5 mill</td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>45-3-1168</td>
<td>Elongarrah</td>
<td>Attanbrow 1987</td>
<td>1.5 mill</td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>45-3-1201</td>
<td>McPherson</td>
<td>Attanbrow 1987</td>
<td>1st mill</td>
<td></td>
<td>b drw'g</td>
<td>no</td>
</tr>
<tr>
<td>45-3-1174*</td>
<td>Bird Track</td>
<td>Attanbrow 1987</td>
<td>1st mill</td>
<td></td>
<td>b, w, b + w (out, of)</td>
<td>no</td>
</tr>
<tr>
<td>45-3-1160</td>
<td>Boat Cave</td>
<td>Attanbrow 1987</td>
<td>1st mill</td>
<td></td>
<td></td>
<td>?</td>
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<tr>
<td>45-3-1170*</td>
<td>Venus</td>
<td>Attanbrow 1987</td>
<td>&lt;1st mill</td>
<td></td>
<td>b, r drw'g</td>
<td>no</td>
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*The contemporaneity of art and deposit ...
Table 6.1 cont.

<table>
<thead>
<tr>
<th>NPWS #</th>
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<th>Published</th>
<th>Dates</th>
<th>Lab Id.</th>
<th>Art details</th>
<th>Sequence?</th>
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</thead>
<tbody>
<tr>
<td>45-3-1210*</td>
<td>Ti-tree</td>
<td>Attenbrow 1987</td>
<td>&lt;1st mill</td>
<td></td>
<td>b dw/g</td>
<td></td>
</tr>
<tr>
<td>45-3-1196</td>
<td>Mangrove mansion</td>
<td>Attenbrow 1987</td>
<td>&lt;500 yrs</td>
<td></td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>45-3-1204</td>
<td>Firestick</td>
<td>Attenbrow 1987</td>
<td>&lt;500 yrs?</td>
<td></td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>45-6-150*</td>
<td>Milligan’s</td>
<td>Clegg 1979</td>
<td>SUA-?</td>
<td></td>
<td>b dw/g, engraving</td>
<td>yes</td>
</tr>
<tr>
<td>45-6-72*</td>
<td>Angophora Reserve</td>
<td>McDonald 1992a</td>
<td>2,000 ± 150</td>
<td>ANU-6584</td>
<td>b + r dw/gs</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,750± 90</td>
<td>ANU-6923</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,150 ±100</td>
<td>ANU-6983</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-6-1614*</td>
<td>Gt Mackerel</td>
<td>McDonald 1992b</td>
<td>3,670±150</td>
<td>ANU-6615</td>
<td>red stencils</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>560±160</td>
<td>ANU-6372</td>
<td>b, w dw/gs + w stencils</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220±120</td>
<td>ANU-6370</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-3-1114</td>
<td>UDM</td>
<td>this thesis</td>
<td>1,220±120</td>
<td>ANU-8134</td>
<td>white stencils</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,860±70</td>
<td>ANU-8135</td>
<td>blk + w dw/g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,540± 60</td>
<td>ANU-8133</td>
<td>red stencils</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4,030±140</td>
<td>ANU-8132</td>
<td>engravings</td>
<td></td>
</tr>
</tbody>
</table>

shelters and dates for these deposits are available (McDonald 1992a, Miller 1983, Mackay and White 1987).

Of the five sites excavated for research projects (16%), the research questions being asked were broader scale ones; contact between the Hunter and the Hawkesbury (Moore 1981) and characterising coastal stone tool assemblages (e.g. Cox et al. 1968).

The following discussion presents the data from some of these excavated shelter art sites to demonstrate the potential in these for an interpretation of contemporaneity of art and deposit. By this process, and by analysing the occupation patterns demonstrated by these sites, general patterning across the region can be observed.

Henry Lawson Drive

The art assemblage at this site is described as:

Rock paintings on the back wall of the shelter above the shell midden area. They were situated about one metre above floor level and comprised at least seven red stencilled hand-prints (sic) which are only just visible. Some red ochre elsewhere on the walls indicates that other art had previously been present. (White & Weineke 1975:7)

Two dates were obtained for the site. The older (5,240 ± 100 BP) derived from the excavation outside the shelter and roof-fall zone and is interpreted as predating the main midden occupation of the shelter. A backed blade was found in association with the charcoal sample dated from this location. The base of the midden inside the shelter was dated to 870 ± 95 BP. The earlier date is interpreted as representing an occupation period predating the rock fall. On the basis of Section drawings (White & Weineke
1975: Figure 7) it would appear that the roof-fall pre-dated the midden period (Units IV and V).

The artefact assemblage retrieved in the 36 cm deposit below the midden was small (n=246) and included backed artefacts but no bipolar or use-polished material. Given the lithic assemblage's characteristics, it is probably Early Bondaian. The date returned is slightly older than might be expected. The early Bondaian has been dated elsewhere in the region to between 5,000-2,800 years BP (Attenbrow 1987; although see Hughes & Djohadze 1980:26). In this instance, the fact that this date derived from outside the dripline means that this may have been subject to a number of taphonomic agencies.

The rock art is unaffected by the rock fall and could therefore relate to either occupation period. However, the fact that the art is very faded, and that it occurs only 1m above the present ground surface, suggests that the stencils may predate the midden period and relate to the lower units which were more than 45cm below the current surface level. Adult hand stencils rarely occur low on shelter walls, and certainly, stencilling one's hand well below waist-height (approx. 1m) would be extremely awkward. Given the build-up of the floor level over time, it would appear reasonable that the stencils predate the midden and the roof-fall period and could be contemporaneous with the earlier occupation period, for which the c. 5,800 year old date was obtained.

Mill Creek

The site M11 excavated by Koettig (Koettig & McDonald 1984, Koettig 1985) contained faded white stencils of hands and of macropod feet.

The deposit at this site was dated to between c.500 - 2,200 yrs BP (see Table 6.1). Two main phases of occupation were determined, these being classified as Middle and Late Bondaian. The main phase of occupation was the earlier one, where the artefact density was three times that recorded in the upper assemblage. No excavated pipeclay was reported, although the poor state of preservation of the faunal remains (Aplin 1985) suggested that the survival chances for this may have been low. Aplin notes that the preservation of faunal material is best in the middle layers, and that the apparent absence of bone from the upper levels is 'noteworthy' (Aplin 1985:82).

It could be argued at this site that the production of the art took place during the more intensive middle Bondaian occupation. This conclusion could be drawn not only on the basis of more intensive occupation during this time, but on the basis of a correlation between the presence of faunal remains (including macropod) in this level and the presence of stencilled macropod feet at the site. It is unlikely that a macropod's feet would have been stencilled, but the beast not consumed.
It is proposed that the production of white stencils at this site took place between c.2,200 and 1,500 years ago.

**Barden's Creek**

Only one of the four excavated art shelters in Barden's Creek was dated on the basis of dispersed charcoal 7-12cm below the surface (BC9; 1,630 ± 90 BP). On the basis of an age-depth curve it is estimated that occupation in this site commenced between 3,500-3,000 years ago (Attenbrow & Negerevich 1984:143). The stone tool assemblage was characterised as being mainly Middle Bondaian, with a possible sparse Late Bondaian phase.

The small art assemblage (<20 motifs) comprised of faded black drawings of anthropomorphs and a quadruped. The authors estimate that 80% of the assemblage is identifiable. All the art was executed in charcoal, a material found in greatest quantities in the layer dated.

While there is not necessarily any correlation between charcoal rich layers in the deposit and charcoal drawings, it would not be an unreasonable conclusion to draw. As this shelter has several phases of occupation, concluding contemporaneity of the art with one particular phase of deposit is difficult. It is argued that the production of charcoal drawings at BC9 date to within the last 1,600 years.

**Bull Cave**

The art from the shelter was recorded in detail by the SPG (1983). The art here includes several contact motifs among its complex assemblage of black and red drawings and white hand stencils. These are two complete and one partial motifs of large bulls. These motifs are executed in traditional techniques; outlined and infilled drawing. One of the complete bulls is red and the other black. Both have white eyes.

Schematically, while obviously being bulls, they have un-bovine feet and almost bird-like heads with no horns. Clegg (1981) has argued that these bull depictions are drawings of escapees from the early days of the colony, in 1788, since these cattle were polled, unlike their 61 progeny found in 1795. He also argues for a 'bitsa' or developmental schema whereby the earlier (red) drawing of the two is more bird-like than bull-like, while the later black version is more schematically 'correct'. The bull's feet were obviously problematic for the Aboriginal artist, because these were completely unlike any native fauna. Difficulties may also have been encountered because these, from a distance, were concealed by grass (see argument in Trezise 1991).
An analysis of the excavated evidence from this shelter does not contain any attempt to correlate the art with the deposit (Miller 1983). And indeed such an effort is made difficult by the fact that the terminal dates for the shelter's occupation deposit are c.1,000 yrs BP. N.B. Koettig's (1985) re-analysis of the Bull Cave material indicates that a Late Bondaian assemblage may be present in the top spit.

This site is an example of the art being of a 'knowable' age, i.e. at European contact, with inconsistent excavated evidence.

**Mangrove Creek**

The Mangrove Creek sites (Attenbrow 1987, Gunn 1979, MacIntosh 1965) are discussed in more detail in Chapter 7. Two of these, however, are discussed here. The Dingo & Horned Anthropomorph shelter is discussed since this excavation at this site was directed purposively at dating the art. Attenbrow's Emu Track 2 site is discussed here since this site demonstrates a situation of potential ambiguity.

**Dingo & Horned Anthropomorph**

The art at this shelter is located in two separate alcoves. The main panel, after which the site is named, is comprised of a dramatic composition involving two red culture heroes (horned anthropomorphs) two dingoes and two echidnae. The other art in the site consists of a complex panel of drawings and stencils. There is an engraved fish on the sloping rock panel at the base of this panel and a number of grinding grooves on a platform outside the dripline.

At this site, two dates [144 ± 125 BP (GX-0069) and 581 ± 120 BP (GX-0070)] were obtained from a pit, near the horned anthropomorph panel. No lithic or faunal assemblage was found in this particular excavation, but clear stratification of charcoal (some hearths) as well as the two "red powdery" strata amongst the yellow sand was found. MacIntosh argues that these powdery strata represent the two artistic episodes at the sites. The older date was collected from a sample below the darker red lens in which one piece of faceted pigment, the same colour as the dingo and horned anthropomorphs, was found. The pigment from a depth of between 24-27cm was described as having 'three of its eight sides "rub-polished"' (MacIntosh 1965:Plate V).

The other dated sample came from above the upper lighter red layer, only 4cm below the surface (ibid 1965:92-3). My interpretation of this more recent date is that it cannot be correlated with the art at the shelter (see discussion Chapter 7).
Emu Tracks 2

At Emu Tracks 2, 15 engraved emu tracks were recorded as being level with the current surface of the deposit. It has previously been assumed (Clegg 1978; Morwood 1979, 1992; Rosenfeld et al. 1981) that where engravings occur on vertical shelter walls that the contemporaneous living surface was likely to have been between 35-50 cm below the base of the engravings.

It was estimated (on the basis of artefact typology) that the first occupation of this shelter began sometime around 4,000 years ago (Attenbrow 1987:Table 7:2). The major occupation of the shelter is thought to have occurred in the 3rd millennium in the Middle Bondaian. The basal levels at Emu Tracks 2 were c.80cm below the current surface, and thus it might be assumed that these engravings are related to the main, Middle Bondaian occupation of this shelter.

However, the morphology of the shelter and nature of the engravings suggest that this may not have been the case. The back wall and bedrock in the shelter is steeply sloping. The one (50 x 50cm) test pit excavated here had contracted significantly at its base, and it is possible that evidence of the site's earliest occupation, towards the front of the shelter, may exist but was undetected by this very small sample (Val Attenbrow, pers. comm., 1991). Thus while a minimum age of Early to Middle Bondaian is suggested by the relationship between the art and deposit in this site (Chapter 7; Table 7.7), it is thought that the art may indeed be older.

On the basis of the spatial relationship between this shelter's art and occupation evidence, an age estimate for this type of art is placed at >4,000 years BP (Chapter 7).

Angophora Reserve

The main occupation phase at this site was between c. 2,000-1,200 years ago. The art consists of small assemblage of faded black and red fish and macropod drawings. No association was possible between the deposit and art in this site, mainly because these are spatially discrete (McDonald 1992a:Figure 2).

The art has the potential to be dated, both by AMS on the charcoal pigment or on carbon within the silica coating which has covered several of the motifs. The art has been severely vandalised in recent years, and the risks of charcoal contamination of the pigments are high. The silica coating, however, offers a good potential (Watchman 1994).
Audley

The 38 motifs at this site were described by Maynard as being 'not all done at the same time, but on several occasions, to which different fashions in colour and form were appropriate' (Cox et al. 1968:99). The sequence at the site was described as first white stencil and red followed by white, and black and white bichrome.

Several phases of occupation deposit were observed, although these were not dated since these appeared to 'offer no index of chronology ... ' (Cox et al. 1968:99). The stratigraphic sections indicate that the earlier phase of occupation included artefacts, with charcoal and a few shells. The later phase comprised tightly packed shell midden (ibid.:Figure 1).

The shells weren't analysed beyond the comment that these comprised 'estuarine species readily comparable with those recovered from a rock shelter some three miles downstream at Gymea Bay (ibid.:94). Bone material also but in quantities 'insufficient to allow any useful identifications'. It was noted in passing that human skeletal remains were found in this site (ibid. 1968:97).

Other excavations in shelters across the region have revealed similar patterns of occupation (Attenbrow 1988, 1992; Clegg 1979; Glover 1974; McDonald 1992a, 1992b; Megaw 1974) and it would appear, from the limited information provided, that this Audley shelter has a similar occupation history to a number of other decorated shelters in estuarine locations.

The phases in the art are also suggestive of similar trends noted, particularly in the Great Mackerel shelter (Section 6.3). In both shelters there is an earlier phase of red pigment followed by a later phases comprised of white stencils and black and white bichromes.

The absence of dates, shell analysis or any vertical information about the sparse stone artefacts makes comment beyond drawing these similarities difficult. On the basis of these similarities in trends, however, and the absence of backed artefacts, the upper midden unit white stencils and black and white bichromes at Audley may be late Bondaian, while the earlier occupation unit and red paintings may be early Bondaian.

Daley's Point (Milligan's)

The Daley's Point shelter is to the north of Broken Bay, and was excavated by Clegg in 1978. This excavation was undertaken prior to constructing a grid to protect the art
from vandals. The art consists of charcoal drawings and engravings (fish?/echidna? and macropod) low on the sloping back wall.

No excavation report has ever been produced (although see Clegg 1979). The site is stated as having been occupied 'for between 200 and 600 years from 900 to 700 years ago, or 1100 to 500 years ago' (Clegg 1979:2). This is taken to mean that a date obtained for the occupation level of the site was 800 ± 100 BP, although this interpretation is clearly only one of many. A basal date is firmly stated as being 5,340 105 BP (SUA-?: not referenced).

Clegg states that there is obvious change over time in the occupation material 'the stone artefacts are low down. All the fish-hook stuff is right on top. The lower shells are larger than the upper shells' (ibid:3). Attenbrow's (1979) analysis of the molluscan remains from the site confirms that a vast quantity of shell was removed from one square, 69 kg. The majority of this consisted of Anadara trapezia (82.6%).

The pigment and engraving art is interpreted (by me) as being associated with the main, midden deposit in this site. Its production is thus tentatively placed within the last millennium.

6.4 Discussion and Conclusions

Of the 35 shelter art sites excavated in the region, dates have been obtained for 22 (Table 6.1 and 6.2). The discussion of the sites above indicates that a careful reading of the original reports can result in an inferred age for the art in many instances on the assumption that art will tend to correspond with more intensive occupation. No detailed analysis of the temporal trends in art styles as suggested by this data is made here. A detailed analysis of diachronic change is made in Chapter 7, at which times these trends will be further discussed.

By plotting the length of time that archaeological sites with art have been occupied and the main phases of occupation at each (Figure 6.2), the general occupation trend identified for the region (Chapter 4) is affirmed. The fact that this occupation pattern is mirrored by shelters with art is considered significant. It indicates that the use of these shelters, which have been used to produce art, document a very similar pattern of behaviour to habitation sites generally. The similarity of these patterns supports the suggestion of contiguity in the use of these locations for general occupation and for the production of art.
Figure 6.2: Dated shelter art sites showing length of occupation and period of most intensive artefact accumulation.
The sites excavated specifically for this research have demonstrated different approaches to testing and establishing the contemporaneity of art and occupation deposit. In all three cases (Yengo 2 is excluded here) it is possible to conclude that particular elements of art production were contemporaneous with particular phases of the occupation remains.

At Great Mackerel, the more recent occupation period was established as being contemporaneous with the more recent phase of art on the basis of the content of the two assemblages. Both forms of evidence suggested the presence of women at the site and on this basis it was concluded that the two were recent and contemporaneous. The more recent occupation layer also contained white pipeclay, a material present only in the more recent art phase. The earlier occupation at this site seems to represent short, sporadic visits, possibly by hunting parties. While it is not possible to conclusively demonstrate the contemporaneity of the earlier occupation with the older rock art, it is possible that the two may also have been produced contemporaneously.

At Upside-Down-Man shelter it has been established that the occupation of the site took place in a relatively restricted time frame (between 4,000 and 1,200 years ago). The stone tools fall into at least two phases Pre-Bondaian and Middle Bondaian (Attenbrow's Phases 1 and 3) with the period between these probably representing a very low level occupation during the Early Bondaian (Attenbrow's Phase 2).

The art at this shelter provides evidence for episodic production. The presence of small quantities of pigment and pipeclay in the occupation layers during the most intensive period of the shelters usage (between c.1,500-1,200 years ago) suggests that most of the main, and more recent, pigment art was produced during the later, and main, habitation of the shelter.

The AMS dating of one of a terminal motif of the assemblages could not be used to confirm or reject these conclusions. Putting an age on the earliest art production at the site is even more difficult, although it is argued that the earlier pigment art here may well be older than middle Bondaian in age. The pecked engravings using a figurative schema represents a conceptual and stylistic development from an assemblage which is predominantly iconic to one which is figurative. The pecked figurative UDM engravings are argued to be a transitional form of the regional Panaramitee style which has been identified as pre Bondaian in age.

A transitional form would be expected to be younger than the Yengo 1 engravings (c.5-6,000 years), but older than the Bondaian art which predominates in the region. On this basis, it could be argued that the UDM pecked engraving might be contemporaneous
with the earliest use of the shelter for occupation. The seemingly late date (i.e. 4,000 years BP) for the oldest lithic assemblage found at this site suggests that this may also be a 'transitional' assemblage. The anomalous nature of both the art and the stone assemblage is suggestive again of contemporaneous events.

The Yengo 1 site provided a more conventional set of data for the establishing the age of its art. The partially buried boulder at the front of the shelter provided the opportunity to date indirectly the regional Panaramitee style engravings by association with deposits. It is argued that these are pre-Bondaian in age (between 5-6,000 years), with a minimum age of at least c.3,000 years. The occupation evidence, including pigment and ground edge fragments, established the contemporaneity of the most recent phase of occupation with the production of pigment art and the sharpening of ground edged implements. The morphology of the shelter floor assisted in this interpretation (given the height of the ceiling prior to deposition).

In the Great Mackerel and UDM sites, the earlier art consisted of red stencils and red paintings. At Yengo 1, the earlier art form consisted of pecked circles, tracks and dots.

At UDM the occupation of the shelter for habitation appears to have ceased around the turn of the millennium. After use of the shelter for camping stopped, it is possible that art production continued, although there is no conclusive evidence for this continuing until European contact, i.e. no post-contact motifs.

At the Great Mackerel site, the terminal phase of the shelter's occupation probably coincided with European contact. Use of the shelter _per se_, may have finished abruptly. The Yengo 1 and 2 shelters have no evidence for contact art, and the terminal dates in Yengo 1 suggest usage up until just prior to contact. There is no reason to assume that the art production and camping did not continue throughout the terminal period of occupation at the main shelter.

In all shelters tested, it could be argued that the main phase of pigment art production was likely to have coincided with the most intensive occupation period. In multi-phased art sites, earlier low intensity occupation could be argued as having an artistic component: which was also of low intensity. The assumption that art production and shelter occupation coincide, is therefore argued as having validity.

These results also broadly demonstrate that there is evidence for diachronic change in the shelter art of the region over the period of its occupation. The clearest evidence for this is in the presence of engraved motifs. While the majority of these are not in datable contexts, the Yengo 1 excavation supports the contention that this style of art predates the bulk of the art in the Sydney region; such as has been demonstrated in numerous
other art regions in Australia (e.g. central Queensland, north Queensland, Victoria River Downs, etc.).

The results also support the model (McDonald 1991a:83) of an earlier, low density artistic tradition predating the main occupation and main artistic period of the region. There are only a small number of shelter sites containing residual Panaramitee engravings. The fact that this earlier art phase is low density matches other forms of early occupation evidence (e.g. Attenbrow 1987), and suggests a continuing tradition over time for the contemporaneity of art and occupation in shelter sites of the region. These findings have significance, which will be addressed in Chapter 7.

Only the ambiguous AMS evidence from the UDM site indicates that art production in shelters might have continued once these were abandoned as places of occupation. With the exception of this shelter, there is strong circumstantial evidence for the contemporaneity of art and domestic and/or economic activities.

This would appear to indicates something about the purpose of shelter art in the recent past, and is highly suggestive about the role which this medium may have played in terms of information exchange theory (Chapter 1). If art is being practised in shelters where the broad spectrum of the community is spectator, then the art is fulfilling a function very different to an art form which functions 'in private'. This proposal will be developed further in Chapters 8 to 10.
Chapter 7
Diachronic variation in the art of the Sydney Basin

7.1 Introduction

This chapter investigates time as a potential source of variability in the Sydney rock art. The possibility of temporal variation in this art body results from one of this research's overarching assumptions i.e. that the majority of the art coincides with the more recent archaeological evidence in the region - the late Holocene Bondaian periods (Chapter 3). The Bondaian (as part of the ERS) has three well dated phases of production identified on the basis of stone tool technology. At issue here is whether these phases indicate the types of widely ramified social changes which would also be reflected by the region's art.

The general homogeneity of the Sydney Basin art style gives few indications of clearcut diachronic variation (cf. the Amhem Land or Kimberley art sequences; Chaloupka 1979, Lewis 1988, Taçon and Chippendale 1992, Walsh 1992, etc.). The sources of social change over time may not have been as dramatic during the main period of this art's production as were evidence in (say) Amhem Land over the last 10,000 years. Given the assumed shorter time depth of production, this is not surprising.

The relationship between artefact technology, typology and social change is a highly complex one. There are several 'camps' in the archaeological community about what the evidence for such changes in the recent past may mean. The 'intensification debate' (Lourandos and Ross, in press) characterises a recognition of late Holocene increases in the number, as well as changes in the uses, of archaeological sites throughout this period. A number of researchers have explored the archaeological evidence for Holocene demographic and technological changes in a range of different environments (e.g. Attenbrow 1987, Beaton 1985, Lampert and Hughes 1974, Lourandos 1985, Ross 1985, M.A. Smith 1982, Williams 1985). Such studies have produced a variety of behavioural explanations [Chapter 4: and see Attenbrow 1987:358-365 for detailed discussion of these: cf. Bird and Frankel (1991)].

These explanatory models demonstrate that the social ramifications of lithic technological change are poorly understood. This being the case, the social relationship between lithic technologies and accompanying artistic traditions are highly mysterious. In the Sydney region there is no evidence for how art production may have related to other cultural factors, nor how this production may have changed according to changing settlement, technology or subsistence patterns.
In other parts of Australia, the development of regionalised art bodies has been explained in terms of greater demographic pressure and increased social complexity producing increased territoriality (David 1991, David and Cole 1990, Morwood 1984). It has been argued that patterns of change in symbolic behaviour (including rock art) were functionally interrelated with changes in resource structure, technology and economy (Morwood 1986:118).

A similar model has been developed for the Sydney region (Chapter 3). This is based on regional archaeological and (limited) ethnohistoric data and grounded in information exchange theory. This model views the art as having an intermediary function and as the material manifestation of a system of values and ideologies. Through the meanings and values elicited by art, the mediation of inherent conflicts and stressful situations is achieved.

The expectation of this model is that increased social pressure would result in increased art production. Social pressure and increased interaction could be argued as resulting from increasing demography. The period with the greatest amounts of archaeological evidence (Attenbrow 1987, Lourandos 1985, Ross 1985) is expected to be correlated with the phase of peak art production, the grounded evidence for symbolic behaviour (Conkey 1978, 1980; Gamble 1982; Morwood 1987). It could also be expected that during this time there would be increased territoriality, with inter-group competition and imposed political control requiring group action. The conditions during such a period would be ideal (viz. Wiessner 1990) for demonstrations of local and regional group identity.

While group identity and territoriality are imposed at a local level, increased social complexity also necessitates broad scaled group cohesion.

'The emergence of regionally distinctive systems for encoding ... information may therefore document the emergence of more standardised ceremonial, trade, and mating networks, which were bounded by emphasising stylistic differences ...' (Morwood 1984:370).

While these regionally distinctive styles distinguished one region from another, they are also demonstrating a prevailing social cohesion at the regional level. Shared ceremonial commitments, such as was documented in the Sydney region at white contact, and other cultural baggage are documented by widespread stylistic similarities of a regional style and other items of material culture (Chapter 3).

The Sydney rock art in the two different contexts potentially fulfil different functions. In the preceding Chapter is has been demonstrated that the production of art and other forms of occupation evidence in sheltered locations are contemporaneous. The art
produced in shelters is thus considered to have had a highly visible (social) context and thus be likely to reveal localised stylistic patterning. The nature of this patterning is discussed later (Chapter 8) and it is the intention of this chapter to explore how changes in the lithic occupation evidence may be correlated with changes in the production of pigment art over time.

Sheltered art provides the better medium for exploring diachronic variability for several reasons. In open engraving sites there is generally a lack of superimpositionning. Also, sheltered sites contain superimposed sequences and, in some cases, associated deposits, some of which have been dated. Pigment art also has the potential to be directly dated, using AMS techniques, although this was not attempted on a large scale for this research (McDonald et al. 1990, in prep.).

Conversely, the engraved motifs within shelter art sites appear to present clear indications for stylistic change over time. It has been demonstrated at Yengo 1 (Chapter 5; Appendix 1) that residual Panaramitee engravings occur within shelters. The two other, more recent, manifestations of the engraving technique (miniature figurative and incised figurative) indicate a development within the pigment technique over time (Chapter 4).

This chapter continues (Section 7.1) with discussion of a previous approach to diachronic variability in Australian rock art identifying the assumptions and limitations of these type of analysis. Morwood's (1979) research is emphasised as it represents the only approach at a regional scale which incorporates archaeological material and art assemblages.

In Section 7.2 a previous model of temporal stylistic change for the Sydney-Hawkesbury region (McCarthy 1979, 1988) is described. Inherent problems are identified with this model and previous tests are reviewed (Cox et al. 1968, MacIntosh 1965, McDonald 1986a, Officer 1984, Sim 1969, L.Smith 1983). Resultant modifications required by the model are highlighted.

A localised analysis is undertaken to explore chronological sequencing in the shelter art (Section 7.3). Because synchronic variability is identifiable across the region (Chapter 8), potentially complicating diachronic evidence, this analysis is restricted to a single drainage basin (Mangrove Creek). An art sequence is identified here using a comprehensive taxonomy of variables (technique, colour and form combinations) in the analysis of 65 shelter art sites.

Both individual site assemblages and motif (subject preference) are analysed. On the basis of superimpositionning, a three part sequence is identified. Changes in motif
preference exhibited by these phases is explored and a spatial analysis of technique variables is undertaken, using multivariate analysis, to refine the results achieved by superimposition analysis.

Finally (Section 7.4), an attempt is made to correlate the resultant sequence with the patterns found in occupation indices in Upper Mangrove Creek (Attenbrow 1987; Chapter 3). Localised trends are highlighted on the basis of this diachronic experiment. The results of AMS dating in the region are then described. While the number of sites in the Sydney Basin dated so far are few, there are significant results from this project in terms of our general assumptions. The ramifications of these analyses and results are discussed in light of subsequent investigations of synchronic variability in the region.

7.2 A previous regional approach to diachronic variability

A number of regional art studies in Australia have analysed the possibility of diachronic stylistic variability, but few in the amount of detail of Morwood's (1979) work in the Central Queensland Highlands. Working on a sample of 92 art sites and a total assemblage of 17,025 motifs, he undertook an analysis of stylistic variability over time, and correlated this with his excavated data for the region.

[S]ome of the changes in the art through time, are clear. Others are less so, while others are still tenuous. However, taken in combination, they suggest that there was a general pattern of change which included colours, techniques, compositions, and context. Relative dating techniques ... used to outline these differences, are differential weathering, superimpositions, spatial analysis, subject and style. (Morwood 1979:278)

Morwood details some of the technical difficulties associated with the recognition of superimpositions - 'some colours are more intense and tend to come through overlying layers, ... others may adhere badly on a pre-existing tint. There are also problems in deciding which of two intersecting engravings was manufactured first' (ibid.:280). Also discussed is the problem of demonstrating comparative bias (i.e. non-random variations) in the distribution of artistic variables in any sequence. One conclusion reached was that superimposition sequences can only deal with major changes in the most common variables (ibid.:301).

Morwood argued that much of the inter- and intra-site variability in his region reflected the episodic nature of art production in the region, as well as the suitability of different surfaces for particular artistic techniques. He argued that small assemblages commonly reflect a single artistic event (ibid.:282) and that the spatial analysis (i.e. the differential distribution of artistic variables) of these could refine a regional sequence (ibid.:284).

A threefold sequence was defined for the Central Queensland Highlands on basis of technique and colour. As well as identifying sequential change in colour usage,
Morwood found a parallel change in motif emphasis. The classification of pecked engravings was modified into 'early' and 'late', on the basis of the later introduction and predominance of the vulva motif (ibid.:316).

Seriation of the three art phases with the archaeological context was done on the basis of relative chronologies: excavated sites (where contemporaneity of art and occupation evidence was demonstrated), the introduction of stone axes into the stone tool assemblage (and the presence of axe stencils), stencilled contact motifs (particularly trade axes).

The elements of Morwood's analysis which have relevance to this analysis revolve around his assumptions and methodology. The following points direct this current analysis:

1) an assumption that association (and direction of association) between contemporary art categories is random, results in
   a) the number of superimpositions that an art type is involved being proportional to the frequency of that art type; and,
   b) there being no bias in the direction of association between pairs of categories:

2) small art assemblages will provide better information about contemporaneity of stylistic variables than large complex sites, since small sites are more likely to represent a single artistic event;

3) large complex sites, through sheer weight of artistic activity are most likely to produce superimpositionning information;

4) a combination of approaches is necessary to investigate diachronic variation. Colour, context, composition and technique are all aspects which are sensitive to change over time. These need to be analysed individually and in combination, by the processes of superimpositionning, and through quantitative analyses directed at investigating trends in spatial patterning and motif (subject) preference.

7.3. An Earlier Model for Diachronic Variability in the Sydney Basin shelter art

McCarthy (1967[1979], 1988) identified a temporal sequence for the pigment art of the Sydney Basin. This was based on the introduction and/or decline of certain colour preferences and artistic techniques, e.g. stencilling, bichrome, polychrome. The
sequence was not aligned to the engraved component, nor was it synchronised with the recognised archaeological sequence for the region (i.e. the ERS).

McCarthy's art sequence was based on sites from Conjola (McCarthy 1959b) and Bull Cave, to the south of the region, as well as sites from the centre (e.g. Canoelands) and further north, i.e. 'rockshelters at Wollombi' (McCarthy 1988:18). The sequence was as follows:

'(1) Stencil phase. Stencils in red and white, also yellow, of human hands and feet, and artefacts, in wet paint, together with the imprints of human hands and feet, and an occasional outline figure. This is the earliest phase.

(2) Red and white phase. Drawings in dry pigment in outline, solid and various infilled styles, of culture heroes, humans animals and artefacts.

(3) Black phase. Drawings in dry charcoal in a wider range of subjects than Phase 2, in outline, solid and various infilled styles, with an important series of black and red, black and white, black and yellow bichromes, red, white and black trichromes; the richest phase of shelter art in the region.

(4) Polychrome phase. This is known in only one figure, a culture hero in four colours, associated with a large red bora initiation ground figure.

(5) White stencil phase. A very rich phase of stencils of human hands and feet, animals' paws, a wide variety of artefacts parts of plants and other subjects. (McCarthy 1988:18)

I have argued (McDonald 1988b) that McCarthy's sequence does not withstand large scale field testing. The major methodological, theoretical and practical problems with McCarthy's sequence include:

* stencils at the beginning and end of the sequence provide an untestable hypothesis; how do you differentiate between an early white stencil and a late one? This ubiquitous technique is felt to be an unreliable temporal marker;

* the sequence omits several techniques which are quite common across the region in certain geographic areas but which were not present in any of the sites used by him in the production of the sequence. These include white, red and yellow paintings and three distinct engraving techniques: intaglio, pecked and abraded outline and incised (McDonald 1991a);

* the sequence does not recognise the possibility of synchronic variation across the region, or the unequal distribution of certain techniques e.g. stencils, paint, different colour use, etc.

David Moore (1988: 31-2) also identified anomalous art features, which he called styles, not included in McCarthy's sequence. None of these 'styles' are specifically excluded by McCarthy's model, but the point to be made is that McCarthy's sequence is not
comprehensive enough to accommodate the full range of stylistic variability which is observable across the region;

* the sequence is not correlated with any recognisable archaeological (temporal) phase or phases. While not invalidating the sequence, this limits its usefulness. Further, several of the art phases are said to be 'probably contemporaneous' (McCarthy 1988: 18). If these are contemporaneous, then they are not technically temporal phases.

In the north of the region detailed analysis of shelter superimpositionning (e.g. MacIntosh 1965, McDonald 1986a, Moore 1988, Sim 1969) and extensive field recording work (McDonald 1987, 1988a) have found evidence which is contradictory to the McCarthy model (although see McCarthy 1961). Sim's 1969 work west of the Macdonald River provides a detailed analysis of superimpositionning (1969: 168-70). An analysis of his data (cf. his interpretation of the data) produces the following sequence at this large site.

1. red infill;
2. white stencils, black infill, red infill/white outline, white outline;
3. black infill/white outline, white infill, red outline;
4. black outline.

At Maroota, south of the Hawkesbury River and north of McCarthy's type site 'Canoelands', a complex medium sized assemblage was recorded and the superimposition sequence examined (McDonald 1986a (Vol. 2): 60-70). The art in the shelter consisted predominantly of white stencils (hands, material objects and twigs) and drawings, and black drawings, and there were also red drawings and cream drawings and paintings. There was one black and white bichrome motif present. The conclusion reached on the basis of the superimposition relationships recorded here, was that the art was executed during a single phase. From the presence of a ship motif amongst the assemblage, it can also be assumed that this assemblage was relatively recent. The assemblage at Maroota would appear to challenge McCarthy's sequence, both on the basis of a contact motif (in charcoal outline and infill) appearing over white stencils (Phase 1 or 5?), and by the contemporaneity of techniques which McCarthy suggests may be separated into different phases - viz. stencils (Phases 1 and/or 5), black drawings and bichromes (Phase 3) and white outline motifs (Phase 1).

Laurajane Smith's (1983) work in the Mangrove Creek area investigated the techniques used in shelter art sites. Using 15 colour and technique variables from 98 sites and applying Correspondence Analysis, her study aimed at exploring whether technique could differentiate ethnic grouping and to explore whether technique was an element of
style (L. Smith 1983: 79). The second aim was based on McCarthy’s equation of style with technique, and his conclusion that changes in technique indicated (diachronic) stylistic change. Smith’s analysis of these characteristics resulted in the identification of three major clusters which she argued could be interpreted as supporting McCarthy’s earlier (i.e. 1967) version which was a four phase sequence (ibid.: 82). She also states that the ‘fit’ between her clusters and McCarthy’s phases is increased by the fact that most sites occur in a cluster interpreted as McCarthy’s ‘youngest phase’, while fewer occur in his oldest phase (ibid.: 83). Given that in his revised version, white stencils also occur in the most recent phase (McCarthy 1988:18) this conclusion can no longer be made.

To the south of the region, the picture is somewhat different. At Audley, Cox et al. (1968) discerned a sequence which supported the early and intermediate phases of McCarthy’s model. However, Officer’s (1984) work in the Campbelltown region indicated that:

> There is certainly no support for a chronological or consistent sequence of colours and consequently no support for a stylistic division according to colour (McCarthy 1970). (Officer 1984: 32)

Officer’s ongoing research further south of the Sydney basin, indicates a better accord with McCarthy’s sequence (Kelvin Officer, pers. comm., 1991).

In conclusion, McCarthy’s sequence has been found to have severe limitation in its application to sites across the Sydney region. This is in part because it does not accommodate the full range of artistic traits known to exist, but also because it subdivides the art into unworkable and untestable divisions. There are sites which partially support the sequence (e.g. Audley) and general patterns on a broader scale (e.g. L. Smith 1983) also offer limited agreement.

Shortcomings such as the lack of correlation with cultural (archaeological) phases have not been addressed previously. And it is hoped that the analysis undertaken here will be able to provide both a more comprehensive sequence as well as an effectual correlation with other aspects of the archaeological record.

McCarthy’s art sequence has been seriously undermined by large scale field testing and detailed analysis in the north and south of the Sydney region. As indicated above (Section 7.0), however, the possibility of diachronic change in art production during late Holocene must be considered.
7.4 Diachronic variability in the art of Mangrove Creek

The ultimate aim of this analysis was to marry trends in rock shelter occupation indices over time (Attenbrow 1987) with any identified trends in artistic traits. This was again tied to the assumption that the art in the region dates to a similar time period as the most archaeologically visible phases of occupation.

This analysis is based on superimposition analysis of (mainly) large assemblages, an analysis of motifs preferences and a quantitative analysis of artistic variables in small sites.

The Sample and the Technique variables

This test of the diachronic variability involves shelter art sites from the Mangrove Creek drainage basin. The 65 shelter art sites this area includes 26 sites recorded by Gunn (1979) and Attenbrow (1981, 1987) and 39 sites recorded by me (McDonald 1987, 1988a). These sites comprise the only large sample which has both a sufficient detail of recording to warrant this level of analysis and which is accompanied by an excavated, local archaeological sequence (Attenbrow 1987). A total of 65 shelter art sites are included in this analysis, seven of which have also been excavated and dated by Attenbrow (1981, 1987), MacIntosh (1965) or myself (Upside-Down-Man: Appendix 2).

A localised assemblage was selected for this analysis in light of potential synchronic variation across the region. The resultant sequence may not, therefore, be broadly applicable on a regional basis, but require modification in some areas to accommodate localised variability.

A comprehensive list of artistic variables were used initially in this analysis (cf. that applied regionally; Chapters 5, 9). A taxonomy of 58 variables (colour, form and technique combinations) were defined (Table 7.1) and applied to the 65 sites. Two levels of analysis were undertaken:

1) sites were counted for the presence and frequency of these 58 variables, i.e. the assemblage of each site was viewed as a single entity and the presence of various techniques was counted; and,

---

1 This is not the same assumption as that made by Smith (1983:83) whereby the youngest art phase will predominate in the most sites, since older art phases would have been more likely to have been destroyed over time (presumably by weathering and other exfoliation processes).
Table 7.1: Techniques and/or colour. Artistic variables counted in the diachronic analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Colour and form</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>black outline</td>
<td>Dry</td>
</tr>
<tr>
<td>2</td>
<td>black infill</td>
<td>Dry</td>
</tr>
<tr>
<td>3</td>
<td>black outline + infill</td>
<td>Dry</td>
</tr>
<tr>
<td>4</td>
<td>red outline</td>
<td>Dry</td>
</tr>
<tr>
<td>5</td>
<td>red infill</td>
<td>Dry</td>
</tr>
<tr>
<td>6</td>
<td>red outline + infill</td>
<td>Dry</td>
</tr>
<tr>
<td>7</td>
<td>white outline</td>
<td>Wet</td>
</tr>
<tr>
<td>8</td>
<td>white infill</td>
<td>Wet</td>
</tr>
<tr>
<td>9</td>
<td>white outline + infill</td>
<td>Wet</td>
</tr>
<tr>
<td>10</td>
<td>yellow outline</td>
<td>Wet</td>
</tr>
<tr>
<td>11</td>
<td>yellow infill</td>
<td>Wet</td>
</tr>
<tr>
<td>12</td>
<td>yellow outline + infill</td>
<td>Wet</td>
</tr>
<tr>
<td>13</td>
<td>white outline</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>14</td>
<td>white infill</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>15</td>
<td>white outline + infill</td>
<td>Wet</td>
</tr>
<tr>
<td>16</td>
<td>red outline</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>17</td>
<td>red infill</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>18</td>
<td>red outline + infill</td>
<td>Wet</td>
</tr>
<tr>
<td>19</td>
<td>yellow outline</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>20</td>
<td>yellow infill</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>21</td>
<td>black infill</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>22</td>
<td>wet + dry, outline + infill (w/w+b, b/w, b+w/b)</td>
<td>Wet/Dry combinations</td>
</tr>
<tr>
<td>23</td>
<td>red dry outline/wet infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>24</td>
<td>black + white outline</td>
<td>Bichrome</td>
</tr>
<tr>
<td>25</td>
<td>white outline, black infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>26</td>
<td>black outline, white infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>27</td>
<td>black + white, outline + infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>28</td>
<td>black + white outline, black infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>29</td>
<td>black + red outline, black infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>30</td>
<td>white outline, black + white infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>31</td>
<td>red + white outline</td>
<td>Bichrome</td>
</tr>
<tr>
<td>32</td>
<td>white outline, red infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>33</td>
<td>red outline, white infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>34</td>
<td>red + white, outline + infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>35</td>
<td>white outline, red + white infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>36</td>
<td>red outline, black infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>37</td>
<td>yellow outline, black infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>38</td>
<td>yellow outline, white infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>39</td>
<td>black + red, outline + infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>40</td>
<td>yellow + white, outline + infill</td>
<td>Bichrome</td>
</tr>
<tr>
<td>41</td>
<td>red and white outline, black infill</td>
<td>Polychrome</td>
</tr>
<tr>
<td>42</td>
<td>red + black + white/yellow, outline + infill</td>
<td>Polychrome</td>
</tr>
<tr>
<td>43</td>
<td>black + red + white outline, black + white/red infill</td>
<td>Polychrome</td>
</tr>
<tr>
<td>44</td>
<td>black, white + yellow outline; black, white + yellow infill; white + black outline, yellow infill.</td>
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</tr>
<tr>
<td>45</td>
<td>black + red + white outline, black infill</td>
<td>Polychrome</td>
</tr>
<tr>
<td>46</td>
<td>black, red, white and yellow outline</td>
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</tr>
<tr>
<td>47*</td>
<td>linear infill</td>
<td>Polychrome</td>
</tr>
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Table 7: 1

<table>
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<tr>
<th>Variable</th>
<th>Colour and form</th>
<th>Technique</th>
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<td>Stencils</td>
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<td>49</td>
<td>red</td>
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</tr>
<tr>
<td>50</td>
<td>yellow</td>
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</tr>
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<td>51</td>
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</tr>
<tr>
<td>52</td>
<td>bichrome</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>print</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>intaglio</td>
<td>Engravings</td>
</tr>
<tr>
<td>55</td>
<td>outline</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>incised outline</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>incised cvi</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>incised infilled</td>
<td></td>
</tr>
</tbody>
</table>

*Not mutually exclusive, therefore excluded from totals

2) the motif classification (used elsewhere in this research: Chapters 5, 8 and 9) was counted according to these 58 variables in order to investigate motif/technique preferences and thus possible trends in motif preference as well as technique preference over time.

The frequency and distribution of these technique variables at the sites was initially investigated with the aim of determining which of these had the potential to provide the necessary types of information. As pointed out by Morwood (1979: 301) superimposition sequences can only be concerned with major changes in the most commonly represented variables. This was also a means of testing the utility of such a comprehensive splitting of technique combinations. Given the very broad classification used in technique analyses at the regional level, a local analysis using a finer grained approach was considered desirable.

Assemblage sizes in the Upper Mangrove Creek sample were found to be generally smaller than those found in the Warre Warren area (McDonald 1988a). From the 26 UMCC sites a total of 424 motifs were recorded, while from the 39 WW sites came a total of 2,371 motifs (more than 5.6 times the number of motifs from 1.5 times as many sites: Table 7.2). However, a twin column chi squared test on the motif assemblages from these two samples revealed that the differences between these were not statistically significant (at .05 level).

Several points become obvious about this extended technical variable list (cf. Tables 7.3 and 7.4). Most of the technique variables occur in very low percentage frequencies (i.e. 17 variables account for 91.3% of the motifs, while 41 variables account for only 8.7% of the motifs recorded).
Table 7.2: Mangrove Creek drainage basin: different sized assemblages located in Upper Mangrove Creek compared with further downstream, the Warre Warren sites.

<table>
<thead>
<tr>
<th></th>
<th>UMCC sites</th>
<th>%</th>
<th>WW sites</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Sites*</td>
<td>18</td>
<td>69.2</td>
<td>23</td>
<td>59.0</td>
</tr>
<tr>
<td>Medium Sites</td>
<td>6</td>
<td>23.1</td>
<td>7</td>
<td>17.9</td>
</tr>
<tr>
<td>Large Sites</td>
<td>2</td>
<td>7.7</td>
<td>3</td>
<td>7.7</td>
</tr>
<tr>
<td>Very Large</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>(40%)</td>
<td>39</td>
<td>(60%)</td>
</tr>
</tbody>
</table>

The most commonly used techniques are white stencilling (26%), black outline and infill drawing (16%) and black infilled drawing (10%). These occur in a great number of sites, but their distribution does not necessarily correlate with the relative frequency of their use. The technique which represents the highest frequency of motifs does not occur in the greatest number of sites: white stencils are found in 23% of sites. However, black outline and infilled motifs and black infilled motifs are each found in c.60% of sites. Black outline (which has only been used in 6% of motifs) occurs in 57% of sites. Similarly, most of the red and white monochrome drawings (which represent consistently low-average proportions of the motifs present) are found in between 30-40% of the sites. Engraved intaglio motifs represent only 1.7% of the motifs counted, but are found in 15.4% of sites. Linear infill is found in 1.3% of motifs, but in 13.8% of sites.

In an effort to determine how this proliferation of variability correlated with overall assemblage size, an investigation of technique occurrence and assemblage size was undertaken. The findings of this investigation suggest that much of this variability is not of temporal (or spatial) significance (following the logic outlined above: viz. Morwood 1979) since these techniques occur rarely, as one-off production episodes.

Of the 41 variables which occur infrequently overall (i.e. <1%: see Table 7.3),

- 8 only (20%) are found at small sites (< 20 motifs);
- 17 are found at medium sized sites (20-50 motifs);
- 10 are found at large sites (50-100 motifs);
- 16 (37.6%) are found only at sites very large sites (>100 motifs);
<table>
<thead>
<tr>
<th>Variable</th>
<th>Tot</th>
<th>% of tech</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>289</td>
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<tr>
<td>17</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>99.7</strong></td>
</tr>
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</table>

*Diachronic Change*
Table 7.4: Mangrove Creek shelter art sites: Number of sites at which different technique variables are present.

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<th>Variable</th>
<th>Number of sites</th>
<th>% of site with technique</th>
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<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>
Most of these rarer technique combinations also only occur in restricted numbers of sites.

- 30 variables (52%) are not found at more than three sites (i.e. they occur in <5% of the sample);

- 42 variables (72%) are not found at more than 6 sites (they occur in <10% of the sample).

Of the 30 variables which occur at very few (<5% of) sites:

3 are found at small sites;
10 are found at medium sized sites;
4 are found at large sites;
14 are found only at very large sites.

More than half (57%) of these variables only occur at medium, large or very large sites. This suggests that these variables are the result of random or chance development rather than specific stylistic phasing, i.e. they are thus likely to be the result of a greater frequency of artistic activity at large sites (and random development) rather than as a result of temporal artistic trends in art production.

The three rare techniques which occurred only in small sites were looked at (e.g. Morwood 1979), although none of these have been recorded in superimposition relationships with other techniques. These are:

#26  dry black outline, white infill
#37  dry yellow outline, black infill
#45  dry black, red and white outline, black infill

The conclusions which can be reached on the basis of these analyses:

* The majority of the art in the Mangrove Creek valley can be accounted for by a much abbreviated list of 17 technique variables. These include the monochrome dry variables (excluding yellow), white paint, red infilled paint, and combinations of red, white and black dry bichrome techniques. White hand stencils are common; red and yellow hand stencils are less common. The engraved intaglio technique is also quite common.

* There is no direct correlation between most frequently used techniques and the numbers of sites at which these techniques are used - this suggests that a few large sites may be foci for both particular techniques as well as for a proliferation of techniques;
* The most common techniques are rarely present in more than 50% of the sample sites. This suggests that the art is relatively diverse and that there is no heavily standardised technical formula for art production;

* the small sites, i.e. those with less than 20 motifs, contain a range of common, average and rare techniques. These sites do have the potential for testing the combination of techniques which may be assigned, if not temporal, then at least spatial significance.

More can be made of these findings on the basis of the superimposition and multivariate analyses.

**Superimposition Analysis**

Thirty-six of the 58 technique variables (62%) were found to occur in superimposition relationships (Figure 7.1). Assemblages found to contain superimpositions occurred in 19 of the 65 sites (29%). A total of 189 superimpositions relationships were recorded. This was never intended to be a numerically oriented recording of superimpositionning (cf. Morwood 1979) since the total number of relationships at each site was not recorded. Rather, the existence of certain trends at each site was recorded², as was the reversal of such trends if these occurred. Superimposition relationships between two techniques would thus only be mentioned twice at a site if the order was also found to be reversed. Such two way relationships indicate a contiguity in the use of the artistic variables involved.

Many of the 36 variables were not recorded in more than one superimposition relationship. This paucity is considered due more to the relative infrequency of certain technique variables and lack of superimpositionning generally, than any deliberate avoidance of certain technique combinations. Multivariate analysis, however, may identify variables which are negatively correlated - providing supplementary evidence to certain superimposition relationships.

As expected (Morwood 1979), the most common technique variables occurred most frequently in superimposition relationships. Given the methodology used, greater frequency of examples was not taken to be significant, since the numerical data retrieved was merely presence and/or absence data. While numerically insignificant the original counted figures have been presented (Figure 6.1). This analysis revealed the following:

+ Intaglio motifs occur very rarely in superimpositions (at 10% of sites with such motifs) since the majority of these are located at the base of shelter walls or on sloping rock

---

² At many sites the superimposition relationships noted represented repeated trends. In other sites, these were single occurrences.
floors (i.e. there is a spatial separation in most shelters of this technique and pigment techniques). Where they do coexist with pigment motifs, they are always underneath the pigment art.

It has already been argued (Chapter 6) that these motifs are residual artistic elements, i.e. predating the Bondaiian. The spatial separation of this technique in shelter sites generally supports a change in focus, which could be explained in terms of diachronic change. The analysis of motif preference (below) may provide support to this: broad-scaled evidence indicates sufficient motif and technique similarity for these to be designated as residual regional Panaramitee art (viz. Maynard 1977, Morwood 1979, Rosenfeld et al. 1981, Franklin 1991).

+ The earliest pigment technique appears to consist of red paint (in both infilled and outlined and infilled forms). Red hand stencils and white hand stencils also appear low in many superimposition relationships.

There is a subsequent proliferation of techniques, with wet and dry pigment, a variety of hand stencil colours (including bichrome). Outline motifs occur in the uppermost layers of many superimposition sequences (wet or dry red, dry yellow and wet or dry white) finishing several sequences. Contact stencils (e.g. metal axes) occur only in white pigment. While stencilling was being practised at contact, there is some evidence for a slight decline for this technique in the last production phase;

+ While some general trends of McCarthy's stylistic sequence are supported by the data, there is no clear cut phasing as organised by him. Stencils (particularly of hands) occur throughout the entire production period of the pigment art. There is definitely no stencil phase predating the depictive art, nor does the depictive art finish to be replaced by stencilling in a terminal phase. There are numerous recorded instances of depictive art superimposed over white stencils, as well as (to a lesser extent) over red and yellow stencils (Figure 7.1). There is no evidence for a red and white bichrome phase predating the predominant 'black phase'.

From this information (Figure 7.1) the following superimposition sequence resulted (Table 7.5). This sequence was achieved by initially clumping the variable techniques into 12 gross classes (e.g. all 3 dry black variables, all 3 dry red variables, polychromes, stencils etc.: Figure 7.1) and identifying general trends. A more detailed ordering within these general trends was then identified. Given the number of variables concerned and
the variety of superimposition relationships, this was the only rational way to manually attempt the task.

Table 7.5: Mangrove Creek Shelter Art sites. Superimposition sequence.

<table>
<thead>
<tr>
<th>Earliest</th>
<th>Most Recent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intaglio motifs</td>
<td>Contact motifs occur in white stencils and red and/or white outlined and infill drawings</td>
</tr>
<tr>
<td>white and red hand stencils, wet red infill (solid), wet red outline and infill</td>
<td></td>
</tr>
<tr>
<td>dry black outline, infilled and outlined and infilled motifs,</td>
<td></td>
</tr>
<tr>
<td>dry red infill and outline and infill motifs, wet red outline,</td>
<td></td>
</tr>
<tr>
<td>wet white infill, white, red, yellow and pink stencils, incised,</td>
<td></td>
</tr>
<tr>
<td>bichromes, black outlined and infilled,</td>
<td></td>
</tr>
<tr>
<td>dry white infill and white and/or yellow outlined and infill,</td>
<td></td>
</tr>
<tr>
<td>polychromes and wet and dry black and white motifs</td>
<td></td>
</tr>
<tr>
<td>dry and wet red outline, wet white outline, dry yellow outline.</td>
<td></td>
</tr>
</tbody>
</table>

On the basis of this sequence it appeared that three technical phases of production occurred.

The main phase of pigment art contains a proliferation of techniques. While these are generally contemporaneous (archaeologically speaking), there are apparent trends in sequencing which are indicated by the order that the variables are presented above. The general sparsity of superimpositionning makes a more definitive break down of the main phase impossible. Before proposing this as a phased sequence for the catchment, an analysis of motif preference was undertaken.

Changes in Motif Preference over Time

The motif range in each of the three potential art phases was examined to determine whether there was any major change in motif preference between these. Such a finding would support the supposition that these were discrete artistic assemblages.

---

3 Enquiries were made at the Computing Services Section, ANU, about seriation programmes, which it was thought may assist in this process. None were known to the Section at the time which would have been able to deal with this specific problem.
This analysis was restricted to identifiable motifs and stencils were removed from the analysis, since this technique has been identified as occurring throughout the pigment sequence (see Table 7.6). This analysis thus involved 24 motifs, a smaller total number of motifs (853) as well as a more restricted range (n=48) of techniques (variables #16, 18, 19, 35 were excluded on the basis that only unidentified motifs had been recorded in these; variable #47 because it was not independent; and variables #48 - 53 because they were stencils).

This analysis demonstrates clear differences between the three proposed phases (Figure 7.3, Table 7.6).

Phase 1 shows a very restricted range of motifs - with a concentration (95%) on tracks, circles and 'other' motifs (dots). Simple-non-figurative motifs (SNF) and male anthropomorphs (1 each) were also recorded but account for <3% of this phase's assemblage.

Phase 2 shows a slightly less restricted motif range, with 'other' motifs (dots) predominating (60.9%). Macropod tracks, SNF, circles and men are still present (accounting for 15.3%), but new elements are also present. Most important amongst these are anthropomorphs (13%) and goannas (7.5%), but a snake, a quadruped, and a complex non-figurative motif are also present (2% each).

Phase 3 shows a proliferation in the motif range and a predominance amongst these for macropod motifs (30.3%). Tracks, circles and 'other' motifs have diminished significantly in their contribution to the assemblage, and one could describe this shift as one towards a greater focus on figurative motifs (and a characteristic Darkingung motif assemblage: Chapter 9).

As the Phase 3 assemblage represented a much larger sample than the other two, a Student's t-test (designed to test whether differences between two populations may be the result of random chance or not) was run on the phased assemblages to assess the statistical significance of their similarities and/or differences.

This revealed the following statistics (df = 23):

<table>
<thead>
<tr>
<th></th>
<th>Statistic (chi-)</th>
<th>Degree of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: Phase 2</td>
<td>-0.2</td>
<td>0.88</td>
</tr>
<tr>
<td>Phase 1: Phase 3</td>
<td>-3.0</td>
<td>0.006</td>
</tr>
<tr>
<td>Phase 2: Phase 3</td>
<td>-3.1</td>
<td>0.005</td>
</tr>
<tr>
<td>Phases</td>
<td>Phase 1</td>
<td>Phase 2</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>42</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 7.6: Mangrove Creek Shells at Moll Island in the proposed phases.
Figure 7.2: Mangrove Creek shelter sites. Motif preferences in the three identified art phases.

Phase 1

Phase 2

Phase 3

Chapter 7
This test indicated that Phases 1 and 2 are both very different to the later Phase. This result shows that the differences between Phases 1 and 2 are unlikely to be the result of chance, as are the differences between the earlier two phases and the later one. The differences between the two earliest phases and the last one are statistically significant.

**Table 7.7:** Proposed Diachronic Sequence in the Mangrove Creek sites. Mangrove Creek Pigment Phases 1-3.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Earliest)</td>
</tr>
<tr>
<td>2</td>
<td>white and red hand stencils, wet red infill (solid), wet red outline and infill</td>
</tr>
<tr>
<td>3</td>
<td>dry black outline, infilled and outlined and infilled motifs, dry red infill and outline and infill motifs, wet red outline, wet white infill, white, red, yellow and pink stencils, incised, bichromes, black outlined and infilled, dry white infill and white and/or yellow outline and infill, polychromes and wet and dry black and white motifs dry and wet red outline, wet white outline, dry yellow outline. Contact motifs occur in white stencils and red and/or white outline and infill drawings</td>
</tr>
</tbody>
</table>

The main phase of pigment art (designated Mangrove Creek Art Phase 3), contains a proliferation of techniques (Table 7.7). It is considered that the production of new art resulted in a cumulative effect. There is no evidence that new techniques superseded older ones. It does not appear to be possible to archaeologically subdivide this major artistic period into discrete temporal events. It would thus appear that within the time frame of the main artistic period that there was not a significant stylistic shift.

Prior to this phase, however, it appears that there was an engraved phase and a pigment phase, both of which may also have been temporally discrete. It is possible
that pigment component accompanied the engraved form, although tying these two together is difficult. The Phased motif analysis showed that these two assemblages were sufficiently different to warrant being called separate population. This is supported by the low correlation between the two techniques occurring in the same site (Table 7.7). There are seven sites which have engravings (Phase 1) but no pigment art; three sites which have Phase 2 but no engravings, and three sites where there are both art forms.

In order to view diachronic patterning in the Mangrove Creek sample a cumulative frequency analysis of these defined phases was applied (following Attenbrow 1987, Morwood 1987). The art in the 65 sites was categorised into the three identified phases (Table 7.8, Figure 7.3).

**Figure 7.3:** Number of sites demonstrating the three identified phases and cumulative frequency of sites with particular phases in use.
Table 7.8: Phased Sequence: Mangrove Creek Shelter Art sites.

<table>
<thead>
<tr>
<th>Site No</th>
<th>Site Name</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Emu Tracks 2‡</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Drought breaker</td>
<td>x</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Emu Tracks</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>35</td>
<td>Corroboree</td>
<td>x</td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>65</td>
<td>Upside down man‡</td>
<td>?</td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>14</td>
<td>Black Hole</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>43</td>
<td>Black echidna</td>
<td>x</td>
<td></td>
<td>xx</td>
</tr>
<tr>
<td>47</td>
<td>Tic Alley</td>
<td>x</td>
<td></td>
<td>xx</td>
</tr>
<tr>
<td>36</td>
<td>Three emus</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>58</td>
<td>Break-a-leg</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>54</td>
<td>Wasps and women</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>27</td>
<td>Swinton's</td>
<td></td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>18</td>
<td>Fallen Rock</td>
<td></td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>5</td>
<td>Kangaroo Head</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>6</td>
<td>Red Eel</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>Roo and Echidna*</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>10</td>
<td>Second Look</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>16</td>
<td>Black Figure</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>19</td>
<td>Bracken</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>20</td>
<td>Owl Figure</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>21</td>
<td>Eleven Cranes</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>22</td>
<td>Damsite 3</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>24</td>
<td>Bird Tracks‡</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>25</td>
<td>Lizard's Leap</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>29</td>
<td>Solitary Kangaroo</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>32</td>
<td>Little end shelter</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>37</td>
<td>The nook</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>38</td>
<td>Macropod and eel</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>42</td>
<td>Eel shelter</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>45</td>
<td>Scumball</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>49</td>
<td>The cranny</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>52</td>
<td>Follow the bouncing ball</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>53</td>
<td>Matrigagle</td>
<td></td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>56</td>
<td>Hunting site</td>
<td></td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>63</td>
<td>Headwater</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>64</td>
<td>Blunt Instrument</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td>Black Hands‡</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>23</td>
<td>Dairy Arm 8</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>62</td>
<td>Fishmonger</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>34</td>
<td>Flannel flower</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>55</td>
<td>Lion's mouth</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>50</td>
<td>Swain's surprise</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>48</td>
<td>Wave Rock</td>
<td></td>
<td>xx</td>
<td>xx</td>
</tr>
<tr>
<td>1</td>
<td>Dingo and Horned Anthrop‡</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Loggers‡</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Echidna</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>13</td>
<td>Frogman</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>15</td>
<td>Red Figure</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>17</td>
<td>Sandy cave</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
Table 7.8: Phased Sequence: Mangrove Creek Shelter Art sites (cont.)

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Name</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Metal Axe</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>31</td>
<td>Eel headed men</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>33</td>
<td>Roos and snakes alive</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>40</td>
<td>Warre Warren Ck</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>41</td>
<td>Rain Gott</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>46</td>
<td>Formal macropod</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>59</td>
<td>Big valley site</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>60</td>
<td>Red Ned</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>61</td>
<td>Black mac</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>11</td>
<td>Candelabra</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>12</td>
<td>Sailing Boat</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>57</td>
<td>White ones</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>39</td>
<td>Banksia</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>Red rat kangaroo</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>44</td>
<td>Waratah 1</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>30</td>
<td>WW Corroboree</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>No. of shelter used for each phase</td>
<td>10</td>
<td>6(+1?)</td>
<td>63 (+1?)</td>
</tr>
<tr>
<td></td>
<td>No. shelter used by this time</td>
<td>10</td>
<td>16</td>
<td>65</td>
</tr>
</tbody>
</table>

+ white stencils only - phasing indistinguishable
‡ excavated sites with radiocarbon dates (see Table 7.8)
* excavated site

The sites in which more than one phase was present were weighted in an effort to demonstrate where the focus of art production appeared to lie.

As would be suggested from the superimpositionning analysis results, the number of shelters used in each Phase varies. Phase 3 has the largest number of sites; Phase 2 has the smallest number of sites (see Table 7.7; Figure 7.3).

Multivariate Analyses

The sample sites were subjected to multivariate analysis to further investigate the question of diachronic variability. An investigation of the variance displayed by the small sites was considered important, since these may demonstrate temporally or spatially discrete stylistic trends. Correspondence Analysis (CA) was employed for this purpose, as with elsewhere in this research (Chapter 8 contains more detailed description of the technique).

For the CA all variables which were present at <5% of the sites were clumped into generalised categories and a reduced variable list of 35 attributes were analysed. This reduction was made to avoid the possibility that the rarer techniques would force the
95% remainder of the data into a homogeneous mass, thereby masking any patterning which may reside therein. The revised variable list is presented in Table 7.9.

Table 7.9: Techniques and/or colour combination variables used in Correspondence Analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Colour and Form</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>black outline</td>
<td>Dry</td>
</tr>
<tr>
<td>2</td>
<td>black infill</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>black outline + infill</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>red outline</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>red infill</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>red outline + infill</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>white outline</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>white infill</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>white outline + infill</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>dry yellow</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>white outline</td>
<td>Wet</td>
</tr>
<tr>
<td>12</td>
<td>white infill</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>white outline + infill</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>red infill</td>
<td>Wet/Dry</td>
</tr>
<tr>
<td>15</td>
<td>yellow outline</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>red dry outline/wet infill</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>rare wet combinations</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>black + white outline</td>
<td>Bichromes</td>
</tr>
<tr>
<td>19</td>
<td>black + white, outline + infill</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>black + white outline, black infill</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>white outline, black + white infill</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>white outline, red infill</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>red + white, outline + infill</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>black + red, outline + infill</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>rarer bichromes (combined)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>polychromes (combined)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>linear infill</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>white</td>
<td>Stencils</td>
</tr>
<tr>
<td>29</td>
<td>red</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>yellow</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>rarer stencils (combined)</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>intaglio</td>
<td>Engravings</td>
</tr>
<tr>
<td>33</td>
<td>incised outline</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>rarer engravings (combined)</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>incised of</td>
<td></td>
</tr>
</tbody>
</table>

The CA results showed that the first two components accounted for 47% of the variance in the data set. The scree slope plot (Wright 1989) also shows that the variance is well described by this CA with the first component accounting for the greatest proportion of the variance (Figure 7.4).
A bivariate plot of the attribute scores revealed a fairly tight cluster around the origin with few outliers (Figure 7.5). As expected, the only variable to fall out significantly was intaglio pecking (variable #32). A surprise combination which also separated was two black and white bichrome variables (#s18 and 21).

Focussing on the main body of variables (Figure 7.6), certain patterns amongst these are clear:

- there is a tendency for colour and technique characteristics to cluster. For instance, the dry reds, blacks and whites are similarly and separately distributed. The painting techniques are also inversely correlated on the second component with the drawing techniques;

- the monochrome, particularly the dry red and black techniques separate (and cluster internally), while the polychrome and most of the bichromes clustered in close proximity to each other.

In terms of colour and technique correlations:

- Red and black drawings appear to be negatively correlated, while black and white bichromes are strongly and negatively correlated with black monochrome art.
Figure 7.5: Mangrove Creek CA Results. Bivariate plot of component scores. Technical variables.
Figure 7.6: Mangrove Creek, CA Results. Bi-plot of component scores.
White stencils appear to be negatively correlated with the remainder of the stencil combinations, suggesting that there is an inverse relationship in colour usage. These results appear to offer only limited support to the temporal sequence identified in this work, with the exception of an earlier pecked phase. Wet red infill (Phase 2) does not separated distinctively from the other phase 3 variables, although it is inversely correlated from red drawings. Similarly, red paintings (characteristic of Phase 2) are inversely correlated with pecked engravings, supporting Phases 1 and 2 as separate phases rather than pigment and engraved versions of the same style.

The CA component score plots (which have been plotted according to site size: see Table 7.2) reveal some interesting patterning (Figure 7.7). As expected, this plot demonstrates a similar distribution of sites across the plot (cf. Figures 7.5, 7.6) to that shown by the variables.

Small sites

Analysis of the small sites showed some logical clustering of sites, although this appears to have little temporal significance. Two sites separated strongly on the basis of their pecked assemblages (#26 and #51: Appendix 6).

With the exception of the two outlying, pecked sites (in the lower right quadrant), the small sites are spread diagonally across the top of the plot (Figure 7.6). These sites can be divided into four main groups with some minor outliers. In the top right quadrant, the sites contain almost exclusively black motifs. This is the largest group, containing 16 sites (39%). Another large group is clustered around the origin (11 sites: 27%). These sites contain black, red and/or white assemblages. In the top left quadrant the art consists of predominantly white motifs. In the lower left quadrant the site assemblages contain predominantly red infill.

Only two of the small sites contain (white) stencils. Only four sites (10%) contain bichrome motifs (one of which also contains a polychrome motif). A total of seven multicoloured techniques are used at these four sites, and, as identified earlier three of these techniques occur only in small sites. This suggests that these represent unique combinations rather than temporally significant markers.

Medium sites

The medium sized sites show a much more restricted distribution, with most (85%) being located in the cluster to the top right. These sites contain mainly black and/or red
Figure 7.7: Bivariate plot of component scores, Mangrove Creek. Small, medium and large-very large sites plotted separately.
drawings and white hand stencils; and the cluster is positioned closer to the origin as a result of this mixing of techniques and colours. The two outlying sites contain red, black and/or white bichromes (site #31) and black and red drawings and pecked motifs (site #58: see Figure 7.6). While most of the sites in this size group occur in the top right quadrant, as was found in the small sites, most of these (unlike the smaller sites) contain white hand stencils.

Large and complex sites

The large and very large sites show a very different distribution. Almost all of the very large site (83%) are located in the top left quadrant, containing as they do a much wider variety of techniques (stencils, bichromes and polychromes) and colours (particularly yellow and white). Some of the large sites are also dispersed across the bottom quadrant, demonstrating a diverse range of techniques occur in these sites.

Conclusions

This results demonstrate the following:

1) intaglio motifs (Phase 1) separate significantly from the remainder of the techniques;

2) wet red infill (Phase 2) does not separate well from many of the more complex colour and technique combinations (although the fact that few sites are found with this phase alone may be masking this characteristic);

3) red and white hand stencils separate well on the first component;

4) monochrome colour usage (in a variety of techniques) distinguishes well between art assemblages. The strong separation of monochrome colours does not suggests that colour avoidance was being practised, rather that art production using a single colour occurred in an episodic fashion.

5) The strong separation between the use of black and red was definitely not indicated by the superimpositionning analysis (Table 7.6; Figure 7.1), although there was a hint that black might precede red (i.e. red drawings consistently covered black drawings with the inverse not being demonstrated universally: dry black infill is only recorded over red infill, and none of the black techniques were recorded over red outline motifs);
6) the more complex uses of colour and technique as well as the use of rarer colour cluster together, along with the use of paint (i.e. wet pigment);

7) small sites (<20 motifs) which presumably represent single artistic events, demonstrate clustering on the basis of specific colours. Four main groups are distinguishable which can be described as

i) predominantly black;
ii) predominantly white;
iii) predominantly red; and,
iv) dry black, red and white combined.

8) hand stencils and bichrome/polychrome motifs rarely occur in sites with less than 20 motifs;

9) medium sized sites (21-50 motifs) contain assemblages which use predominantly black and red drawings and have white hand stencils. These sites rarely have other coloured hand stencils present;

10) large sites (51-100 motifs) contain a range of techniques (predominantly monochrome) with white hand stencils, and or pecked engravings;

11) very large sites (>100 motifs) contain the fully range of techniques employed in the Creek valley; most of the rarer techniques and colours are only found in these sites.

While the CA has demonstrated clustering of the sites on the basis of colour and technique preferences, these groupings cannot be interpreted as indicating temporal trends on the basis of superimposition analysis results.

Rather it appears to demonstrate certain things about the manner in which the art body of the creek valley was produced, namely that small sites represent limited artistic events which concentrated on using a limited range of raw material. These would appear to be *ad hoc* episodes which produced art with whatever raw material was to hand (mainly the ubiquitous charcoal). Sites which represent more conspicuous art foci contain a wider range of techniques and raw material. The sites which have been used extensively for the production of art demonstrate the full range of techniques and colours available to the artists in residence. Increasing artistic complexity while being the result of time (in so far as more time was spent at the more complex sites) can not be demonstrated as the result of an evolution of the style.

*Chapter 7*
Two earlier phases are supported by the motif preference analysis and on the basis of superimpositionnning analysis. The separation of the pecked motifs is also strongly supported by the CA. However only minor trends in colour preference or technique are indicated in the main body of the art. Complex sites appear to have been used for longer periods of time or for more intensive periods of artistic activity. The proliferation of techniques in these sites appears to result from specific artistic developments on site rather than from a widespread trends in the development of traits. The fact that the largest and most complex sites cluster cohesively demonstrates an overriding stylistic homogeneity in the sites of this size. And the same pattern is identified with the medium sized sites. These results are suggestive of different site types being identified. This is discussed further (Chapter 10).

7.5 Mangrove Creek Art Sequence

On the basis of superimpositionnning, motif preference and multivariate analyses the following phases of art production are discerned within the Mangrove Creek valley:

Mangrove Creek Art Phase 1  pecked engravings of tracks and circles.

Mangrove Creek Art Phase 2  red paintings and hand stencils, and white hand stencils (red and white hand stencils do not co-occur).

Mangrove Creek Art Phase 3  a proliferation of techniques and colour use, perhaps starting with plain dry black and dry red motifs and then developing into a range of paints, dry bichromes, stencils of varying colours, polychromes and incised motifs. Outline-only motifs end the sequences of many shelter, although contact motifs have also been recorded in white stencils and drawn red and white outlined and infill forms.

How then to assess the conclusions reached about the art sequence in light of Attenbrow's evidence for shelter habitation indices and artefact discard rates over time (Chapter 4)? Is it possible to correlate the art in the Mangrove Creek catchment with occupation deposit, or to propose an absolute chronology (viz. Morwood 1979: 330) based on the data obtained here.

Definite comments about the earliest and terminal phases are possible.
A projected date of c.6,000 years BP is given for Phase I at Yengo 1, associated with a Pre-Bondaian lithic assemblage (Chapter 6). A pre-Bondaian date association can also be inferred for Emu Tracks 2 in upper Mangrove Creek.

At Emu Tracks 2, the 15 engraved emu tracks were recorded as being level with the current surface of the deposit. It has previously been assumed (Clegg 1979; Morwood 1979, 1992; Rosenfeld et al. 1981) that where engravings occur on vertical shelter walls that the contemporaneous living surface was likely to have been between 35-50 cm below the base of the engravings. At Emu Tracks 2, the basal levels were c.80cm below the current surface and it was estimated (on the basis of artefact typology) that the first major occupation of the shelter began sometime around 4,000 years ago (Attenbrow 1987: Table 7: 2). In the basal layers, however, the test pit (50 x 50cm) had contracted significantly as a result of the steeply sloping bedrock. It is possible that evidence of the site's earliest occupation (towards the front of the shelter) may exist but was undetected by this very small sample (Val Attenbrow, pers. comm., 1991). Regardless of the exact timing of the shelter's first usage, it would appear on the basis of the art's position on the wall that this was contemporaneous with earliest usage of the shelter, which predated the main occupation of the shelter during the Early to Middle Bondaian (see Table 6.7).

On the basis of this shelter's art and occupation evidence, an estimate for the age of Phase 1 is given as >4,000 years BP.

At the terminal end of the local art sequence, there is evidence which indicates that pigment art was being produced at European contact. Drawings of sailing ships in a limited range of pigment techniques and the stencilling of metal axes indicate that the art in the Mangrove Creek valley (and indeed wider Sydney region) was being produced at least as late as 1788, although a date of 1770 (the arrival of Captain Cook at Botany Bay) is also possible for this pro terminus. This is discussed further in relation to the geographic distribution of contact motifs (Chapters 8 and 9), but it is not possible to assume that the sailing ships depicted must be those of the First Fleet, nor that trade items handed out by Captain Cook [Beaglehole 1955] could not have travelled this far north.

Both Mathews (1897) and McCarthy (1939) cite evidence of an Aboriginal person in Wollombi Brook executing art as late as 1843, although there is no evidence to indicate that this was executed in a culturally proscribed fashion. The ethnohistoric evidence offers no examples of people observed to produce art in the early days of white settlement, although there are several references which indicate that the art was observed by early diarists (Chapter 3). The fact that contact motifs are relatively rare
in the Sydney area suggests either that the production of art at this time was sporadic, or that the use of art as a cultural medium very quickly diminished after contact.

The question of timing between Phases 2 and 3 is problematic. Other than assuming contemporaneity between earlier, lower frequency art production and similarly low frequency occupation evidence, there is an absence of associated evidence for Phase 2 art.

A correlation between art and deposit can be investigated more closely at seven sites in the Mangrove Creek valley. Seven of the 65 shelters used in this art analysis have been excavated, and five of these have been dated\(^4\). From these dates and the archaeological phases predominating at each site, correlations between art and occupation phases can be made (Table 7.10). This is not a simple exercise as the sites excavated by Attenbrow (c.70% of this sample) were not excavated for the purpose of investigating this question.

**Table 7.10:** Excavated shelters with radiocarbon determinations and estimated archaeological phases and designated art phases.

<table>
<thead>
<tr>
<th>Site</th>
<th>Dates</th>
<th>Occupation Phases</th>
<th>Art Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emu Tracks 2</td>
<td>-</td>
<td>2, 3, 4</td>
<td>1</td>
</tr>
<tr>
<td>Upside Down Man</td>
<td>4,030 ± 140BP</td>
<td>1</td>
<td>17,2</td>
</tr>
<tr>
<td></td>
<td>1,540 ± 60 BP</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,220 ± 120 BP</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Roo and Echidna</td>
<td>6,700 ± 150 BP</td>
<td>1</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Bird Tracks</td>
<td>-</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Black Hands</td>
<td>3,040 ± 85 BP</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>3, 4</td>
<td>3</td>
</tr>
<tr>
<td>Dingo and Horned Anthrop</td>
<td>581 ±120 BP</td>
<td>not analysed</td>
<td>3</td>
</tr>
<tr>
<td>Loggers</td>
<td>11,050 ± 135 BP</td>
<td>1</td>
<td>3?</td>
</tr>
<tr>
<td></td>
<td>7,950 ± 80 BP</td>
<td>2</td>
<td>3?</td>
</tr>
<tr>
<td></td>
<td>2,480 ± 60 BP</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>530 ± 90 BP</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

UMCC data from (Attenbrow 1987)
UDM (this thesis, Appendix 2)
Dingo and Horned anthropomorph (Macintosh 1965)

---

\(^4\) While 18 shelter art sites were excavated by Attenbrow, the art in only five was recorded in sufficient detail for this level of analysis.
Of the five shelters excavated by Attenbrow, four have multiple phases of occupation evidence and most have Phase 3 art. The site that has a single Phase of both art and deposit is Bird Tracks (Table 7.10). The art here is designated Phase 3, the deposit (undated) Phase 4. Assuming that the two were contemporaneous events (Chapter 6), Art Phase 3 at this site is placed in the last 1,600 years (Attenbrow 1987: Table 7.2).

There were multi-phase occupations in the remainder of Attenbrow's excavated art shelters. At the three shelters with pigment art (Roo and Echidna, Black Hands and Loggers), all had their most intensive occupation during Lithic Phase 3 (2,800-1,600 years ago). While the correlatable evidence from these shelters is tenuous, it is argued (following Chapter 6) that the production of the pigment art coincided with the most intensive period of occupation. Middle to Late Bondaian associations are thus suggested for these Phase 3 art in these sites. More direct associations are possible from the remaining excavated art shelters.

The presence of at least three artistic episodes at the Upside Down Man (UDM) shelter has already been argued (Chapter 6, Appendix 3), while the dating and analysis of the deposit indicates two distinct phases of use. The contemporaneity of the main phase of occupation (Lithic Phase 3) and the majority of the art (Art Phase 3) is indicated on the basis of excavated evidence. However, it is also argued that a late artistic episode, including a suite of outline motifs, one of which had samples collected for AMS dating, may well post-date the terminal occupation of the site c.1,200 years BP. The results of the AMS radiocarbon dating were inconclusive, but are suggestive of art production continuing for some time after the abandonment of the shelter for habitation.

The two pecked motifs at this site are figurative, unlike the majority of the pecked assemblage in this creek valley. It is possible that these represent a 'transitional' form between Phases 1 and 2. The basal dates and the nature of the assemblage at site establishment, i.e. pre-Bondaian Phase 1 but with a relatively recent date, support such an argument. The early pigment art, the painted red anthropomorphic figures are stylistically similar to several of the engraved anthropomorphs, and these may be more closely related temporally than other Phase 1 and 2 motifs (see 7.3 above). The Phase 2 motifs here are correlated with the earlier occupation of the site.

The Middle Bondaian stone assemblage which represents the major and terminal lithic occupation phase of this shelter ends later than proposed by Attenbrow's (1987) sequence. This phase is dated elsewhere in the catchment to between 2,800 -1,600 years ago. Similarly, the UDM early Bondaian (Unit III) also returned a relatively recent data (c.4,000 years BP) compared with Attenbrow's proposed chronology.
Correlating the UDM's excavated information and its art assemblage, the following dates are given for the identified phases:

Art Phase 2  
<4,000 - > 1,600 years BP

Art Phase 3  
c.1,600 - 1,200 years BP

The other shelter excavated expressly to date its art was Dingo and Horned Anthropomorph (MacIntosh 1965). At this site, two dates (144 ± 125 BP (GX-0069) and 581 ± 120 BP (GX-0070)) were obtained from one pit. No lithic or faunal assemblage was found in this particular excavation, but clear stratification of charcoal, hearths and two 'red powdery' strata was found amongst the yellow sand. The older date was collected from a sample below the darker red lens in which one piece of faceted pigment was found (the same colour as the dingo and horned anthropomorphs). The faceted pigment found by MacIntosh at a depth of between 24-27cm was described as having 'three of its eight sides 'rub-polished" (1965: Plate V). This is the most conclusive excavated evidence for ochrous art production in the Sydney region⁵.

The other dated sample came from above the lighter red layer, only 4cm below the surface (MacIntosh 1965: 92-3). My interpretation of this more recent date is that it cannot be correlated with art production at the shelter. The red 'powdery' layers may well have been reddened ash associated with the charcoal lenses below or above this (1965: 92). Such features have been associated with hearths excavated by me in other sandstone shelters (UDM, square 4 (see Plate A3.8); AR1, square 10D McDonald 1992a). The discovery of faceted red ochre, of the same colour as the dingoes and horned anthropomorphs, with the lower date establishes the likely production date for these motifs.

The remainder of the art at this shelter is classified generally as Phases 3. Its condition suggests that much of the production at this site may have predated the dingo and horned anthropomorph composition. The red and white horned anthropomorphs⁶, dingoes and echidnae are classified, on the basis of technique, as appearing late in Art Phase 3. The dated evidence for this site indicates that these motifs were produced midway through the last millennium. On the basis of the results at this site, it would appear that Phase 3 was still being produced well into the last millennium, long after occupation in UDM shelter ceased.

⁵ Attenbrow excavated 'ground ochre' at only one site ('Sunny'; Attenbrow 1987: Table 5.5); and this shelter had no art (and see Glover 1974 (2CU/5), Tracey 1974 (4CU/5) and Megaw 1974 (W}L/). At UDM, Great Mackerel and Yengo 1 while ochre and pipeclay were found in the excavations, these pieces were so small that no evidence of faceting was visible, nor likely to be so.

⁶ This particular motifs has an extremely restricted distribution in the Mangrove Creek catchment and near Mogo Creek just to the west (Chapter 9). Swinton's shelter has an example of this motif, late in its sequence (Plate 20).
On the basis of these two shelters and Emu Tracks 2, and owing to the presence of contact motifs in the art of the Valley, the following chronology for the Mangrove Creek Art sequence is proposed:

<table>
<thead>
<tr>
<th>Art Phase</th>
<th>Date Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Phase 1</td>
<td>Pre- or Early Bondaiian &gt; 4,000 years BP</td>
</tr>
<tr>
<td>Art Phase 2</td>
<td>Early Bondaiian  &lt; 4,000 - &gt;1,600 years BP</td>
</tr>
<tr>
<td>Art Phase 3</td>
<td>Middle to Late Bondaiian c.1,600 - European contact</td>
</tr>
</tbody>
</table>

Difficulties were encountered in accurately dating this chronology because of the scarcity of sites with art in dateable contexts, and inconsistencies in dating the Stone Tool Phases in particular sites. Dating the beginning of Art Phase 3 was difficult on the basis of the three sites used, and the commencement of this phase of production could have been a millenium earlier than the dates proposed here, at the beginning of the Middle Bondaiian. A correlation of art phases with broader lithic phases appears to be the most judicious categorising of the material (cf. Attenbrow 1987). It is argued that the main art production period in most sites is contemporaneous with the most intensive period of stone tool production, the Middle Bondaiian. It is thought, however, that art production continued into the late Bondaiian and indeed up until contact. The production of the art in shelter contexts continued without appreciable stylistic change with the changeover from the Middle to late Bondaiian. The significance of this finding is discussed (Chapter 10), in terms of the model for stylistic behaviour in the region.

The diachronic analyses indicate that appreciable changes have not occurred over the main period of art production. Thus, variability investigated on the basis of geography (Chapters 8 and 9) should not be unduly affected by diachronically significant 'noise'. Once the synchronic analyses have been completed, an extrapolation to the region of this proposed localised art sequence can be attempted.
Chapter 8

Regional synchronic variation in the art of the
Sydney Basin engraving assemblage

8.1 Introduction

This chapter looks at regional stylistic variability in the engraving component. The investigation is restricted to motif depictions, since the technical variations in this medium are extremely limited. The analysis is aimed at identifying whether broad scale patterns can be interpreted culturally, not just environmentally (McMah 1965). A comparison of these results with those achieved in the shelter art assemblage will be made in a later chapter (Chapter 10).

There was some initial concern that by focussing on motif, the analysis would not be investigating style per se, but merely compositional variety\(^1\). However, as the overall aim was to analyse the engraving and shelter art components at a comparable level (despite their technical differences and the variability that these introduce to motif form), motif taxonomy appeared the most judicious approach to the problem.

The use of motif has been successfully employed at a regional and localised level, investigating a range of stylistic questions (Clegg 1987, Officer 1984, Franklin 1984, Smith 1989). Indeed, there are theoretical arguments for why such an approach can provide stylistic information (Chapter 1). Sackett (1990) proposes that one way of approaching stylistic choices made by artisans was to use a classification system based on thematic variety. He cites various examples of how the combination of motifs and compositional features may indicate high levels of ethnically significant patterning (e.g. Glassie 1975, Longacre 1981) and suggests that "themes may well be the [things] that give congruence to isochrestic choices in non-material aspects of cultural life" (Sackett 1990:41). While this type of classification has previously not been attempted on an archaeological rock art assemblage, the approach being used here will test Sackett's proposition. The use of the quantitative technique Correspondence Analysis (CA), which seeks patterning in the combination of variables (motifs) in the data set, was considered an ideal tool for such an approach.

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\(^1\) A more qualitative approach to particular motifs (e.g. from body proportions, angle of macropod's tails, orientation of motif, presence of eyes and other internal features, etc.) across the region may have revealed patterning in the way certain motifs were depicted. However, given the lack of success of this approach to demonstrating ethnicity on a limited scale (Smith 1983; and see Clegg 1981), and the overall similarity achieved by such an approach on a coarse-grained (regional) level (Franklin 1984), I was unwilling at the outset to spend the time on this unwieldy and time consuming approach.

Synchronic variation: Engravings

Introduction ...
Details of approach and methodology are described in Section 8.1. While basic information about the motif classification and the data base used were provided earlier (Chapter 5), analytical details about the quantification of this data base are provided here. This information is supplemented by the data provided in Appendices 4 and 5, by discussions about the classification system used (Appendix 6) and by computer plots supporting the Correspondence Analysis (CA).

The CA indicated that the region's engraving assemblage was largely homogeneous (Section 8.2). There was no major internal structure (e.g. no distinct groupings) present within the component, and such a result would be expected for a body of art which has been defined as a regional style. However, a closer analysis of the CA results on the basis of geographic location demonstrated (using these same CA results) the nature and extent of variability at various localised levels. The results were viewed according to the language boundaries in evidence at white contact and to major drainage basins within the study area. These contexts provide an explanatory framework for variation across the region.

The posited style boundary to the south of the region was further investigated. This was initially identified by McMahan (1965) on the basis of motif range and schematic differences in the engraving assemblage. Work on the Rock Art Project determined the likely location for this boundary as the Georges River and that this boundary existed for both art components. The shelter art component was also found to demonstrate varying technical options south of this boundary (McDonald 1985a, 1990a). This research has been able to refine further the extent of the stylistic differences either side of this boundary. Clines in style elsewhere across the region are also defined and described. These are manifested as increasing and/or decreasing amounts of homogeneity in localised areas as well as varying motif foci.

In one area of the region engraving sites in different topographic locations were investigated to explore the possibility of different potential contexts of information exchange. Vertical engraving sites around the estuarine foreshores (in a very public location) were compared with open engraving sites on the ridgelines (where because of its different environmental situation it is assumed that the audience was more restricted).

The distribution of uncommon motifs is also explored (Section 8.3). This type of motif was thought to have the best potential to indicate the influence of localised (or even individualised) stylistic traits. Uncommon motifs are swamped in large-scale analyses, and it was hoped that this scale of analysis may provide additional stylistic information. Whales, for instance demonstrate a fairly restricted geographic range. This, however, could be an environmental range as much as a cultural one. Other motifs, such as profile
people, culture heroes, certain material objects and Complex-non-figuratives (CXNF's) are felt to be better indicators of cultural choices. The restricted distribution of contact motifs is also discussed.

As well as the regionally based quantitative analyses, several areally restricted qualitative analyses of motif depiction and preference (Sackett's 'compositional features') were undertaken (Section 8.5). These analyses concentrated on motifs which are not affected by environmental considerations (e.g. marine animals; proximity to sea etc.). Certain attributes on human figures (particularly gender, and items of material culture), CXNF's and culture heroes are the focus of this analysis.

8.2 Definition of a regional style: methodology

The aim of the analyses undertaken was to provide a basic statistical description of the two art components (i.e. average assemblage size, motif frequencies etc.) and to determine the amount of variation within the assemblages on the basis of multivariate analysis. This approach was necessary to describe objectively and compare the art components. The general approach described here is applicable to both art components.

As with most exercises of quantification, logical steps are required to code the data in a form which can be read by a computer, analysed and then interpreted by an archaeologist. As well as logically ordering the data, it is necessary to justify the selection of variables as meaningful and relevant to the questions being asked (Chapter 1). This theoretical aspect of the classification and selection process is discussed more fully in Appendix 4. The procedures followed in quantifying the two art components can be broadly defined as:

- identification of the sample;
- selection of variables;
- collection (counting) of variables for the sample;
- input of counted information into (computerised) data base;
- selection/clumping of variables for analysis;
- analysis of data base; and,
- interpretation of analysis results.

Having identified the sample (Chapter 5), the selection of variables for analysis proceeded. Variables included a motif classification for both art components (these were fundamentally the same with additional motifs for the more diverse shelter art
component) and a taxonomy of technical variations for the shelter art sites (Appendix 4). Topographic, grid reference and site association information for both site types was also collected (Appendices 5 and 6).

Motif Variables

The desire for comparability between the two components was an overriding factor in the selection of motif variables. It was recognised, however, that inherent differences in the two components would necessitate some variation in the motifs identified and counted.

The motif classification was initially devised for the Rock Art Project (Stage I) specifically for the engraved assemblage (McDonald 1985a). The field recording exercises undertaken in Stages II and III of the Project (McDonald 1987, 1990a), revealed a greater motif variability in the shelter art component. This resulted in shortcomings in the motif range which had been used solely for the engraved sites. This necessitated two additional motif categories (hands and axes) for the motif classification for both components, and the exclusive use of two motif categories (hand stencil variations and "other") for the shelter art sample (see Tables 5.3 and 5.4; Chapter 5).

Counting

Once the motif and technique classifications had been devised, counting of both components proceeded\(^2\). The counted data was recorded on accounting broadsheets. Each site had one column; variables were recorded by row. As well as counting motif and technique variables, site card information (for those sites not actually visited by me) was used to provide the locational, topographic and site association variables. NPWS site identification was also recorded for each site.

All data were entered on the UNIVAX mainframe system at the Australian National University.

Analyses

Analysis of the data commenced using unmodified motif count information, i.e. the raw data which had been entered into the computer. This involved the analysis of 27 motif variables with this engraving assemblage.

---

\(^2\) The fieldwork undertaken for the Rock Art Project and this research necessitated a total recounting of both components which had initially been counted in Stage 1 (McDonald 1985a). The shelter art component had not originally had its motif assemblage counted. This was recorded and the previously counted technique information was checked. New sites were incorporated into the sample. This process was considered necessary in terms of recorder continuity.
All data were put through a GENSTAT Correspondence Analysis (Version 3.1), designed to investigate variance within large multivariate data populations (the multivariate analyses used are defined and discussed further in Appendix 4). Both art components were found by this method to be largely homogeneous populations, which clustered tightly and showed no underlying structure. The pattern of distribution, both for variables and sites, was affected largely by the presence of a few outliers. On the advice of Dr Ross Cunningham (Statistician, Statistics Department, ANU), the analysis was re-run removing these outliers, in an effort to seek the underlying patterns within the greater data set. This was done a few times, until it became clear that the method was imposing structure upon the data - in much the same way a cluster analysis would.

Two further steps were then taken in the treatment of the data. This involved clumping the motifs and converting them to binary data. The motif taxonomies for both components were reduced to seven variables (Table 8.1). Converting to binary data was a simple process of using presence and absence rather than raw count data: if a variable was present it received a value of 1; if it was absent its value was 0. The CA of the engraving sites was based on a reduced sample of 705 sites (i.e. sites which contained only unidentified motifs were excluded from the analysis). The shelter art sample included 546 sites. This approach proved to be very successful, as will be seen below (Section 8.2).

Table 8.1: Engraving Sites. Clumped motif variables used in Correspondence Analysis.

<table>
<thead>
<tr>
<th>Variable No.</th>
<th>Motif/Variable description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anthropomorphic</td>
</tr>
<tr>
<td>2</td>
<td>terrestrial</td>
</tr>
<tr>
<td>3</td>
<td>birds</td>
</tr>
<tr>
<td>4</td>
<td>marine</td>
</tr>
<tr>
<td>5</td>
<td>material objects</td>
</tr>
<tr>
<td>6</td>
<td>tracks</td>
</tr>
<tr>
<td>7</td>
<td>other</td>
</tr>
</tbody>
</table>

Clumped variable 1 includes individual variables 1 - 5; 2 = v 6-8; 3 = v 9,10; 4 = v 11-14; 5 = v 15-8; 6 = v 21-24; 7 = v 25-27 (see Table 5.1). Unidentifiable motifs have been excluded from this level of analysis.

8.3 Correspondence Analysis; data, results and interpretation

As described previously, the aim of a CA is to investigate sources of variance within a data set, the purpose being to identify groups of similar and dissimilar objects (in this case sites). The advantage of this technique over other multivariate tools is that the
variables (in this case motifs) which create these groupings can be identified. It is not so much the presence of individual motifs which creates the variance, but the combination of variables.

As a first step to interpreting the geographic variability within this assemblage, a CA using grid location as a factor was run. This revealed no internal groupings or structure in the data, nor any strong positive correlation between geography and motif. This result supported the absence of strong patterning or major divisions within the assemblage.

The data base for this component is too large for the plot of the site distribution to be meaningfully interpreted (Figure 8.1). For this reason the results were replotted using subdivisions of the data (Table 8.2: Appendix 7; Figures A7.1 - A7.7). These sub-plots are based on exactly the same results, but the smaller sample sizes enables more useful interpretation.

This analysis has been undertaken on a variety of scales. The first analysis involved an arbitrary division of the sites into map sheet provenance. This level of analysis was completed for Stage III of the Rock Art Project because a more sophisticated division of the data into archaeologically meaningful geographic zones using the recorded AMG grid reference information could not be achieved at that time.

The data were subdivided into eight groups which could be interpreted broadly on a geographical basis. The resultant groups were unequal in size, but this indicated to some degree the geographical biases of the sample (Table 8.2). This division of the data base, while being arbitrary in terms of the archaeological context of the sites in question, gave control over north-south and east-west clines in the data (see Figure 8.4). The seven sub-plots are presented in Appendix 8.

Table 8.2: Analytical grouping of engraving sites according to NPWS Id numbers. Groups used in regional interpretation of CA results.

<table>
<thead>
<tr>
<th>Group</th>
<th>Map numbers</th>
<th>1:250,000/1:100,000 maps</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>37 - 6 's</td>
<td>Singleton/Cessnock</td>
<td>4 sites</td>
</tr>
<tr>
<td></td>
<td>45 - 1 's</td>
<td>Sydney/Wallerawang</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>45 - 2 's</td>
<td>Sydney/St Albans</td>
<td>37 sites</td>
</tr>
<tr>
<td>Group 3</td>
<td>45 - 3 's</td>
<td>Sydney/Gosford</td>
<td>234 sites</td>
</tr>
<tr>
<td>Group 4</td>
<td>45 - 4 's</td>
<td>Sydney/Blue Mountains</td>
<td>10 sites</td>
</tr>
<tr>
<td></td>
<td>45 - 5 's</td>
<td>Sydney/Windsor</td>
<td></td>
</tr>
<tr>
<td>Group 5</td>
<td>45 - 6 's</td>
<td>Sydney/ Sydney</td>
<td>377 sites</td>
</tr>
<tr>
<td>Group 6</td>
<td>52 - 2 's</td>
<td>Wollongong/Wollongong</td>
<td>19 sites</td>
</tr>
<tr>
<td>Group 7</td>
<td>52 - 3 's</td>
<td>Wollongong/Port Hacking</td>
<td>35 sites</td>
</tr>
</tbody>
</table>

Chapter 7
When it came to completing the analyses for this research, a more detailed subdivision of the region's data was contemplated. There were concerns about the relevance of the documented linguistic boundaries (Chapter 3) and there were obvious sampling problems (i.e. unequal sample sizes) inherent in such an approach. A division of the data into archaeologically meaningful zones appeared a vexed question. Thus for the initial analysis, the arbitrary divisions in the data were maintained. In an effort to investigate more closely possible cultural divisions across the region, several localised areas were chosen (from those with better sample sizes) to investigate linguistic boundaries (Section 8.3).

**Regional Analysis**

The CA results indicated that the Sydney Basin engravings were a relatively homogeneous body of art. The first two components account for 64% of the variance in the sample and these appear to discriminate well. The first component accounts for the greatest amount of variance in the data base (Figure 8.1), and the scree slope plot (Wright 1992) demonstrates that this component describes considerable structure in the data. Less variance is accounted for by the second component, and the slope then tails off.

**Figure 8.1**: Engraving CA results: Plot of the latent roots indicating that the variance in the data set is well accounted for by the first two components.

![Graph showing the latent roots](image)

No major internal groupings or divisions were identified, although certain sites were identified as outliers (Figure 8.2). The plot of the first two co-ordinates for the variables (Figure 8.3) reveals that three of the variables (2, 3 and 4) are good discriminators. In the first co-ordinate, marine animals (3) and birds (4) are negatively correlated, while in the second co-ordinate, birds (3) are negatively correlated with land animals (2). Thus sites which contain large numbers of bird motifs would have very few marine depictions,
while sites with a large number of land animals would contain small numbers of bird depictions (and *vice versa*). Anthropomorphs are relatively weakly positioned on the first co-ordinate, but have a relatively good discriminating effect on the second co-ordinate. Material objects, tracks and "other" motifs are relatively poor discriminators being situated, as they are, close to the origin.

On the basis of the CA results, there was no evidence for strong or distinctive localised variability across the region. However, certain stylistic clines in the area were present, and these are observable on inspection of the described subdivisions. Localised variability is identifiable in the bivariate sub-plots (Appendix 7: A7.1-A7.7) by the distribution and/or clustering of sites relative to the origin (i.e. \(X + Y = 0\) on the bivariate plot). Sites close to the origin are those which are poorly discriminated in relation to the axes in question (i.e. relatively homogeneous); those which are dispersed well away from the origin are well discriminated by their motif assemblage, and therefore are identified differently. In other words, "common" sites fall close to the origin; unique or more unusual sites are located away from the origin. The identification and distribution of outlier sites (in particular quadrants of the graph) in localised areas is felt to be the key to investigating stylistic variability - thematic variety - across the region.

The bivariate plots for each group were analysed. The number of sites within a defined and consistent radius of the origin were noted\(^3\), allowing for a calculation of the percentage of "common" and outlier sites in each area. Given the disparate sample sizes, this was necessary for comparability of the data overall. As the computer generated plots sometimes generated the two axes at different scales, the calculation of the radius sometimes described an ellipse rather than a circle.

The distribution of the outlier sites between the four quadrants was also investigated, since variations in this result, which results from different compositional foci across the region revealed by the CA result, would enable more specific statements on localised variability. The four quadrants were labelled as follows:

\[
\begin{array}{cc}
  A & B \\
  (-) & (++) \\
  \hline \\
  D & C \\
  (-) & (+) \\
\end{array}
\]

---

\(^3\) This has been drawn on each of the bivariate plots as an heuristic device.

*Chapter 7*
Figure 8.2: CA scores, Entire engraving component (705 sites). Each dot represents many sites.
This quantification demonstrated the localised variability in assemblage content, i.e. motif depictions (Figure 8.3). These results are summarised here (and see McDonald 1990a; Appendix 8)

**Figure 8.3:** Engraving Assemblage. Correspondence Analysis. Bivariate Plot of Variable Scores.

The sites in the north-west of the region were found to be relatively heterogeneous. Outlier sites occurred mostly (86%) on the positive side of the vertical axis, indicating that they are more strongly (and positively) discriminated by the first component. Sites in these groups contained many tracks (bird and macropod) as well as a definite preference for macropods and other land animals, birds and anthropomorphs.

The large group of sites (234) in the north-east of the Basin (north of the Hawkesbury River) were more heavily clustered around the origin (45%), while the outliers again showed a tendency to be located on the positive side of the vertical axis (76%). There was a preference in these sites for tracks (particularly human, i.e. "mundoes"), material objects (shields) and marine depictions. Anthropomorphic depictions were also very common.

The sites situated in the centre of the geological basin (between the Hawkesbury River and Botany Bay; the Cumberland Plain and the coast) were well represented in the
analysis. There were 377 sites in this group. This sample probably represents best the core Sydney Basin assemblage. Given the size of this sample and its central (geographic) location, this is hardly surprising.

Most of the sites (54%) in this group were tightly clustered around the origin. The majority of the sites in this group contained marine depictions, material objects, tracks (particularly mumpoons) and anthropomorphs. Land animals were quite common, as are birds. There are several outlier groups within this sample. One major cluster was formed by (53) sites which contain combinations of exclusively marine depictions. Another group of sites, which formed a major cluster (25 sites), all contain a single macropod.

South of the Georges River, there was a marked increase in heterogeneity. The sample south of the Port Hacking (group 8) was well dispersed away from the origin (26.5% homogeneity). These sites all contained a predominance of marine depictions and other material objects. Some were combined with anthropomorphs, while others included terrestrial animals and "other" motifs. The outlier sites in this group indicated a major difference from preceding groups in detective preference.

When the percentages of homogeneous sites across the region are compared (Figure 8.4), the patterning is clear.

**Figure 8.4:** Percentage of homogeneous engraving sites in each analytical Group.
The most homogeneous assemblages were located in the centre of the greater Sydney Basin (Groups 5 and 3). Moving north-west and south, this homogeneity decreased. Sites to the west of the central core were also fairly homogeneous.

As well as differences in overall homogeneity, there was marked variation in the distribution of outlier sites (compositional focus) across the region. This suggested that the emphasis on certain combinations of motifs did vary across the region, and that it was changes in these combinations which characterised the stylistic clines across the region. These were sometimes explicable in terms of economic factors (e.g. proximity to the sea). Not all of these variations, however, were so easily explained.

8.4 Language Areas. Searching for boundaries and between-group distinctiveness

Four language areas (following Capell 1970) are recognised to have existed within the study area at European contact (Chapter 3). As discussed previously, these languages were mutually intelligible, although ethnohistoric evidence suggests that the locations of neighbouring 'tribal territories' were recognised and respected by the groups living in the Sydney region at contact. Ethnohistoric evidence also indicates that the participation of neighbouring groups was required in important ceremonies.

Anthropological work elsewhere on the continent suggests that the type of boundaries which would have existed between language groups would not have represented impenetrable barriers (viz. borders between neighbouring countries or states). Such studies also suggest that such boundaries may be fluid over time. The distribution of the contact languages may not have extended back more than a few generations.

The archaeological evidence also calls into question the longevity of these boundaries: the cultural change which occurred at around 1,000 years BP (with the introduction of fishhooks and the decrease in the use of rockshelters) may have had such significance that the contact language boundaries are meaningless for the full extent of the art's production (i.e. the last 3,000 years).

Capell (1970) defined boundaries between language groups largely on the basis of major rivers and creeklines. I have argued (following Peterson 1976) that the boundary of a group's range should be at the periphery of its economically viable area. Boundaries would thus be expected (in topographically dissected areas such as the Sydney Basin) along ridgelines. This argument also supports the use of ridgelines for
access routes around the region, as ethno-historically reported, since these would have been following the periphery of any particular group's territory.

The model proposed in this thesis suggests that stylistic behaviour which reinforces group distinctiveness might be observable on the basis of drainage basins, with boundaries between groups expected along ridgelines and not creeklines. The use of drainage basins as a means of subdividing the landscape was thus undertaken.

Within the five documented language areas, 25 drainage basins were defined across the region. These were coded and the information recorded for each site (Table 8.4).

Language Areas

As identified earlier, a potential problem with the analyses according to language area is the disparate size of the samples in each (Table 8.3).

**Table 8.3: Language areas, codes and sample sizes.**

<table>
<thead>
<tr>
<th>Language Group</th>
<th>Code</th>
<th>No. of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darkung</td>
<td>1</td>
<td>137</td>
</tr>
<tr>
<td>Guringai</td>
<td>2</td>
<td>434</td>
</tr>
<tr>
<td>Sydney (Eora)</td>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>Dharug</td>
<td>4</td>
<td>49</td>
</tr>
<tr>
<td>Tharawal</td>
<td>5</td>
<td>52</td>
</tr>
</tbody>
</table>

As described previously (Chapter 5) this distribution of sites in part represents an archaeological 'reality', with decreasing site numbers at the periphery of the Sydney Basin. This may in part also reflect the geological reality. There do appear to be more available engravable surfaces on the coast, north and south of the Hawkesbury River, although this has never been quantified. Stage 1 of the Rock Art Project (McDonald 1985a) determined that much of the bias with this component resulted from the geographic focus of certain recorders in locations closer to Sydney city. The fact that 70% of this assemblage was recorded by W.D. Campbell, Fred McCarthy and Ian Sim (see bibliography) means that the distribution of this sample largely reflects their areas of interest [Sim (1966a) represents the only focus on engraving sites in the north-west of the Basin].

Limited systematic EIS surveys, over admittedly small areas, in the north and south of the region have revealed a relatively low number and density of engraving sites. Likely explanations for this could be either geological or cultural. In the Mill Creek valley to the south of the Georges River, the ridgelines on either side of the drainage basin were characterised by shale laterite, some of which had been extensively mined by the local Municipal Council for road construction (McDonald 1991b). The sample survey here
(over an area of c. 45 sq km) revealed no engraving sites, although one such site is known in this drainage basin (Attenbrow and Negerevich 1984).

In the north of the region, the Mangrove Creek valley, both in its upper catchment and its middle reaches around Warre Warren Creek, has been systematically sampled over an area of approximately 200 sq km (Attenbrow 1981, McDonald 1988a). Engraving sites here were relatively few (four - 3% of recorded sites) although large numbers of suitable rock surfaces were located and inspected. These results are in stark contrast with those achieved at Maroota (another inland area), where 12 engraving sites were located in one square kilometre (McDonald 1986a).

A correlation of sample size per language area and motif categories was made (Figure 8.5), to investigate whether the patterning achieved by these analyses was the result of sampling inequities.

**Figure 8.5:** Bivariate plot of sample size and number of motifs recorded per sample area. The five language areas and two randomly generated *Guringai* samples.

This demonstrated that there was no one-to-one correlation between these two factors (site size and motif numbers). The *Guringai* sites were further subdivided into random 50 and 100 site samples, for the comparison of assemblage composition (and CA results) according to language area. These measures indicated that the unavoidable sampling inequities in the data base do not appear to produce significant problems with these analyses.
8.4.1 Motif Assemblage Differences across the Basin

Before analysing the CA results, basic assemblage details were investigated for each of the language areas. The division of the sites into language area was achieved on the basis of Capell's (1970) defined boundaries (Figure 3.1; Chapter 3).

**Darklingung**

A total of 2,127 motifs (1,803 recognisable) was recorded from the 137 sites in this area. Proportionally, the largest sites in the region are located in this area (average 15.5 motifs/site). Two (50%) of the regions largest sites (>100 motifs) are found in this area. The motif focus is on tracks (bird, human and roo's respectively). Macropods are the next most common motif. Whale motifs are the only category not represented in this assemblage.

Men are the most commonly depicted human figures, followed by non-gendered anthropomorphs. Profile depictions are quite common. Relatively few (six) culture heroes are located in this area. Boomerangs are the most commonly depicted material culture items (Figure 8.6).

**Darug**

This inland area has less of a focus on tracks than its more northerly counterpart (see above). Mundos and bird tracks still figure strongly, although macropods and land animals represent a large component of this assemblage (Figure 8.7). Human figures are again focused on males, and here there is a greater emphasis on profile figures than non-gendered anthropomorphs. Only three culture heroes are located in this area (at two sites). The average site size in this area is eight motifs per site.

**Guringai**

This sample is located on the coast and represents the largest sample (and main focus) in the region. A total of 4,699 motifs was recorded from the 434 sites in this area. The average site size (total sample) is 11 motifs per site. The other 50% (two) of largest site (>100 motifs) are located in this language area.

In order to examine the effect of sample size, two random sub-samples were generated (one of 50 and the other of 100 sites) to examine the effect that this may be having on the results (Figure 8.8).
All three histograms reveal the same focus on mundenos and fish, followed by macropods, other land animals and men. While the peaks and troughs of these graphs vary slightly according to sample size, the results are basically the same. Only the sample of 50 resulted in any of the motif types (roo tracks and contact motifs) 'dropping out'. These were two of the least common motif types in the total sample.
Figure 8.8: Guringai Language Area. Motif Assemblage.

Guringai (total sample: 434 sites)

Guringai (random 50 sites)

Guringai (random 100 sites)

Synchronic variation: Engravings  Motifs - language areas...
While this sample is located on the coast, its motif focus is not entirely explicable in terms of environment (cf. the Sydney group).

**Sydney (Eora)**

This language group is located on the coast, south of Guringai (and Port Jackson) and north of the Georges River. This has the smallest sample size (largely as a result of the focus in this area of European settlement, but also because the Cumberland Plain with its shale geology comprises a large proportion of this area.

A total of 245 motifs were recorded at the 32 sites in this area (an average of eight motifs per site).

The focus in this area is definitely on fish (46%), while whales and other marine animals are also common (Figure 8.9). There is a much reduced motif classification for this area (14 - 59%) and it is possible that here sample size is playing a part.

**Figure 8.9:** Sydney (Eora) Area: Motif Assemblage.
**Tharawal**

This area is also located largely on the coast, south of the Georges River. A total of 245 motifs was recorded here. The sites here (on average) are the smallest recorded in the Basin (5 motifs/site). There is a combined focus on marine depictions (30.7%), but the most commonly depicted motifs are men (14.8%) and non-gendered anthropomorphs (20.3% in total). Macropods and land animals also figure heavily, while mundoes are the most frequently depicted tracks (Figure 8.10).

**Figure 8.10: Tharawal Area: Motif Assemblage.**

Tharawal (52 sites)

**Summary**

Site size and motif focus vary across the region. While general environmental trends can be observed, i.e. more fish and marine depictions on the coast, higher proportions of land animals inland, there are other foci which cannot be explained so simply. These include the varying proportions of animal and human tracks in different parts of the region, and the dominance of human figures on the coastal sites south of the Georges River. This information is summarised here.

**Darkingung**

The sites are generally large in this area with several very large sites occurring along access routes. The density of sites, however, is lower than in other areas. The motif focus is on tracks (roo, bird and human) and macropods.

*Synchonic variation: Engravings*
Darug

Average site size is roughly half that found in the Darkung area. Macropods and other land animals dominate this assemblage, and tracks are less dominant than further north.

Guringai

This area has the largest number of sites and represent the core of the engraving assemblage. Average site size is larger than Darug but smaller than Darkung. The motif focus here is on m undoes and fish, followed by macropods, other land animals, and men.

Eora

Only a few sites have been recorded from this area, and these are relatively small. The motif focus here is on fish, m undoes, whales and other marine animals.

Tharawal

The smallest average site size occurs in this area. The focus is on men, other marine depictions, and fish, followed by macropods and other land animals.

8.4.2 Correspondence Analysis and Language Areas

While trends in the motif assemblages across the Basin are quite clear (Section 8.2.1 and 8.3.1), the CA results were analysed to determine the compositional differences and foci in the different areas, and to demonstrate internal variability in the overall assemblage. Here the language areas were analysed both in toto and according to internally distinguished drainage basins. This was done since several of Capell's boundaries were located along creeklines, and the intention of this work was to test these boundary locations.

Drainage Basins

A total of 25 drainage basins with sites were defined across the region (Figure 8.11). These vary considerably in size and very large drainage areas have been defined for areas with low site numbers (e.g. Blue Mountains, Burratorang, Port Jackson). The following codes have been used (Table 8.4). Not all of these basins include engraving sites. Some contain exclusively shelter art sites (Chapter 9).
Figure 8.11: The 25 drainage basins defined across the Sydney region. Refer Table 8.4 for identification.
Table 8.4: Drainage Basins, Language Areas and Sample sizes.

<table>
<thead>
<tr>
<th>Drainage Basin</th>
<th>Basin Code</th>
<th>Lang. Group</th>
<th>No. of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Macdonald</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Wollombi</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Wyong</td>
<td>3</td>
<td>1/2</td>
<td>3</td>
</tr>
<tr>
<td>Colo</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Central Macdonald</td>
<td>5</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>Mangrove Creek</td>
<td>6</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Mooney Mooney</td>
<td>7</td>
<td>1/2</td>
<td>59</td>
</tr>
<tr>
<td>Brisbane Water</td>
<td>8</td>
<td>2</td>
<td>88</td>
</tr>
<tr>
<td>Kurrajong</td>
<td>9</td>
<td>1/4</td>
<td>-</td>
</tr>
<tr>
<td>Cattai</td>
<td>10</td>
<td>1/4</td>
<td>6</td>
</tr>
<tr>
<td>Berowra</td>
<td>11</td>
<td>2/4</td>
<td>42/28</td>
</tr>
<tr>
<td>Cowan</td>
<td>12</td>
<td>2</td>
<td>113</td>
</tr>
<tr>
<td>Pittwater</td>
<td>13</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td>Middle Harbour</td>
<td>14</td>
<td>2</td>
<td>107</td>
</tr>
<tr>
<td>Lane Cove</td>
<td>15</td>
<td>2/4</td>
<td>9/2</td>
</tr>
<tr>
<td>Port Jackson</td>
<td>16</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Botany Bay</td>
<td>17</td>
<td>3</td>
<td>1/-</td>
</tr>
<tr>
<td>Port Hacking</td>
<td>18</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Woronora</td>
<td>19</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Mill/Williams</td>
<td>20</td>
<td>4/5</td>
<td>-1</td>
</tr>
<tr>
<td>Georges</td>
<td>21</td>
<td>4</td>
<td>1/3</td>
</tr>
<tr>
<td>Nepean</td>
<td>22</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Burrarorang/B Mtns</td>
<td>23</td>
<td>4*</td>
<td>9</td>
</tr>
<tr>
<td>Cataract</td>
<td>24</td>
<td>4/?/5</td>
<td>-</td>
</tr>
<tr>
<td>Avon/Cordeaux</td>
<td>25</td>
<td>4/?/5</td>
<td>-</td>
</tr>
</tbody>
</table>

*May be mixture of Darug and Gandangara Language areas

Because of the widely disparate sample sizes across the region, investigation of language boundaries and/or drainage basin boundaries was undertaken in just three locations. These analyses were intended to test the possibility of language boundaries and to explore the degree of intra-language area patterning. Three areas which contained reasonable sample sizes of both site types were selected for this level of analysis. These were:
1) Intra-language area patterning within the *Darkung* language group (drainage basins 1, 5 and 6:107 sites);

2) The east-west patterning across the proposed *Guringai/Darug* language boundary south of the Hawkesbury River (drainage basins 10-13:316 sites); and,

3) The east-west patterning across the proposed *Tharawal/Darug* language boundary (drainage basins 18 - 21). This last group involves 51 sites south of the identified (regional) style boundary of the Georges River.

In the first two of these areas, extensive recording work has been completed (Gunn 1981, McDonald 1986, 1987, 1988a, 1990, Vinnecombe 1980) and all excavations were undertaken for this thesis. The third area has been studied in more detail by previous researchers (Officer 1984, Sefton 1988, SPG 1974) and this was seen as a useful test area south of the proposed Georges River style boundary.

**CA according to drainage basins**

In this analysis the sites from the language areas were combined as well as being viewed according to drainage basin (Figure 8.11). The Language Area plots\(^3\) are indicated first followed by the drainage basin subplots. Motifs are again the seven clumped motif classes used in the overall CA results (i.e. 'anthropomorphs' include men, women, non-gendered and profile anthropomorphic figures and culture heroes). More detailed descriptions about thematic focus results from re-inspection of the site recordings in certain areas.

1) **Darkung language group** (drainage basins 1, 5 and 6).

This group of sites is located north of the Hawkesbury River and includes the major drainage basins of the Macdonald River and Mangrove Creek. The Upper Macdonald and Central Macdonald groups were distinguished on the basis of the Bala Range, which forms an artificial boundary across its centre. The more northerly of these groups is known to have been in contact with Hunter River language groups (Appendix 1; Moore 1981). Drainage Basin 4 was excluded from this analysis as there was only one site there.

---

\(^3\) These plots are all based on the same CA results. The plots have a manually drawn circle or ellipse (depending on the scale of the axes) indicating the approximate cut-off for the homogenous 'zone'. The intention of this procedure was to provide a visual aid in the interpretation of the bivariate plots. NB. Each dot symbol may represent many sites.
DARKINGUNG

(107 sites)

Outliers

| Core: 44.9% | 6.8% | 42.4% |
| 5.1% | 45.8% |

The sites in this overall grouping are relatively homogeneous (45%), with a heavy emphasis on tracks, anthropomorphs, terrestrial animals and birds.

Upper Macdonald: (Figure 8.12)

Outliers

| Core: 41.6% 12 sites | 0% | 14% |
| 0% | 86% |

This group is relatively homogenous (42%) with a strong emphasis on tracks. Many sites in this group consist of combinations of tracks, anthropomorphs, other material objects and birds. There are no marine depictions in this set of sites.

Central Macdonald: (Figure 8.12)

Outliers

| Core: 49.1% 55 sites | 7.1% | 32% |
| 3.6% | 57% |

This group of sites is also quite homogenous (49%) and includes the sites along the Boree Track (a known access route). There is again a strong emphasis on tracks and anthropomorphic figures, and a number of sites which have birds only. Material objects (spears, clubs) also figure strongly. There are very few marine depictions, and these include plain fish, eels and turtles (site 172).

Mangrove Creek: (Figure 8.12)

Outliers

| Core: 37.5% 40 sites | 8% | 60% |
| 8% | 24% |

This group of sites are less homogenous (37.5%), but again are strongly focussed on terrestrial animals and material objects. Anthropomorphs and birds also figure strongly.
Figure 8.12: Bivariate plots, CA results, *Darkungung* Language Area (Upper Macdonald, Central Macdonald and Mangrove Creek).

Upper Macdonald (12 sites)

Central Macdonald (55 sites)

Mangrove Creek (40 sites)

Synchronic variation: Engravings

CA - language areas...
2) East-west patterning *Guringai/Darug* language boundary

(drainage basins'10 - 13:316 sites)

Capell puts the boundary between these two language areas along Berowra Creek (Figure 3.1). Both banks of this creekline were surveyed for Stage III of the Rock Art Project (McDonald 1990b). Vertical engravings were located on both banks, and the art on both sides (albeit only within 40m distance, 10m elevation of the creek) were observed to be very similar. For the purposes of analyses here, the language areas are defined on the basis of Berowra Creek being the boundary. The drainage basin analysis indeed indicates that the sites on either site of the creek do contain differences.

<table>
<thead>
<tr>
<th>DARUG</th>
<th>(34 sites)</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core:35%</td>
<td>18.2%</td>
<td>45.5%</td>
</tr>
<tr>
<td></td>
<td>13.6%</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GURINGAI</th>
<th>(182 sites)</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core:45%</td>
<td>27%</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>16%</td>
<td>38%</td>
</tr>
</tbody>
</table>

The *Darug* sites are less homogeneous than the *Guringai* sites. There is also a general change in focus between the more unusual sites in the two areas, with generally more land animals occurring in the former and more tracks and birds occurring in the latter. There is also a greater focus on marine compositions. Looking at the drainage basins, there is also considerable variability within these groups, this being less easily explained (i.e. there are no apparent environmental explanations).

<table>
<thead>
<tr>
<th>Cattai:</th>
<th>(Figure 8.13)</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core:50%</td>
<td>33.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>6 sites</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

This area has a very low number of sites, and thus the results are treated tentatively. There are three sites in the core zone and one each in three of the quadrant. The outlier sites have fish and eels, land animals and anthropomorphs and material objects.
Figure 8.13: Cattai Drainage Basin; Bivariate plot of CA results.

(Darug) Berowra: (Figure 8.14)

Outliers
Core: 32.1%  15.8%  47.4%
28 sites
15.8%  21%

This group of sites are on the left bank of Berowra Creek; this being one of Capell's language boundaries. These sites are quite heterogenous (cf. the engraved component overall), with the focus being on terrestrial animals. There are many sites with single macropods. Anthropomorphs and material objects (particularly shields) are a common combination. Culture heroes and profile anthropomorphs are also present. Vertical engravings occur in this group.

(Guringai) Berowra: (Figure 8.14)

Outliers
Core: 46.3%  21.7%  13%
42 sites
17.4%  47.8%

This group is more homogeneous than its counterpart on the western side of this drainage basins. The focus of its outlier sites is also different to those on the other bank of Berowra Creek, this being on anthropomorphs, mundoes, shields, culture heroes and other birds. There is an increasing number of marine depictions (including whales). Vertical engravings occur in this group.
Figure 8.14: Berowra Drainage Basin (*Darug* and *Guringai* Language Areas); Bivariate plot of CA results.

Cowan: \(\text{(Figure 8.15)}\)

<table>
<thead>
<tr>
<th>Outliers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: 42%</td>
<td>21%</td>
</tr>
<tr>
<td>113 sites</td>
<td>22.4%</td>
</tr>
<tr>
<td></td>
<td>13.4%</td>
</tr>
<tr>
<td></td>
<td>40.3%</td>
</tr>
</tbody>
</table>

This group is quite homogeneous and again is focussed on a variety of anthropomorphs, birds and other material objects (particularly axes). There is a more even spread between the top two quadrants, with fish and whales being as common as kangaroos, shields and boomerang combinations.
Figure 8.15: Cowan Drainage Basin; Bivariate plot of CA results.

Pittwater: (Figure 8.16)

<table>
<thead>
<tr>
<th>Core: 55.5%</th>
<th>27 sites</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>66.7%</td>
<td>8.3%</td>
<td>25%</td>
</tr>
</tbody>
</table>

This group is the most homogenous (55.5%) of all the groups analysed in this more selective fashion. The focus of this group is heavily on marine animals, and there are many sites with fish only. There are also many whales in this group. Sites in the bottom left quadrant are characterised by combinations of marine animals (particularly fish, eels and whales) with engendered anthropomorphs and tracks.

3) The Tharawal language area (Basins 18 - 21).

This last group involves 50 sites south of the identified style boundary of the Georges River. All sites fall within Capell's designated Tharawal language group area. There are very few sites from the western part of this area. The 11 Woronora sites represent a slightly more 'inland' focus, although this creekline is only 10km from the coast and its lower reaches are estuarine.
**Figure 8.16:** Pittwater Drainage Basin. Bivariate plot of CA scores.

**THARAWAL**

Core: 20%  
50 sites

<table>
<thead>
<tr>
<th>Outliers</th>
</tr>
</thead>
</table>
| 44% | 30%  
| 10% | 16%  

This group of sites is the least homogenous (20%) of those analysed according to language area.

**Mill Creek/Georges River:** (Figure 8.17)

Core: 75%  
4 sites

<table>
<thead>
<tr>
<th>Outliers</th>
</tr>
</thead>
</table>
| 0% | 0%  
| 0% | 100%  

There are too few sites in this (combined) drainage basin group for these results to be meaningfully discussed. These results have, however, been amalgamated into the larger language group for discussion.

**Woronora:** (Figure 8.17)

Core: 9%  
11 sites

<table>
<thead>
<tr>
<th>Outliers</th>
</tr>
</thead>
</table>
| 0% | 70%  
| 0% | 30%  

*Chapter 8*
Figure 8.17: Tharawal Language Area (Woronora and Port Hacking Drainage Basins); Bivariate Plot of CA Scores.

Sample size may well be affecting the result with this group also. The group is highly heterogenous. There is a strong focus amongst the outlier sites on kangaroos and other terrestrial animals and material objects. The lesser focus is on anthropomorphs and tracks (human, roo and bird). There are no marine depictions.
Port Hacking:  (Figure 8.17)

<table>
<thead>
<tr>
<th>Core: 17.1%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 sites</td>
<td>58.6%</td>
</tr>
<tr>
<td></td>
<td>10.3%</td>
</tr>
<tr>
<td></td>
<td>17.2%</td>
</tr>
<tr>
<td></td>
<td>13.8%</td>
</tr>
</tbody>
</table>

This group is also highly heterogeneous (17%), but with a different outlier focus from the preceding group. A variety of foci is present in this group, although the main group is that with marine depictions (including whales and other marine). Combination marine and material object sites are also common. Most assemblages in this group are fairly small and the motif ranges present in each very low: the largest site has 15 identifiable motifs; the greatest variety of motifs at a site is six.

Conclusions

The Darkungung and Guringai language areas have the most homogenous engraving assemblages (45%), followed by the Darug (35%). The engravings in the Tharawal area are the least homogenous (20%).

Internal variations in the Darkungung language area indicated that the two groups of Macdonald River sites are relatively similar in their degrees of homogeneity and outlier focus (tracks). These sites are, however, different from the Mangrove Creek sites, which are less homogenous and show a different motif focus - on terrestrial animals. The overall language area is relatively homogenous with a motif focus on tracks and terrestrial animals.

The Darug sites are considerably more heterogeneous than either the Darkungung or the Guringai sites (35%:45%). Capell's proposed boundary between these groups is supported by this analysis: the sites on either side of the Berowra creekline demonstrate markedly different levels of variability, and dissimilar outlier foci, i.e. motif preferences. The sites on the Guringai (eastern) side of the Berowra drainage basin compared with those on the Darug (western) side of this same basin support these general differences.

The Guringai area is relatively homogenous, but again there is evidence for localised variability within this area. The Cowan sites are less homogenous than those from the Pittwater sample. The analyses of the drainage basins in this central part of the region demonstrates a gradual clinal increase in variability as one moves west away from the coast (NB. excluding the small Cattai sample).
Comparison between these first two sets of analyses suggests that the Mangrove Creek sites are most like the Darug sites. These two groups are less homogenous than both the Darkungung and Guringai sites, however all three sets have different motif foci.

Analysis of the Tharawal sites reveals an assemblage which is markedly dissimilar to all preceding groups. The sites are considerably more heterogenous (only 20% are within the core area) and the outlier foci are differently distributed. A comparison of the two drainage basins with reasonable samples within this language area suggests geographic influences create differences between its coastal and the slightly more inland sub-groups. Despite differences in outlier focus, these two groups consistently demonstrate the most variance of all groups analysed by this procedure.

The results demonstrate a complex network of stylistic variability as defined by engraved motif preference across the region. Some of the language boundaries proposed for the contact era are supported by these analysis, e.g. the east-west Guringai-Darug boundary; and the northern Tharawal boundary. Sites within the proposed Darkungung area, however, show considerable variability, with the sites from Mangrove Creek being more like the sites from the Darug Language Area.

The significance of this patterning will be discussed further following the investigation of compositional features and the distribution of rare motifs made below. They will also be discussed (Chapter 10), in the light of synchronic analyses of the shelter art assemblage.

8.5 Ridge top vs vertical engraving sites

The fieldwork done for this research identified the presence of vertical engraving sites around the foreshores of Broken Bay and its main estuarine tributaries (Figure 8.18). A model based on the ethnohistoric literature sees this zone as a highly public one, and the sort of location where stylistic bounding behaviour is likely to be demonstrated (Wiessner 1990).

On the ridgelines and plateau areas above these waterways there are vast numbers of open engraving sites. The art sites on the foreshore at the bottom of cliffs and steep hillslopes provide a different social context from the open engraving sites on the less (economically) productive plateaus above. The sites are close to the estuarine resources and indeed most would have been accessed either by canoe or on foot around the foreshore (and see Plates 29-32).

Conversely, many of the ridgelines around the region are documented access routes (e.g. the Boree Track, Kulnura Ridge). It is likely that sites in these locations will provide

Synchronic variation: Engravings  Topographic variability ...
a different kind of information, e.g. one which promotes social cohesion. It is also assumed that any sites which may have had ritual significance would be most likely to have been located away from the main economic centres of any dialectic group's territory.

An analysis of the Guringai language area (Cowan and Berowra drainage basins) was undertaken, comparing the ridgetop, hillside and valley bottom engraving sites. This area was selected because of the large proportion of engraving sites in this language area generally, and because a number of vertical engraving sites have been found in this area. A comparison of motifs was undertaken (Figure 8.19), as was a re-sorting of the Correspondence Analysis results to determine the varying degrees of homogeneity of these locations. Hillside sites were included in this analysis since these sites represent a considerable proportion of the engraving sites generally, and it was of interest to determine how sites in these locations rated relative to the other two locations.

There are 78 sites in ridgetop locations in this area. The average site size is 12 motifs/site. The average distance to permanent drinking water from these sites is 570m. The predominant motif in these locations is the mundoe (c.35%), followed by fish (15%) and men (8%).

In the 63 hillslope sites the predominant motif is the fish (15%) followed by mundoes (12.5%), other land animals (9%), men and boomerangs (c.8%), macropods and shields (c.7%). The average distance to permanent drinking water from these sites is 460m.

There are many fewer vertical engraving sites (14) in this language area and these are generally smaller than sites in the other two locations (av. 7.5 motifs/site). The average distance to drinking water from these sites is greater than from either of the other locations, for, while these are located next to the water's edge, Berowra and Cowan Creeks are saline and tidal. The motif focus in these sites is also different to those in the other two locations with fish predominating (35%), followed by macropods (15%). There is a variety of missing motif classes in this suite of sites including culture heroes, circles and contact motifs. Mundoes only represent a very small proportion of these sites (c.2%).

Sample sizes are unequal, particularly comparing the ridgetop and hillslope sites with those from the valley bottom locations. The differences in motif preferences on ridgetop and hill side locations are quite striking and cannot be explained in terms of sampling however (Figure 8.18). While sampling may be playing a part in different motif preferences, and particularly motif class absences, in the vertical engravings, the differences in predominant motifs are clear.
Figure 8.18: Two examples of vertical engraving sites from Berowra and Cowan Creeks. Not the complexity of composition and shared line designs.
Figure 8.19: Motif histograms for engraving sites on ridgetops, hillslopes and vertical engravings in valley bottom locations.
Plate 29  Site on Smith's Creek, Ku-ring-gai Chase. View of shelter showing its proximity to the water's edge and height of stencils (arrowed; see below). These must have been done standing in a canoe at high tide.

Plate 30  Smiths Creek. Detail of three red stencils positioned high on back wall in concave surfaces in a beautiful piece of sandstone.
Plate 31  Site on Cowan Creek near Hallett's Beach. General view of overhang from water. The floor of shelter is below the high tide mark.

Plate 32  Detail of engraved outline fish motif located on the floor of this shelter near Hallet's Beach (see above). Individual peck marks are clearly visible.
Figure 8.20: CA bivariate plots according to topographic location. *Guringai* language area; Berowra and Cowan drainage basins.

Ridge tops (76 sites)

Hillslopes (62 sites)

Vertical sites, valley bottoms (14 sites)

*Synchrone variation: Engravings Topographic variability ...*
The Correspondence Analysis results similarly indicate differences between the engraving sites in these three locations (Figure 8.20).

**Ridgetops:**  (Figure 8.20)

<table>
<thead>
<tr>
<th></th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core:45%</td>
<td>26.2%</td>
</tr>
<tr>
<td>76 sites</td>
<td>21.4%</td>
</tr>
<tr>
<td></td>
<td>9.5%</td>
</tr>
<tr>
<td></td>
<td>42.9%</td>
</tr>
</tbody>
</table>

This group is quite homogeneous (45%), with its outlier focus in quadrant C. There is a slight subsidiary focus in quadrant A.

**Hillslopes:**  (Figure 8.20)

<table>
<thead>
<tr>
<th></th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core:48%</td>
<td>18.8%</td>
</tr>
<tr>
<td>62 sites</td>
<td>18.8%</td>
</tr>
<tr>
<td></td>
<td>18.8%</td>
</tr>
<tr>
<td></td>
<td>43.8%</td>
</tr>
</tbody>
</table>

This group has a similar level of homogeneity to the ridgetop sites (48%), and the same outlier focus. There is an equal emphasis in the three other quadrants, further evidence for a slightly broader range of subject choices in these sites.

**Vertical sites, valley bottoms:**  (Figure 8.20)

<table>
<thead>
<tr>
<th></th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core:36%</td>
<td>33.3%</td>
</tr>
<tr>
<td>14 sites</td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>55.6%</td>
</tr>
</tbody>
</table>

This group is the most heterogeneous (36%), but has the same outlier focus as the other two groups. There are no outlier sites in quadrant D, and there is a subsidiary focus in quadrant A.

The sites on the ridgetops and hillslopes are more homogenous than those around the water's edge. While there are demonstrated differences in degrees of homogeneity, however, the outlier foci in these locations are all very similar. This result is as would be expected within the one language area (Section 8.3.2) and supports a model of these sites being used by the same group of people in a range of different information contexts. These results will be discussed further in Chapter 10.

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Chapter 8
8.6 Rare Motifs

The distribution of rare and/or unique motifs was analysed in an effort to establish their geographic extent. It was thought that this type of investigation may elucidate localised stylistic traits. Analysis concentrated on non-economic motifs in an effort to demonstrate cultural (and not environmental) influences.

An inspection of the number of times that any individual motif occurred at an engraving site in the region demonstrated some interesting and unexpected results (Table 8.5; Figure 8.21). The motif which occurs at most sites in the region is the emu (41%) followed by fish and macropods, men and other land animals. Mundoes were only present on c.15% of the sites. This result suggests that certain sites contain certain motif foci (i.e. lots of motifs are concentrated on a few sites, while other motifs are much more dispersed (relatively fewer motifs are placed on many more sites).

Table 8.5: Engraving sites. Motif total, maximum incidence at any particular site, number of sites in the region with motif present, and percentage of sites with motif.

<table>
<thead>
<tr>
<th>Motif</th>
<th>Total</th>
<th>Max incidence</th>
<th>Sites with Motif present</th>
<th>% of Sites with Motif</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>422</td>
<td>14</td>
<td>199</td>
<td>27.8</td>
</tr>
<tr>
<td>Woman</td>
<td>79</td>
<td>5</td>
<td>56</td>
<td>7.8</td>
</tr>
<tr>
<td>Anthropomorph</td>
<td>182</td>
<td>15</td>
<td>115</td>
<td>16.1</td>
</tr>
<tr>
<td>Profile Person</td>
<td>79</td>
<td>5</td>
<td>53</td>
<td>7.4</td>
</tr>
<tr>
<td>Culture Hero</td>
<td>36</td>
<td>2</td>
<td>29</td>
<td>4.1</td>
</tr>
<tr>
<td>Macropod</td>
<td>543</td>
<td>13</td>
<td>247</td>
<td>34.5</td>
</tr>
<tr>
<td>Snake</td>
<td>56</td>
<td>3</td>
<td>45</td>
<td>6.3</td>
</tr>
<tr>
<td>Other Land Animal</td>
<td>312</td>
<td>10</td>
<td>170</td>
<td>23.7</td>
</tr>
<tr>
<td>Emu</td>
<td>76</td>
<td>7</td>
<td>51</td>
<td>4.1</td>
</tr>
<tr>
<td>Other Bird</td>
<td>166</td>
<td>11</td>
<td>101</td>
<td>14.1</td>
</tr>
<tr>
<td>Fish</td>
<td>905</td>
<td>47</td>
<td>250</td>
<td>34.9</td>
</tr>
<tr>
<td>Eel</td>
<td>182</td>
<td>7</td>
<td>97</td>
<td>13.5</td>
</tr>
<tr>
<td>Whale</td>
<td>101</td>
<td>7</td>
<td>71</td>
<td>9.9</td>
</tr>
<tr>
<td>Other Marine</td>
<td>156</td>
<td>9</td>
<td>97</td>
<td>13.5</td>
</tr>
<tr>
<td>Shield</td>
<td>232</td>
<td>23</td>
<td>103</td>
<td>14.4</td>
</tr>
<tr>
<td>Boomerang</td>
<td>303</td>
<td>15</td>
<td>144</td>
<td>20.1</td>
</tr>
<tr>
<td>Axe</td>
<td>45</td>
<td>5</td>
<td>28</td>
<td>3.9</td>
</tr>
<tr>
<td>Other material object</td>
<td>218</td>
<td>13</td>
<td>106</td>
<td>14.8</td>
</tr>
<tr>
<td>Mundoe</td>
<td>1,360</td>
<td>99</td>
<td>157</td>
<td>21.9</td>
</tr>
<tr>
<td>Roo track</td>
<td>186</td>
<td>18</td>
<td>43</td>
<td>6.0</td>
</tr>
<tr>
<td>Bird track</td>
<td>541</td>
<td>95</td>
<td>71</td>
<td>9.9</td>
</tr>
<tr>
<td>Circle</td>
<td>309</td>
<td>17</td>
<td>96</td>
<td>13.4</td>
</tr>
<tr>
<td>CXNF</td>
<td>70</td>
<td>3</td>
<td>53</td>
<td>7.4</td>
</tr>
<tr>
<td>contact</td>
<td>36</td>
<td>11</td>
<td>11</td>
<td>1.5</td>
</tr>
<tr>
<td>hand</td>
<td>19</td>
<td>3</td>
<td>11</td>
<td>1.5</td>
</tr>
</tbody>
</table>
This analysis focussed on the concentrated rarer motifs, i.e. those which are relatively rare and which occur on few sites, and on one motif, shields, which was relatively rare but highly dispersed.

**Figure 8.21:** Engraving component. Percentage of sites at which particular motifs appear.

The distribution of these motifs was plotted (Figures 8.22-8.25). The percentages of sites with each motif type were calculated per language area (Table 8.6). These figures were compared with the overall percentage figures for each language area so that relative significance could be determined. In order to test the statistical significance of these differences, an approximate randomisation method (Noreen 1989, Wright 1991) was also used on the figures presented in Table 8.6.

This analysis revealed some interesting findings, and confirmed some of the differences revealed by the previous analyses. There is a significantly higher proportion of profile figures and roo tracks and a significantly lower proportion of shields and axes in the *Darlingun* area.

Shields, axes occur in significantly higher proportions in the *Guringai* area, while there are significantly fewer profile people and complex-non-figurative motifs in this area.

In the *Darug* area, there is a significantly higher than expected number of profile people and complex-non-figurative motifs. Contact motifs and hands also figure quite highly. In the *Tharawal* area, there are significantly lower proportions of women, snakes, shields and axes.
Table 8.6: Rare Engraving Motifs. Distribution per Language Area (outstanding figures in bold).

<table>
<thead>
<tr>
<th>Motif</th>
<th>Number (and %) of Sites with motif in each Language Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Woman</td>
<td>12</td>
</tr>
<tr>
<td>Profile person</td>
<td>26</td>
</tr>
<tr>
<td>Culture hero</td>
<td>5</td>
</tr>
<tr>
<td>Snake</td>
<td>11</td>
</tr>
<tr>
<td>Shield</td>
<td>11</td>
</tr>
<tr>
<td>Axe</td>
<td>3</td>
</tr>
<tr>
<td>Roo tracks</td>
<td>30</td>
</tr>
<tr>
<td>CXNF</td>
<td>17</td>
</tr>
<tr>
<td>Contact</td>
<td>3</td>
</tr>
<tr>
<td>Hand</td>
<td>2</td>
</tr>
</tbody>
</table>

Total sample  2127 (19.5) 4699 (61.9) 245 (6.5) 360 (4.6) 245 (7.4)

If we take a probability level of 0.05 as statistically significant, we have the following significant differences between language areas (Table 8.7). The differences and similarities between the *Guringai* and *Darkung* groups are statistically significant. The differences (and similarities) between the *Guringai* sites and the *Darug* and *Tharawal* sites are also significant.

Table 8.7: Engraving sites. Significant values for rare motifs in the five language areas.

<table>
<thead>
<tr>
<th>Language Areas compared</th>
<th>Significance value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

These results confirm the localised character of the engraving assemblage in different areas of the Basin. The distributions of these sites (Figures 8.21-8.24) also suggest some interesting subject foci. The sites with culture heroes are focussed in the western part of the *Guringai* territory, and reveal a possible design link with the *Darkung* (this is not suggested by the CA results which shows the overall foci to be quite different from these two areas). The distribution of profile anthropomorphs and axes (and contact motifs) is very similar to that of the culture heroes. The apparent focus of these motifs has implications in terms of aggregational contact (def. Conkey 1981) between these language groups.
Figure 8.22: Engraving sites. Distribution of sites with women and profile anthropomorph motifs.
Figure 8.23: Engraving sites. Distribution of sites with culture hero and shield motifs.

**Culture Heroes** (29 sites)

- Broken Bay
- Port Jackson
- Botany Bay
- Port Hacking
- Lake Illawarra

**Shields** (107 sites)

- Broken Bay
- Port Jackson
- Botany Bay
- Port Hacking
- Lake Illawarra
Figure 8.24: Engraving sites. Distribution of sites with axe and macropod track motifs.
Figure 8.25: Engraving sites. Distribution of sites with axe and macropod track motifs.

CXNF (53 sites)

Contact Motifs (11 sites)

Lake Illawarra

0 10 20km

N

Broken Bay

Port Jackson

Botany Bay

Port Hacking

Colo River

Georges River

Woronora River

Marran Creek

Botany Creek

Cronin Creek

Colo River

Botany Creek

Cronin Creek

Lake Illawarra

0 10 20km

N
8.7 'Compositional Details'

This analysis explores possible differences in composition which may provide further evidence of cultural and/or stylistic choices across the region (Sackett 1990). This analysis is done selectively, choosing motifs for which no environmental influence could be adduced. Shields and culture heroes were the two motif types selected for this analysis.

Shields

Previous archaeological analyses of shield designs have demonstrated stylistic patterning explicable in terms of trade and overall alliance systems (Dickens 1992, Hatte 1992; and see Morwood 1987). Local ethnohistoric evidence suggested that the analysis of this motif type may provide ethnically-sensitive patterning. Various early commentators indicated that the coastal peoples from around Sydney and further north carried distinctively patterned shields (Bellinghausen and Rossiyisky in Barratt 1981; Enright 1900, Threlkeld in Gunson 1974). It was hoped that an analysis of shield designs may indicate the distribution of particular designs and that this distribution may in turn suggest the interrelatedness of contacts around the region.

Threlkeld described most comprehensively the construction of the region's wooden shields, albeit from around the Lake Macquarie area (Awabakal/Guringai language areas). These were

'three feet long by eighteen inches ... lozenge shaped, pointed at top and bottom, and pigeon breasted rather than flat. ... The shields are always painted with white pipeclay and are generally ornamented with a St George's Cross, formed by two bands two or three inches wide, one vertical the other horizontal, coloured red ...' [Gunson 1974:68].

Rossiyisky describes the wooden shields from the Sydney area very similarly, although noting that "they are daubed with various red and white figures" [(In) Barratt 1981:23, emphasis mine]. Bellinghausen's description confirms the colour usage as "dry white colouring substance over which was painted red stripes" (In Barratt 1981:41; and see Enright 1900; Cave in Brayshaw 1974).

My analysis of the rock engraving component shows that while shields are fairly rare motifs (232 - 3% overall ) generally, they are fairly dispersed (at 103 sites; 14%). There are few sites which have concentrations of this motif type: site 45-3-376 has 23 shields, 45-6-705 has 15 (Figure 8.25). Most sites, however, have one or two shields (av. = 2 shields/site). These motifs are usually found on larger sites (average assemblage size = 22 motifs/site). The shield from one site (NPWS 45-6-689) was
Figure 8.26: Site 575 (NPWS # 45-6-705) with 15 shield motifs and three boomerangs.
Figure 8.27: Range of shield designs present in the engraved component.
Figure 8.28: Distribution map of main shield designs.

KEY: Sites with:-
+ 'St George' (2B) design only (8 sites)
× 'Double cross' (2C) design only (30 sites)
0 Plain shields only (14 sites)
▲ Diamond combinations only (11 sites)
X Sites with >15 shield motifs (2 sites)
excluded from this analysis on the basis that the motif was incomplete and the internal
design was not discernible. The site sample for this analysis was 102 sites.

This analysis indicates that the focus of shields is in the *Guringai* language area
(85.4%). *Darringung* has the next highest number of shields (10.7%) followed by
*Darug* (2.9%) and *Tharawal* (1.0%). There are no engraved shields in the *Eora*
language area.

As little design detail was provided by ethnohistoric accounts, the engraved
assemblage of shields was inspected to determine the extent of design variety, which
analysis revealed to be considerably greater than described by Threlkeld. Twenty-six
design categories (including undecorated) were identified (Figure 8.26). The designs
consist of variations on the horizontal and vertical line theme. The only major design
element separating them is the presence or absence of diamond shaped elements at
either or both of the shield's pointed end(s). There are several unique examples
(designs 6 A-C) which are variations on designs 2B and 2C. The first two of these
appear to be shields which have been punctured by many spears (see Megaw 1993).

The two sites with many shield motifs (#'s 45-3-376, 45-6-705) are separated by
considerable distance. One is north of the Hawkesbury River (Mangrove Creek
drainage basin), the other is at Mosman (Middle Harbour drainage basin: Figure 8.31).
The former consists entirely of design varieties 1, 2B and 2C. The latter has a total of
seven design types (4A, 4D, 4E, 4F, 5B, 5E, and 2C) most of which have the diamond
point decorations at one or both ends.

This investigation commenced by analysing sites with only a single design type
present. It was thought this procedure would facilitate clear focus on localised patterning
in the design elements, unconfused by synchronic 'noise'. Ethnohistorical records
suggest that the 'St George cross' form (2B) would be the most common, although this
was not the case. Sites which contained more than one type of design were excluded
from this initial sort of the shields. Four major design themes were identified and these
accounted for 62% of the sites with shields (Table 8.8).

Plain shields, as might be expected, are ubiquitous. They are present on both sides of
the Hawkesbury River in the *Guringai* language area, as well as in *Darringung, Darug*
and *Tharawal* sites. This analysis revealed, however, that the focus for the St George
cross design was quite restricted. With the exception of one *Darringung* site located
west of Mangrove Creek (on Flat Rocks Ridge), this design was confined to the
Cowan, Pittwater and (particularly) Middle Harbour drainage basins: all in the *Guringai*
language area.

---

*Chapter 8*
Table 8.8: Engraving sites. Shields Distribution of types according to language areas and drainage basins. Single types only, no mixed varieties.

<table>
<thead>
<tr>
<th>Area</th>
<th>Plain</th>
<th>%</th>
<th>2B</th>
<th>%</th>
<th>2C</th>
<th>%</th>
<th>4+5 variat.</th>
<th>%</th>
<th>%f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darkung CMcD</td>
<td>1</td>
<td>6.7</td>
<td>1</td>
<td>11.1</td>
<td>2</td>
<td>7.1</td>
<td></td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>Dark'g Mooney</td>
<td>3</td>
<td>20.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Darug Berowra</td>
<td>1</td>
<td>6.7</td>
<td>1</td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Darug Lane Cove</td>
<td>1</td>
<td>6.7</td>
<td></td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Guringai Mooney</td>
<td>1</td>
<td>6.7</td>
<td>4</td>
<td>14.3</td>
<td></td>
<td></td>
<td></td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>Guringai Bris Wat</td>
<td>2</td>
<td>13.3</td>
<td>5</td>
<td>17.9</td>
<td></td>
<td></td>
<td></td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>Guringai Cowan</td>
<td>3</td>
<td>20.0</td>
<td>3</td>
<td>33.3</td>
<td>7</td>
<td>25.0</td>
<td></td>
<td>63.6</td>
<td>31.8</td>
</tr>
<tr>
<td>Guringai Pittwater</td>
<td>1</td>
<td>11.1</td>
<td>2</td>
<td>7.1</td>
<td></td>
<td></td>
<td></td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Guringai Middle H</td>
<td>3</td>
<td>20.0</td>
<td>4</td>
<td>44.4</td>
<td>5</td>
<td>17.9</td>
<td></td>
<td>36.4</td>
<td>25.4</td>
</tr>
<tr>
<td>Guringai Lane C</td>
<td></td>
<td></td>
<td>1</td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Tharawal Port Hac</td>
<td>1</td>
<td>6.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>15</td>
<td></td>
<td>9</td>
<td>14.3</td>
<td>28</td>
<td>44.4</td>
<td></td>
<td>11</td>
<td>17.4</td>
</tr>
</tbody>
</table>

The double (horizontal) cross design (2C) is the most commonly engraved in the region. It occurs at 28 sites (in isolation) as well as at another 13 sites in combination with a variety of design forms. It occurs in Guringai, Darkung and Darug areas.

The design element with diamonds at either end of the shield has a very restricted distribution. The 11 sites with this form of design element (in isolation) occur only in the Guringai area, in the Cowan and Middle Harbour drainage basins.

The two forms which thus appeared to have the most potential for indicating inter- and intra-language design contact were the St George (2B) variety and the diamond-end varieties (numbers 4 and 5), which are both restricted predominantly to the Guringai area. The distribution of these design elements in sites with combination shield designs was next analysed, but was found to have an equally restricted distribution (Table 8.9). More than 90% of these sites were in the Guringai area, with the Cowan and Middle Harbour drainage basins containing 68% of these sites.

The conclusion which can be reached about shield designs in the region is that they exhibit highly localised characteristics. The Guringai language area has the largest number of shields in the region and contains the greatest degree of design variability. It has also been demonstrated that there are localised design traits within this area. Cowan and Middle Harbour drainage basins contain high frequencies of shields; the design focus for both the diamond infill and double-cross (type 2C) appears to be shared by these drainage basins.

Synchronous variation - Engravings  'Compositional details'...
Table 8.9: Engraving sites. Shields Distribution of mixed design types according to language areas and drainage basins. Type 2C, 4 & 5 varieties.

<table>
<thead>
<tr>
<th>Area</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darkung CMcD</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>Darug Berowra</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>Guringai Mooney</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>Guringai Bris Wat</td>
<td>3</td>
<td>13.3</td>
</tr>
<tr>
<td>Guringai Cowan</td>
<td>7</td>
<td>31.8</td>
</tr>
<tr>
<td>Guringai Pittwater</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>Guringai Middle H</td>
<td>8</td>
<td>36.4</td>
</tr>
<tr>
<td>Totals</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

The ethnohistoric literature on this point has been shown to be highly inadequate, with regard to both the design variability present and the distribution of the design which was considered to be the most widespread.

Either there was a severe constriction in the designs being used on shields at contact with type 2B (the St George Cross) predominating as reported, or, the subtleties of design variability were overlooked by the ethnohistoric reporters (and see comments re shield illustrations in Chapter 3). If the first explanation is correct, it is possible that the ethnohistoric 'present' has little applicability in the prehistoric past, particularly in terms of ethnically significant designs. If the latter is correct, and it would appear from the conflict between early 'words' and early 'illustrations' that this is the more likely scenario, this is another example of the inadequacies of European observation regarding the richness of Aboriginal culture in the region.

Culture Heroes

A total of 36 culture heroes is present at 29 sites across the region (Table 8.10). This motif is differentiated from ordinary anthropomorphs on the basis of its extreme size (the mean length of this motif is 5.2m; st dev. = 1.4m) and by the degree of infilled decoration. Some types of this motif involve animal features ('Therianthropes'; Flood 1987), particularly bird's and/or snake's heads. There are two main forms of culture hero: those either partially or fully in profile ('Daramulari' type) and those which are front-on with limbs akimbo ('Biaini 'type). These have been named following McCarthy's (1959a; and see Clegg 1981) nomenclature, although his interpretation (sensu strictu) is not adopted.
<table>
<thead>
<tr>
<th>Site Number</th>
<th>Max length (m)</th>
<th>Blaimi/ Daramulan</th>
<th>Animal features</th>
<th>Infill</th>
<th>Other features</th>
</tr>
</thead>
<tbody>
<tr>
<td>37-6-8</td>
<td>2.7</td>
<td>B</td>
<td></td>
<td>dot</td>
<td>breasts, penis and foot added, fingers 1 hand, 2 eyes, headdress, 47 dots</td>
</tr>
<tr>
<td>45-2-16</td>
<td>6.8</td>
<td>D</td>
<td>bird head</td>
<td>heavy dot/linear</td>
<td>penis + leg added, ornate headdress, bird head</td>
</tr>
<tr>
<td></td>
<td>5.0</td>
<td>B</td>
<td></td>
<td>heavy dot/linear</td>
<td>pointy ears headdress, male dotted linear infill</td>
</tr>
<tr>
<td>45-2-45</td>
<td>3.3</td>
<td>B</td>
<td></td>
<td>heavy</td>
<td>two deep eyes, body linear infill waist band no hands or feet, conical head</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>B</td>
<td></td>
<td>some lines</td>
<td>two deep eyes + 3 smaller ones, 4 dots in penis; toes on feet, stumpy arms</td>
</tr>
<tr>
<td>45-3-39</td>
<td>4.5</td>
<td>D</td>
<td>birdlike</td>
<td>linear</td>
<td>bird like with long rayed headdress. No foot visible. Waistband + linear infill</td>
</tr>
<tr>
<td>45-3-56</td>
<td>5.0</td>
<td>D</td>
<td>birdlike</td>
<td>linear</td>
<td>bird-like with long pointed headdress, 2 eyes + mouth. No foot visible.</td>
</tr>
<tr>
<td>45-3-99</td>
<td>8.3</td>
<td>B</td>
<td></td>
<td>lines dots</td>
<td>twisted perspective.; penis to side</td>
</tr>
<tr>
<td>45-3-110</td>
<td>3.2</td>
<td>D</td>
<td>birdlike</td>
<td>linear dots</td>
<td>leg with human foot, head twisted perspective w headdress. 2 eyes</td>
</tr>
<tr>
<td>45-3-168</td>
<td>5.7</td>
<td>D</td>
<td>bird head</td>
<td>lines on neck</td>
<td>emu like; 2 legs w feet and penis to side</td>
</tr>
<tr>
<td>45-3-228</td>
<td>6.0</td>
<td>B</td>
<td>long ears</td>
<td>lines</td>
<td>buttocks shown + 2 legs, enormous ears, breasts? under arms, + 5 eyes</td>
</tr>
<tr>
<td>45-3-232</td>
<td>5.6</td>
<td>B</td>
<td>bird head</td>
<td>lines</td>
<td>no arms, twisted perspective head, headdress</td>
</tr>
<tr>
<td>45-3-954</td>
<td>3.5</td>
<td>B</td>
<td></td>
<td>heavy linear</td>
<td>feet, fingers 1 hand, no penis or headdress, 2 eyes eyes, headdress</td>
</tr>
<tr>
<td>45-3-1289</td>
<td>6.5</td>
<td>B</td>
<td></td>
<td>lines</td>
<td>2 penes, eyes, headdress</td>
</tr>
<tr>
<td>45-6-42</td>
<td>4.7</td>
<td>D</td>
<td></td>
<td>lines</td>
<td>large head, no neck; 1 leg added; toes 1 foot only; single line headdress, 3 eyes</td>
</tr>
<tr>
<td>45-6-44</td>
<td>4.6</td>
<td>B</td>
<td></td>
<td>lines</td>
<td>snake + other head w headdress. Human foot</td>
</tr>
</tbody>
</table>

Table 8.10: Engraving sites. Culture heroes: compositional details.
<table>
<thead>
<tr>
<th>Site Number</th>
<th>Max Length (m)</th>
<th>Biamu/ Daramulun</th>
<th>Animal features</th>
<th>Infill</th>
<th>Other features</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-6-284</td>
<td>3.4</td>
<td>B</td>
<td>-</td>
<td>linear</td>
<td>7 dots on face no ears; fingers + toes; fringed body infill, big penis; holding boomerang assoc. w long tail mudesos</td>
</tr>
<tr>
<td>45-6-290</td>
<td>5.3</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>2 legs, sinuous neck, arm w axe added, profile leg</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>D</td>
<td>snake/bird</td>
<td>-</td>
<td>1 leg, sinuous neck, arm w axe, 2 legs w feet (1 added) penis added</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>B/D</td>
<td>snake head</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>45-6-312</td>
<td>5.0</td>
<td>B</td>
<td>pointy ears</td>
<td>linear design</td>
<td>fingers toes facial features holding a no of material objects, body design.</td>
</tr>
<tr>
<td>45-6-313</td>
<td>4.5</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>v. long arms and legs foot on one leg only, fingers, toes</td>
</tr>
<tr>
<td>45-6-315</td>
<td>6.0</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>fingers + toes, waist + arm bands, small penis, looped headdress; assoc w shields</td>
</tr>
<tr>
<td>45-6-316</td>
<td>5.3</td>
<td>B</td>
<td>-</td>
<td>many lines</td>
<td>horizontal + vertical infill; fingers on arms and legs, no neck, facial features, penis</td>
</tr>
<tr>
<td></td>
<td>4.7</td>
<td>B</td>
<td>-</td>
<td>many lines</td>
<td>horizontal + vertical infill finger like appendages on arms and legs, no neck, facial features inverted 'smile', penis w infill</td>
</tr>
<tr>
<td>45-6-323</td>
<td>5.0</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>hands + feet w fingers + toes, barbed arrow in side, crossed body lines, penis</td>
</tr>
<tr>
<td>45-6-324</td>
<td>6.3</td>
<td>D</td>
<td>bird like</td>
<td>lines</td>
<td>emu like with human foot, arm appendage added</td>
</tr>
<tr>
<td>45-6-346</td>
<td>4.2</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>rayed headdress, girdle + arm bands, 2 eyes</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>rayed headdress, girdle + arm bands, body design, 1 foot</td>
</tr>
<tr>
<td>45-6-412</td>
<td>6.7</td>
<td>D</td>
<td>-</td>
<td>lines</td>
<td>male w key shaped headdress</td>
</tr>
<tr>
<td></td>
<td>5.5+</td>
<td>D</td>
<td>-</td>
<td>-</td>
<td>female, pointed breast, 5 eyes</td>
</tr>
<tr>
<td>45-6-434</td>
<td>5.7</td>
<td>B</td>
<td>-</td>
<td>lines</td>
<td>waist + armbands, penis, feet w toes, headdress, holding fish</td>
</tr>
<tr>
<td>45-6-436</td>
<td>9.3</td>
<td>D</td>
<td>-</td>
<td>lines</td>
<td>leg added on to penis, arms added onto head; headdress foot w toes, arm + hand w fingers added. Birdlike head w beak. Long meandering penis 6 eyes, dot on heel</td>
</tr>
<tr>
<td>45-6-890</td>
<td>6.2</td>
<td>D</td>
<td>bird head</td>
<td>lines</td>
<td></td>
</tr>
</tbody>
</table>
Table 8.11: Engraved culture heroes. Distribution of *Daramulan* and *Bioimi* types according to language areas and drainage basins.

<table>
<thead>
<tr>
<th>Area</th>
<th><em>Daramulan</em></th>
<th>%</th>
<th><em>Bioimi</em></th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darkungung UMcd</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Darkungung CMcd</td>
<td>4</td>
<td>100</td>
<td>4</td>
<td>100</td>
<td>4</td>
<td>11.1</td>
</tr>
<tr>
<td>Darkungung Mangr.</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Darug Cattai</td>
<td>1</td>
<td>50</td>
<td>1</td>
<td>50</td>
<td>2</td>
<td>5.6</td>
</tr>
<tr>
<td>Darug Berowra</td>
<td>1</td>
<td>50</td>
<td>1</td>
<td>50</td>
<td>2</td>
<td>5.6</td>
</tr>
<tr>
<td>Guringai Mooney</td>
<td>1</td>
<td>50</td>
<td>1</td>
<td>50</td>
<td>2</td>
<td>5.6</td>
</tr>
<tr>
<td>Guringai Bris Wat</td>
<td>3</td>
<td>75</td>
<td>1</td>
<td>25</td>
<td>4</td>
<td>11.1</td>
</tr>
<tr>
<td>Guringai Berowra</td>
<td>3</td>
<td>60</td>
<td>2</td>
<td>40</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>Guringai Cowan</td>
<td>5</td>
<td>31.3</td>
<td>10*</td>
<td>62.5</td>
<td>16</td>
<td>44.4</td>
</tr>
<tr>
<td>Totals</td>
<td>14</td>
<td>(38.9)</td>
<td>21</td>
<td>(58.3)</td>
<td>36</td>
<td>100.1</td>
</tr>
</tbody>
</table>

*1 of these culture hero is half *Daramulan* and half *Bioimi.*

Figure 8.28a: Engraved Culture Heroes. Site 45-6-436 with *Daramulan* motifs which appears to have been altered over time (after Campbell 1899:Plate XXV, Fig 4).
**Figure 8.29:** Engraved Culture Heroes. Distribution of Biarmi and Daramulan type motifs.

**KEY:**
- ▲ Daramulan type (10 sites)
- ● Biarmi type (16 sites)
- B Mixed or transitional types (2 sites)
Figure 8.30: Engraved Culture Heroes. Sites with *Daramulan* and/or *Biaimi* motifs which appear to have been altered over time.

Site 45-6-85 (after McCarthy 1954a: Fig 7C)

Site 45-6-890 (after McCarthy 1947a: Plate Z, Figure 3)

Site 45-3-228 (after McCarthy 1956: Group 3, Fig V)
Figure 8.31: Engraved Culture Heroes. Sites with paired and/or transitional Daramulan and Blaimi motifs. NB Daramulan on 45-2-16 has altered outline also.

Site 45-6-290 (after McCarthy & Hansen 1960: Figure I).

Site 45-2-16 (after McDonald 1986a: Figures 3 and 8).
This motif forms shows an interesting feature which suggests its cultural importance, or at least its continuation of use over time. More than half of these motifs appear to have evidence for more than one episode of engraving. Many have added features or altered outlines. The Daramulan figures appear particularly susceptible to change, with many having a second leg added, and sometimes an arm or extra penis (Figures 8.28, 8.29).

These motifs occur at a range of site sizes. Some extremely large (97 motifs), but there are four sites with only two motifs and one with only a single culture hero present. The average size of sites with this motif present is 25.4 motifs/site. The average distance to drinking water from sites with these motifs is c.500m.

As indicated by the analysis of rare motif distribution, this motif is restricted to the Guringai (75%), Darug (8.3%) and Darkung (16.7%) language areas. The main focus is in the Guringai area where most (44.4%) are located in the Cowan drainage basin (Table 8.11).

Most of these motifs occur singly at sites, but are often paired. Some of these pairings are clearly male/female; others are male/male. Some sites include paired and/or transitional Daramulan and Biaimi types (Figure 8.30).

The Daramulan type is focussed (86%) in the Guringai area, while the distribution of the Biaimi form is more widespread (although still 67% in Guringai). The two Daramulan-type culture heroes located outside the Guringai area occur on major engraving sites (Devil's Rock Maroota, Flat Rocks Ridge) in places which it could be argued are aggregation locales (Conkey 1980) or at least in locations (e.g. on access routes) where groups cohesion is being demonstrated.

The highly focussed distribution of both culture hero forms in the Guringai area, with varying but relatively minor examples in adjoining (northerly and westerly) language areas, suggests a degree of design contact among these three language areas, the contact stemming from the Guringai.

A similar pattern was demonstrated by the shields. It will be interesting to compare the distribution of these same motifs in the shelter art component, to determine whether the pattern holds for both media.

8.8 Conclusions

These analyses have shown that across the Sydney region the engraved component exhibits stylistic variability. This is distinctive in only one area to the south of the Basin, where a previously identified style boundary has been confirmed. In other parts of the
region this variation is clinal. This variation can be explained in terms of the defined
language areas, but even within these areas, there is localised variability on the basis
of drainage basins.

The Darkung and Guringai language areas were found to have the most homogenous
engraving assemblages (45%), followed by the Darug (35%). The engravings in the
Tharawal area are the least homogenous (20%). The Guringai sites consistently
demonstrate the highest levels of homogeneity, but again there is still evidence for
internal variability. The Cowan sites are less homogenous than those from the Pittwater
drainage basin. Excluding the small Cattai sample, the analyses of the drainage basins
in this central part of the region demonstrates a gradual clinal increase in variability as
one moves west away from the coast.

Analysis of the Tharawal sites reveals an assemblage which is markedly dissimilar from
all preceding groups. The sites are considerably more heterogenous (only 20% are
within the core area) and the outlier foci are differently distributed. Comparison of the
two drainage basins with reasonable samples within this language area suggests
geographic influences create differences between its coastal and the slightly more inland
sub-groups. Despite differences in outlier focus, these two groups consistently
demonstrate the highest levels of variability of all groups analysed.

The results demonstrate a complex network of stylistic variability as defined by
engraved motif preference across the region. The sites within some language areas,
show varying degrees of variability and levels of internal cohesion. Sites from the
Darkung Mangrove Creek drainage basin appear to be more like sites from the Darug
Berowra drainage basin. Some of the language boundaries proposed for the contact era
are supported by these analysis, e.g. Capell's proposed boundary between the Darug
and Guringai groups. Comparison of the sites on the Guringai (eastern) side of the
Berowra drainage basin with those on the Darug (western) side, demonstrate markedly
different levels of variability, and dissimilar outlier foci, i.e. motif preferences. The
northern Tharawal boundary is also indicated by these results with the location for this
matching the identified style boundary in the art.

The analysis of rare motifs confirmed the localised character of the engraving
assemblage in different parts of the Basin. The distributions of sites with rare motifs
(Figures 8.21-8.24) also suggested some interesting subject foci. The sites with culture
heroes are focussed in the western part of the Guringai territory, revealed a design link
with the Darkung, also suggested by the CA results and levels of homogeneity.

An analysis of compositional detail on rare engraved motifs revealed design contact
between Guringai area, with the Darkung and Darug language areas, the contact
stemming from the *Guringai*. Design variability on shield motifs was found to be extraordinarily diverse in the Guringai area, with both less motifs and a marked decrease in design options being practised outside this language area. These analyses indicated that more specific levels of analysis could provide additional information to that achieved using a broader perspective and thus of necessity a coarser grained approach.

These results will be discussed further in Chapter 10, in light of the subsequent analyses undertaken on shelter art sites (Chapter 9).
Chapter 9

Regional synchronic variation in the
shelter art assemblage of the Sydney Basin

9.1 Introduction

This chapter looks at regional stylistic variability in the shelter art assemblage. The investigation here is focussed on both motif depiction and technical variation. As with the engraved assemblage, the analysis is aimed at identifying whether broad scale patterns can be interpreted on more than environment grounds (McMah 1965). A comparison of these results with those achieved for the engraving sites is made below (Chapter 10).

The quantitative analysis again focuses on motif combinations, not on qualitative aspects of motif. The overall aim was to analyse the engraving and shelter art assemblages at a comparable level (despite their technical differences and the potential variability that this introduces to motif form). Motif preference was seen as the best approach to this problem (see more detailed discussion, Section 8.1).

Details of approach and methodology for both art components have been described in Section 8.2. Basic information about the motif classification and the data bases used are also provided elsewhere (Chapter 4). The analytical details about the quantification of both data bases are detailed in Section 8.2 (and reiterated where relevant here: Section 9.2). This information is supplemented by the data provided in Appendices 5 and 6, by discussions about the classification system used (Appendix 4) and by the computer bivariate plots supporting the CA (Appendix 7).

The results of the Correspondence Analyses (both motif and technique) are described in Section 9.2. This description first details the general results achieved for the entire region (McDonald 1990ab). The initial analyses have been extended here to explore variability between language areas and drainage basins. These analyses are preceded by a general comparison of motif and technical characteristics in the designated language areas (Section 9.3).

The CA results for both motif and technique are presented in terms of drainage basins. The three different locations across the region, investigated with the engraving assemblages, were again subject to more detailed analysis of the CA results (Section 9.4.1 and 9.4.2; motif and technique respectively).
The distribution of uncommon motifs is also explored with this component (Section 9.5). The presence of this type of motif was thought to have the best potential to indicate the influence of localised stylistic traits. Motifs, such as profile people, culture heroes, items of material culture and complex-non-figurative (CXNF’s) appear to be good indicators of localised cultural choices. The restricted distribution of contact motifs is again investigated.

As with the engraved component, several small scale qualitative analyses of motif depiction and preference were undertaken (Section 9.6). These analyses were aimed at motifs which are unlikely to have been affected by environmental factors. To enable comparison between the artistic media, shields and culture heroes were again the focus of this analysis.

9.2 Correspondence Analysis: regional data, results and interpretation

The main aim of these analyses was to provide a basic statistical description of motif and technical information (i.e. average assemblage size, motif frequencies, colour usage etc.). The multivariate technique used has allowed quantified statements to be made about the regional homogeneity of this art form as well as demonstrating what distinguishes sites (i.e. the sources of variance within the data base) across the Basin.

The same organisational procedures were followed with this site type as were described previously for the engraving assemblage. Motif variables were fundamentally the same as those used for the engraving sites with two additional motifs being required by the more diverse shelter art component. A taxonomy of technical variation was used for the shelter art sites (Table 5.1; Appendix 4). Topographic, grid reference and site association information were also recorded (Appendix 6).

As was described for the engraved component, analysis of the data commenced with unmodified count information. This involved the analysis of 29 motif variables. The motif taxonomies was then reduced to those seven clumped taxa (Table 9.1) and the CA was run using binary data. The CA of the shelter art technical data comprised 546 sites, while the CA of motif (i.e. excluding sites which contained unidentified motifs only) involved 439 sites.

Comparison of the results for technique and motif (i.e. intra-art component as distinct from inter-component comparison) will be interesting, since it has previously been identified that the two are not equal when it comes to identifying stylistic variability (e.g. McDonald 1990ab, Officer 1984). The analysis undertaken for Stage III of the Rock Art Project indicated that stylistic variability in this component was demonstrated by a complex mosaic of characteristics. As with the engraved component (Chapter 7), the SRAP
Stage III results (McDonald 1990ab) are reiterated here, since these demonstrate general geographic patterning for the entire region's database. The more detailed and smaller scaled analyses undertaken for this research follow (Sections 9.2 and 9.3).

Motif

As with the engraved component, the motif taxonomies analysed here was reduced to seven variables (Table 9.1).

Table 9.1: Shelter Art sites: Clumped motif variables used in Correspondence Analysis.

<table>
<thead>
<tr>
<th>Variable No.</th>
<th>Motif/Variable description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anthropomorphic</td>
</tr>
<tr>
<td>2</td>
<td>terrestrial</td>
</tr>
<tr>
<td>3</td>
<td>birds</td>
</tr>
<tr>
<td>4</td>
<td>marine</td>
</tr>
<tr>
<td>5</td>
<td>material objects</td>
</tr>
<tr>
<td>6</td>
<td>tracks</td>
</tr>
<tr>
<td>7</td>
<td>other</td>
</tr>
</tbody>
</table>

Clumped variable 1 includes individual variables 1 - 5; 2 = v 6-8; 3 = v 9,10; 4 = v 11-14; 5 = v 15-18; 6 = v 21-25; 7 = v 26-29 (see Table 5.1). Unidentifiable motifs have been excluded from this level of analysis.

The first two components account for 54.4% of the variance in the sample and these appear to discriminate well. The first component accounts for the greatest amount of variance in the data base (Figure 9.1), and the scree slope plot (Wright 1989) demonstrates that this component describes considerable structure in the data. Less variance is accounted for by the second component, and the slope then tails off.

The plot of the first two co-ordinates for seven clumped variables reveals that the data is discriminated quite well by five of the variables (Figure 9.2.a). Variables 1 and 4 (see Table 9.1) are close to the origin and these play little part in distinguishing between the sites.

In the first co-ordinate, variables 2 and 6 exhibit an inverse relationship with variables 3, 5 and 7. This indicates that sites which contain a combination of birds, material objects and/or other motifs are likely to be very different to sites which contain land animals and/or tracks (i.e. hand stencils) - and that sites which contain high numbers of one set of variables are likely to contain low numbers of the other set. In the second co-ordinate, variables 2 and 6 are inversely related (although the significance of this is less than that demonstrated by the first co-ordinate).
**Figure 9.1:** Pigmot CA results: Scree slope plot of the latent roots indicating that the variance in the data set is well accounted for by the first two components.

The distribution of motif variables on the graph is mirrored by the distribution of sites (see Figure 9.2.b). Sites which are poorly discriminated by their motif assemblage lie close to the origin. Sites which are well discriminated on the basis of their motifs, are distributed across the graph, their position on the graph determined by the variables which are present in their assemblages (e.g. sites which have predominantly tracks (i.e. hand stencils) are located in the negative quadrant: sites which have predominantly birds in their assemblages are located in the positive quadrant). On the basis of this plot, it is possible to state that the shelter art component is a relatively homogeneous body of data, with no major internal groupings.

Given the large size of the data base and the scale of the plot, the usefulness of Figure 9.2.b for any detailed interpretation is low. For this reason the results were replotted using subdivisions of the data (McDonald 1990ab). These sub-plots were based on exactly the same results, but the smaller data size enables a more detailed examination and interpretation.

As with the engraving component, the data were subdivided into eight regional sub-groups which could be roughly interpreted geographically. These groups were based on the NPWS site identification number, which is based on mapsheet location (Table 9.2, Figure A6:1). Groups 1 - 7 are directly comparable to the similarly numbered engraving Groups. Group 8 represents an area in which no engraving sites are recorded.

**Synchronic variation: Shelter Art**

**Regional CA results ...**
Figure 9.2: Correspondence Analysis; Shelter motifs. Bivariate plot of component scores of a) motif and b) sites.

(a)

(b) (each ■ equals many sites with identical values.)
These groups are a gross and arbitrary division of the sample. By this method, however, good control was achieved on general east-west and north-south divisions in the data (cf. McDonald 1985aa). These bivariate plots from the initial analysis of the CA results are presented en masse (Appendix 6, Figures A6:17 - 26).

Table 9.2: Analytical grouping of shelter art sites according to NPWS Identification numbers. Groups used in interpretation of regional CA results.

<table>
<thead>
<tr>
<th>Group</th>
<th>Map numbers</th>
<th>1:250,000/1:100,000</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>37 - 5 -s</td>
<td>Singleton/Howes Valley</td>
<td>30 sites</td>
</tr>
<tr>
<td></td>
<td>45 - 1 -s</td>
<td>Sydney/Wallerawang</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>45 - 2 -s</td>
<td>Sydney/St Albans</td>
<td>66 sites</td>
</tr>
<tr>
<td>Group 3</td>
<td>45 - 3 -s</td>
<td>Sydney/Gosford</td>
<td>144 sites</td>
</tr>
<tr>
<td>Group 4</td>
<td>45 - 5 -s</td>
<td>Sydney/Penrith</td>
<td>17 sites</td>
</tr>
<tr>
<td>Group 5</td>
<td>45 - 6 -s</td>
<td>Sydney/Sydney</td>
<td>107 sites</td>
</tr>
<tr>
<td>Group 6</td>
<td>52 - 2 -s</td>
<td>Wollongong/Wollongong</td>
<td>171 sites</td>
</tr>
<tr>
<td>Group 7</td>
<td>52 - 3 -s</td>
<td>Wollongong/Port Hacking</td>
<td>6 sites</td>
</tr>
<tr>
<td>Group 8</td>
<td>52 - 1 -s</td>
<td>Wollongong/Burrarorang</td>
<td>5 sites</td>
</tr>
</tbody>
</table>

The basic reason for the following analysis, is that while there are no distinctive (separate) groupings within the data base, that there are clines\(^1\) across the geographical range of the Sydney Basin. These should be identifiable in the bivariate plots by the degree of homogeneity demonstrated by the sites in each group, as well as by the presence and distribution of outlier sites relative to the origin.

The same technique was used for identifying common sites and outliers as was used with the engraving assemblage. That is, the number of sites within a defined and

\(^1\) def of cline = continuous, graded variation in members (sites) of a species (art component).
consistent radius of the origin were noted\(^2\), allowing for a calculation of the percentage of "common" and outlier sites in each area. Given the disparate sample sizes, this was a necessary step in the comparison of the data overall.

The distribution of the outlier sites in particular quadrants was also investigated, since variations in this result across the region would enable more specific statements on localised variability. The four quadrants were labelled as follows:

\[
\begin{array}{c|c}
A & B \\
\hline
(+ -) & (+++) \\
D & C \\
(-) & (+)
\end{array}
\]

This analysis indicated that localised variability in assemblage content (i.e. motif depictions) does exist across the region (McDonald 1990ab:87-94; see Appendix 6).

**Technique**

The technique classification was devised initially for the Rock Art Project Stage I (McDonald 1985aa). It has been used extensively for that Project, this research and other art shelter recording exercises (e.g. McDonald 1988a). This has been found to be a satisfactory method of quantifying the data (although further splitting of this was undertaken for a more detailed diachronic experiment: Chapter 6). The technique classification includes a combination of technique (variables 4-8, 16), form (variables 1-3, 9-11) and colour (variables 12-15) information as well as assemblage total and total number of recognisable (i.e. classifiable) motifs present (Table 5:5; Appendix 6).

Given the interdependence of some of the 18 technical variables (i.e. a depictive motif are described by a combination of all variables excluding #8), the technique taxonomy for the shelter art assemblage was reduced to include only unlinked variables (Table 9.4). The choice about which variables to exclude was made on the basis of the perceived values of these, considering relative comparability with the engraved assemblage. The form variables (#’s 1-3) provide information which can be directly compared with the engraving assemblage (i.e. most engravings are in outline form with the bare essentials of internal marking as required for identification). Conversely, the

\(^2\) The same consistent radius as used for the engraving sites was employed here. This has been drawn on each of the bivariate plots as an heuristic device.

*Chapter 9*
technical information inherent in the painted vs drawn variables and similarly in the monochrome vs multi colour usage can be documented easily for the different areas (Section 9.3), while the vast majority of the pigment art in the region is drawn and monochrome.

In the CA, the first two co-ordinates account for 64.4% of the variance in the data set and account well for its structure. This is demonstrated by the 'scree-slope plot' (Figure 9.3; Wright 1992) which indicates that a significant amount of the variance is accounted for by the first component. The bivariate plot of the first two co-ordinates for the nine technique variables revealed a good potential for discriminating between sites in the region (Figure 9.4). Most of the variables, however, with the exception of numbers 8 and 13 (see Table 9.3) are not very good discriminators, being positioned as they are close to the origin.

**Figure 9.3:** Pigtec CA results: Plot of the latent roots indicating that the variance in the data set is well accounted for by the first two components.

![Scree plot](image)

In the first component, variables 8, 12 and 13 (stencils, white pigment and yellow pigment) are inversely related to variables 1, 3 and 12 (black pigment, outline and outline and infill motifs). In the second co-ordinate, variable 16 (engravings) exhibits a strong positive value, while all other variables has a weak negative value. Given the scree slope for the latent roots from this analysis (Figure 9.3) the significance of the second components distribution is diminished, although the resultant site patterning is worthy of note (see below).
Table 9.3: Shelter Art sites: reduced list of technique variables used in Correspondence Analysis. Variable numbers remain the same as for the extended list to avoid confusion.

<table>
<thead>
<tr>
<th>Variable No.</th>
<th>Technique description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>outline</td>
</tr>
<tr>
<td>2</td>
<td>infill/solid</td>
</tr>
<tr>
<td>3</td>
<td>outline and infill</td>
</tr>
<tr>
<td>8</td>
<td>stencil</td>
</tr>
<tr>
<td>12</td>
<td>black pigment</td>
</tr>
<tr>
<td>13</td>
<td>white pigment</td>
</tr>
<tr>
<td>14</td>
<td>red pigment</td>
</tr>
<tr>
<td>15</td>
<td>yellow pigment</td>
</tr>
<tr>
<td>16</td>
<td>engraving (scratched, pecked)</td>
</tr>
</tbody>
</table>

In archaeological terms, these results suggest that sites which have large numbers of stencils and/or white pigment present are unlikely to have also black outline and infilled motifs. This result - with a dichotomy between white stencils and black drawings - appeared to be a very accurate summation of regional characteristics.

An inspection of the bivariate plot for the distribution of sites (Figure 9.4), reveals a fairly solid clustering around the origin with sites being pulled out along the first co-ordinate. There is a group of sites more widely dispersed on the second component, which is suggestive of a separate grouping, although again, this component has less interpretative value in terms of describing the underlying structure in the data set. This analysis indicates that while the majority of sites in the region are relatively homogeneous, that the variables used are identifying structure in the data set and hence sources of variability amongst the assemblages. The regional sample was again too large to allow meaningful interpretation. The results were thus replotted on the basis of the broad geographic sub-divisions described above (see Table 9.3; McDonald 1990ab: Figures 29 - 36).

On the basis of these CA results, it was possible to describe how sites varied according to technique across the region. The relative homogeneity of the defined groups and the focus of each group's outlier sites (i.e. in their respective quadrants) was the basis for interpreting varying levels of technical similarity/diversity.
Figure 9.4: Pigtec CA Results. Bivariate plot of component and eigen scores. 
- A) variables and B) sites.
Regional Comparison

Both sets of analyses indicate that there is a core of more homogeneous sites in the centre-west of the Sydney Basin. Away from this central area there is increasing variability (Figure 9.5 and 9.6). This homogeneous focus does not mirror that achieved for the engraved assemblage. Nor does the technical set of shelter art variables reveal the same levels (or foci) of homogeneity as does the investigation of motif.

The results based on the technique variables indicate that there is a higher degree of technical homogeneity than there is similarity in subject preference. That is, the variability demonstrated by technique variables is less than that demonstrated by motif variables.

Both analyses indicate, however, that the sites from Groups 2 and 3 are the least diverse in the region (Groups 4 and 8 also demonstrate a high degree of homogeneity, but their smaller sample sizes makes conclusions more difficult). Sites from Groups 1 and 5 and 6 (and the very small sample from Group 7), on the other hand, demonstrate considerable diversity in subject preference and in the artistic techniques employed.

Subtle differences between the sites in the different groups are indicated by the outlier sites. These indicate (for technique and motif) that there is a preference in some areas of the Basin for (hand) stencilling (Groups 1, 2 and 5), while in other areas drawings of (predominantly) land animals in black pigment are most common (Groups 3 and 6).

Figure 9.5: Shelter Art; Motif. Percentage of homogeneous shelter art sites in each analytical group.
Figure 9.6: Shelter Art, Technique. Percentage of homogeneous shelter art sites in each analytical group.

<table>
<thead>
<tr>
<th>Group</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>89</td>
</tr>
<tr>
<td>Group</td>
<td>82</td>
</tr>
<tr>
<td>Group</td>
<td>80</td>
</tr>
<tr>
<td>Group</td>
<td>6</td>
</tr>
<tr>
<td>Group</td>
<td>7</td>
</tr>
</tbody>
</table>

At the completion of SRAP III (McDonald 1990ab) it was obvious that this complex mosaic of stylistic variability required more detailed analysis. This is achieved below (Section 9.3).

9.3 Language Areas

The division of the study area according to the region's posited language boundaries has previously been described. Similar analyses to those achieved on the engraving sites have also been done for the shelter art assemblage using both motif and technique information. The sites were divided into language area on the basis of the boundaries defined by Capell's (1970) work (Figure 3.1).

Motif and Technical Differences across the Basin

Before analysing the CA results, basic assemblage details (motif and technique) were investigated for each of the language areas.

The technique information recorded included unidentifiable motifs. By including technical information for motifs which could not be identified, it was considered that a more accurate picture of technical information across the region would be achieved. A corollary of this is that there is not always a correlation between motif proportions and technique characteristics (e.g. while hands might dominate the identifiable motifs, stencilling does not necessarily dominate in technique). A large proportion of the unidentified component of the shelter art assemblage results from poor preservation conditions, *ad hoc* drawing activity, superimpositioning and the rigours of the classification system.
Darkung Language Area

This group of inland shelter art sites represents the largest sample in the region. A total of 7,725 motifs were recorded from the 190 sites in this area. Only 4,972 of these motifs could be classified; 30% of the assemblage comprised unidentified motifs. The largest recorded assemblages in the region are located here (average 40.7 motifs/site) as are the two biggest known assemblages (Swintons (site #) with 857 motifs and Yengo 1 (site #1) with 505 motifs). Even removing these two sites, the average site size is quite high 33.8 motifs/site.

The predominant motif is the hand (54.1% of the recognisable motifs, including variations: Figure 9.7). The focus of the depictive motifs (Figure 9.8) is on macropods (19%) followed by anthropomorphs (16%) and other land animals (10%). The whale motif is the only category not represented in this assemblage. Non-gendered anthropomorphs are the most commonly depicted human figures, followed by men and then women. Profile depictions are fairly uncommon. Most of the culture heroes in the pigment medium are located in this area. Boomerangs are the most commonly depicted material culture items.

Figure 9.7: Darkung Language Area Motif Assemblage (excluding unidentifieds).
Figure 9.8: *Darkung* Language Area. Depictive motifs.

Depictive pigmented motifs dominate this assemblage, with dry pigment (drawing) being the most commonly employed technique (52%). Stencilling is a very common technique (39%), while the other technical options are less common (Figure 9.9). The use of wet pigment (painting) is more common in this area than in any other language area (motifs; 4%).

Figure 9.9: *Darkung* Language Area. Techniques employed.

Of the depictive motifs there was a fairly even distribution between the three identified forms (Figure 9.10) with infilled motifs being slightly more common than the other two forms.
Figure 9.10: Darkung Language Area depictive motifs. Form.

Colour preference in this area is clearly for white pigment, followed by black, red and yellow (Figure 9.11).

Figure 9.11. Darkung Language Area. Colour usage.

Darkung Language Area

This language area is also located inland and sites were split into two groupings on either side (north and south) of the Cumberland (shale) Plain. This was done to test the posited language boundaries relative to geographic proximity.

In the northern area a total of 1,297 motifs were recorded from 36 sites. Only 851 of these were recognisable; 34.4% of the motifs were unidentifiable. Average site size in this area is also quite large, 36 motifs/site. Hand stencils dominate this assemblage (53.4% of the recognisable motifs, including variations: Figure 9.12).
'Other' motifs dominate the depictive motifs (19%) followed by birds (12%) and other land animals (9%). Human figures are again focused on non-gendered anthropomorphs, and here there is a greater emphasis on profile figures than in the Darkung assemblage (Figure 9.13).

Two culture heroes are located in this area (at two sites). Boomerangs are the most
commonly depicted material culture items in this area. Depictive pigmented motifs dominate the techniques used in this assemblage (i.e. when unidentified motifs are included in the analysis). Dry pigment (drawing) is the most commonly employed technique (52%). Stencilling is a very common technique (40%), while the other technical options are less common (Figure 9.14).

**Figure 9.14:** *Darug* (North) Language Area. Technical options employed.

The depictive motifs demonstrate a fairly even distribution between the three defined forms (Figure 9.15) with infilled (solid) motifs being slightly more common than the other two forms.

**Figure 9.15:** *Darug* (North) Language Area depictive motifs. Form.

Colour preference in this area is again for white pigment, followed by black, red and yellow (Figure 9.16). Red is more common and white slightly less dominant here than in the Darkungung sample.
Figure 9.16: *Darug* (North) Language Area. Colour preferences.

![Pie chart showing colour preferences](image)

The southern *Darug* sample comprised 90 sites with 1,613 motifs. Only 722 of these were recognisable; 55.2% of this assemblage was unrecognisable. The average site size here is 17.9 motifs/site.

Again there a dominance of hands (34%) but less so than in the preceding groups (Figure 9.17). Unlike the northern sample of *Darug* sites, the dominant depictive motifs are other land animals (22%) followed by macropods (15%) and anthropomorphs (14%). Culture heroes and women are present but extremely rare. 'Other material objects' are the most commonly depicted material culture items, followed by boomerangs (Figure 9.18).

Figure 9.17: *Darug* (South) Language Area. Motif Assemblage.

![Bar chart showing motif assemblage](image)
Figure 9.18: *Darug* (South) Language Area. Depictive Motifs.

Depictive pigmented motifs predominate this assemblage, with drawing being the most common technique (79%). Stencilling is much less common (17%), while the other technical options are either less common or non-existent (Figure 9.19). Technical variability is considerably more limited in this *Darug* group compared with its northern counterpart.

Figure 9.19: *Darug* (South) Language Area. Technical options employed.

Motifs form here is considerably more disproportionate that is found in either the northern *Darug* or *Darningung* samples. Outlines and infilled motifs are more common than outline only motifs. Infilled only forms are quite rare (Figure 9.20).
Figure 9.20: Darug (South) Language Area. Form.

Colour preferences demonstrated by this sample area are also different to the more northerly groups. Black is the preferred colour followed by red, white and yellow (Figure 9.21).

Figure 9.21: Darug (South) Language Area. Colour preferences.

Guringai Language Area

This sample represents the most northerly coastal group in the region. A total of 1,504 motifs were recorded from the 78 sites in this area. Just over 38% of this assemblage was unidentifiable; 930 motifs were classifiable. The average site size here is 19.3 motifs/site, considerably smaller than the inland northerly groups.

Hand stencils (60%) dominate this group (Figure 9.22), while fish (23%) and macropods (20%) are co-dominant in the depictive assemblage (Figure 9.23). There are no culture heroes or profile people amongst the anthropomorphic figures in this assemblage. Boomerangs are the most frequently depicted material objects followed by shields.
Depictive pigmented (combined) motifs dominate this assemblage, however the use of dry pigment is almost equalled by stencilling (Figure 9.24). Painting is relatively common.
**Figure 9.24:** Guringai Language Area. Technical options employed.

Motif form show a slight preference for outline and infilled motifs followed by infilled forms and then outlined only motifs (Figure 9.25).

The preferred colour in this area is black, followed closely by white and red. The use of yellow is rare (Figure 9.26).

**Figure 9.25:** Guringai Language Area depictive motifs. Form.

**Figure 9.26:** Guringai Language Area. Colour preferences.
Sydney (Eora) Language Area

This language group is located on the coast, south of the Guringai (and Port Jackson) and north of the Georges River. This group has the smallest sample size partly as a result of the focus in this area of European settlement, but also because the Cumberland Plain and its shale geology comprises a large proportion of this area.

A total of 65 motifs were recorded at the five sites in this area (averaging 13 motifs/site). Very few of the motifs (11%) were unidentifiable; 58 were recognisable.

Hand stencils dominate this assemblage (65.5%), while the depictive focus is on fish (39%) and other marine animals (28%: Figures 9.27, 9.28). There is a much reduced motif classification for this area (10 - 34%) and it is likely that sample size is playing a part in the restricted range of motifs present (although see 9.4).

Figure 9.27: Eora Language Area. Motif Assemblage.

Stencilling dominates this assemblage, with the use of dry pigment the only other recorded technique (Figure 9.29). Small sample size here makes these observations tentative.

Analysis of form shows a preference for outlined motifs followed by outlined and infilled forms. No infilled only motifs were recorded from the depictive assemblage in this area (Figure 9.30).
Figure 9.28: *Eora* Language Area. Depictive Motifs.

Figure 9.29: *Eora* Language Area. Technical options employed.

Figure 9.30: *Eora* Language Area depictive motifs. Form.

The preferred colour in this area is white, followed by red, black and yellow (Figure 9.31).
Figure 9.31: *Eora* Language Area. Colour preferences.

*Tharawal* Language Area

This area is also located largely on the coast, south of the Georges River. A total of 2,387 motifs were recorded here from 99 sites. As with the *Darug* south sites a high proportion (58%) of this assemblage is unrecognisable; there were 1,005 recognisable motifs. The sites here are of average size (24.1 motifs/site).

This is the only area across the region where hand stencils do not predominate the recognisable motifs (Figure 9.32). Macropods and hands are co-dominant (c.20%). When hands are excluded, macropods dominate the depictive motifs (25%) followed by other land animals (11%) anthropomorphs and birds (both c. 10%: Figure 9.33). Profile anthropomorphs figure here as commonly as they do in the *Darug* (north and south) sites. Women and culture heroes, however, are extremely rare.

The drawing technique dominates this assemblage, with stencilled motifs representing c.10% of the assemblage (Figure 9.34). There were very few wet and dry combination motifs (5; 0.2%) and very few engravings (2; 0.1%).

Motif form shows a combined emphasis on outlined motifs and outlined and infilled forms. Infilled only forms are less common amongst the depictive motifs recorded from this area (Figure 9.35).
Figure 9.32: *Tharawal* Language Area. Motif Assemblage.

Figure 9.33: *Tharawal* Language Area. Depictive Motifs.
Figure 9.34: Tharawal Language Area. Technical options employed.

![Bar chart showing technical options](image)

Figure 9.35: Tharawal Language Area depictive motifs. Form.

![Pie chart showing forms](image)

The predominant colour in this area is black, followed by red, white and yellow (Figure 9.36).

Figure 9.36: Tharawal Language Area. Colour preferences.

![Pie chart showing colour preferences](image)
Summary

In terms of motif assemblages, Tharawal language area is clearly differentiated from all other language areas on the basis of its relative absence of hand (stencils). There is also a predominance of black pigment and concomitant sparsity of white pigment in this area.

All other areas reveal varying levels of similarity and dissimilarity in their motif assemblages.

There is no clear focus on marine animals in the Guringai or the Tharawal areas, both of which are located on the coast. The remaining coastal group however i.e. Sydney (albeit based on an extremely small sample) does exhibit a greater focus on maritime subjects.

There are several motif classes which are "missing" from the central area of the Basin and yet reveal contact between the northern and southern ends of the region. Profile people, for instance are common in the Darkung and northern Darug sites as well as the southern Darug and Tharawal sites. There are none of these motifs in the Guringai or Sydney area.

The division of the Darug sites north and south of the Cumberland Plain revealed that some bedrock design notions (Sackett 1990) transcend the geographic gulf (plain?) between these two assemblages. Both sets of Darug sites have a predominance of hand stencils with other land animals, macropods and anthropomorphs dominating (cf. with Tharawal where macropods clearly predominate). It also revealed that distance has created some differences in assemblage characteristics between the two sets of Darug sites. Birds, 'other' and boomerang motifs dominate in the northern group, while these elements are of lesser importance in the southern group. Similarly, the schematic peculiarity of these southern sites, the use of four leg on terrestrial animals and two legs on birds (cf. two and one used, respectively, to the north) is present in both the southern Darug and Tharawal sites, but not the northern Darug sites. This aspect has not been investigated in detail for this research.

Colour usage in the different language areas reveal definite (cultural?) preferences across the region. It would seem unlikely that this preference demonstrates availability of resources. Charcoal (the apparent source of the black pigment; although see McDonald et al. 1990) is universally available; white pigment derives from pipeclay (kaolin) which is commonly found in creeklines around the region (pers. observ.) and would require only a certain amount of local knowledge to procure; red (and yellow)
pigment derives from ironstone bedding within the sandstone formation, and again would require little local knowledge to find.

In the south of the region there is a definite preference for black pigment (commensurate with a lower focus on stencilling). In the north of the region there is a definite focus on white pigment, and while this reflects the common usage of stencilling as a technique, there are also a large number of white drawings and paintings in this area. This dominance of white supports a model of contact between the Hunter Valley where white is prevalent, and this part of the Sydney region (Moore 1981; see Appendix 1 this work).

In the Guringai area, while black dominates, there is a much more even usage of this colour with red and white. Red is commonly used for stencilling here as well as for drawing.

Yellow is only rarely used (c.1%) in all language areas, although its highest percentage contribution is to any assemblage is in the Darringung area (4%). There are many sites with yellow stencils in this area, but relatively few drawings and paintings (except in the Warre Warren area in the Mangrove Creek catchment: McDonald 1988a).

Unidentified motifs were used in this analysis because of the technical information which they were able to provide (McDonald 1990ab). Without exception this motif class represents a significant proportion of all shelter art assemblages.

Varying chemical compositions and dryness may be factors in preserving the shelter art in different parts of the region. Age is another potential factor: older art may be less recognisable (due to fading, subsequent superimpositioning) than more recently executed art (and see Watchman 1994). In areas where there are few stencils, the unidentifiable component increases (for classificatory reasons). In many large assemblages, the unidentified component increases due to superimpositioning and the obscuring of underlying motifs.

The significance of colour and motif variability across the region is discussed further in light of the CA results (Section 9.4).
9.4 Correspondence Analysis, Language Areas and Drainage Basins

While trends in the motif assemblages and technical options across the Basin are quite clear (Section 9.3), the CA results were analysed to determine the significance of compositional differences and technical emphases in the different areas. Here the three selected areas were analysed according to language areas and drainage basins within these. The analyses involve first motif (Section 9.4.1) and then technique (Section 9.4.2).

As explained more fully in Chapter 8, there was some concern that the contact language boundaries may not have had relevance back into prehistory (Chapters 3 and 4). By using drainage basins, it was hoped that the art could be divided into meaningful smaller units (viz. Peterson 1976) which might be interpreted socially. The second reason was that several of Capell's boundaries were located along creeklines, and the intention of this work was to test these boundary locations.

A total of 25 drainage basins with art sites were defined across the region (Figure 8.11). The codes used here are the same as those used for the engraved assemblage (Tables 9.4 and 9.5). The sample sizes for this component vary markedly compared with the engraved component. The largest sample of shelter sites falls in the Darkungung language area. This distribution reflects the work done in the Mangrove Creek Catchment (Attenbrow 1981, 1987, Gunn 1979, McDonald 1988a) as well as extensive recording work for the Rock Art Project (McDonald 1987, 1990a).

**Table 9.4**: Shelter Art sites (motif): Language areas, codes and sample sizes.

<table>
<thead>
<tr>
<th>Language Group</th>
<th>Code</th>
<th>No. of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darkungung</td>
<td>1</td>
<td>190</td>
</tr>
<tr>
<td>Guringai</td>
<td>2</td>
<td>78</td>
</tr>
<tr>
<td>Sydney</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Dharug</td>
<td>4</td>
<td>97</td>
</tr>
<tr>
<td>Tharawal</td>
<td>5</td>
<td>99</td>
</tr>
</tbody>
</table>

The same three sample areas were used as for the engraved component's analysis. These were:-

1) Intra-language area patterning within the Darkungung language area (drainage basins 1, 5 and 6);

2) The east-west patterning across the proposed Guringai/Darug language boundary south of the Hawkesbury River (drainage basins 10 - 13); and,
3) The east-west patterning across the proposed Tharawal/Darug language boundary (drainage basins 18 - 21). This last group involves sites south of the previously identified (regional) style boundary of the Georges River.

Table 9.5: Shelter Art sites (motif): Drainage Basins, Language Areas and Sample sizes.

<table>
<thead>
<tr>
<th>Drainage Basin</th>
<th>Basin Code</th>
<th>Lang. Group</th>
<th>No. of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Macdonald</td>
<td>1</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>Wollombi</td>
<td>2</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Wyong</td>
<td>3</td>
<td>1/2</td>
<td>4/3</td>
</tr>
<tr>
<td>Colo</td>
<td>4</td>
<td>1</td>
<td>17/1</td>
</tr>
<tr>
<td>Central Macdonald</td>
<td>5</td>
<td>1</td>
<td>54</td>
</tr>
<tr>
<td>Mangrove Creek</td>
<td>6</td>
<td>1</td>
<td>84</td>
</tr>
<tr>
<td>Mooney Mooney</td>
<td>7</td>
<td>1/2</td>
<td>1/1</td>
</tr>
<tr>
<td>Brisbane Water</td>
<td>8</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Kurrajong</td>
<td>9</td>
<td>1/4</td>
<td>2/3</td>
</tr>
<tr>
<td>Cattai</td>
<td>10</td>
<td>1/4</td>
<td>-/6</td>
</tr>
<tr>
<td>Berowra</td>
<td>11</td>
<td>2/4</td>
<td>12/20</td>
</tr>
<tr>
<td>Cowan</td>
<td>12</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>Pittwater</td>
<td>13</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Middle Harbour</td>
<td>14</td>
<td>2</td>
<td>14/1</td>
</tr>
<tr>
<td>Lane Cove</td>
<td>15</td>
<td>2/4</td>
<td>6/2</td>
</tr>
<tr>
<td>Port Jackson</td>
<td>16</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Botany Bay</td>
<td>17</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Port Hacking</td>
<td>18</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Woronora</td>
<td>19</td>
<td>5</td>
<td>55</td>
</tr>
<tr>
<td>Mill/Williams</td>
<td>20</td>
<td>4/5</td>
<td>17/1</td>
</tr>
<tr>
<td>Georges</td>
<td>21</td>
<td>4/5</td>
<td>33/7</td>
</tr>
<tr>
<td>Nepean</td>
<td>22</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Burragorang/B Mtns</td>
<td>23</td>
<td>4*/5</td>
<td>15/10</td>
</tr>
<tr>
<td>Cataract</td>
<td>24</td>
<td>47/5</td>
<td>-/14</td>
</tr>
<tr>
<td>Avon/Cordeaux</td>
<td>25</td>
<td>47/5</td>
<td>-/7</td>
</tr>
</tbody>
</table>

*May be mixture of Darug and Gandangara Language areas

9.4.1 Shelter Art Motifs

The sample used for the CA of motifs comprised 469 sites. Sites with only unidentifiable motifs were excluded from these analyses. This analysis is based on the same CA results described above (Section 9.1). As described, the results have been plotted by subdividing the sites into their relevant drainage basins and language areas. Only those sitesthat lie in the three selected samples are included in these descriptions, unlike the regional analyses presented in Section 9.2.

The bivariate plots are presented as Figures for both language area and individual drainage basins. The core homogeneity is indicated and the distribution of outlier sites demonstrated using the quadrant method described earlier (p 7). The data for both language areas and drainage basins are presented thus.
1) Darkingu Language Area
   (drainage basins 1, 5 and 6)

This group of sites is located north of the Hawkesbury River and focuses on the major
drainage basins of the Macdonald River and Mangrove Creek. The Upper Macdonald
and central Macdonald were distinguished between on the basis of their position relative
to the Bala Range which forms an artificial boundary across its centre. The more
northerly of these groups was in close proximity to Hunter Valley, and there was a
known access route into the more northerly region along the Boree Track the Hunter
Range and then along what is now the Putty road (Mathews 1899).

DARKINGUNG
   (157 sites)

The sites in this overall grouping are homogeneous, with a heavy emphasis on
anthropomorphs, terrestrial animals and birds and stencilled hands and weapons (Figure
9.37).

**Figure 9.37**: Darkingu Language Area. Bivariate plot of CA (Pigrot) scores.
Figure 9.38: Darklingung Language Area. Bivariate plots for the three drainage basin groupings.
The three drainage basins show consistency in their core homogeneity. There is, however, a clinal variation in the focus of the motif compositions from the upper Macdonald to Mangrove Creek drainage basins.

**Upper Macdonald**: (Figure 9.38)  

<table>
<thead>
<tr>
<th>Core: 42.1%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 sites</td>
<td>18.2% 18.2%</td>
</tr>
</tbody>
</table>

54.5% 9.1%

This group is relatively homogeneous (42%) with a strong emphasis on hands. Most of the sites in the negative quadrant comprise of hand only sites.

**Central Macdonald**: (Figure 9.38)  

<table>
<thead>
<tr>
<th>Core: 44%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>54 sites</td>
<td>10% 22.3%</td>
</tr>
</tbody>
</table>

33.3% 33.3%

This group of sites is also quite homogenous (44%), with the focus being on the negative side of the second component. There is again a strong emphasis on hand stencils and on anthropomorphic figures. Macropods and other land animals figure strongly, as do birds and other material objects. Quite a few of these sites include complex-non-figuratives.

**Mangrove Creek**:  (Figure 9.38)  

<table>
<thead>
<tr>
<th>Core: 45%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 sites</td>
<td>8.5% 25.5%</td>
</tr>
</tbody>
</table>

12.2% 53.2%

This group of sites has a similar degree of homogeneity (45%) to the Central Mangrove sites, but with a decreasing emphasis on hands (NB. the shift in focus to quadrant C). Anthropomorphs, terrestrial animals, material objects and birds figure strongly. Eels and fish also occur frequently. Other motifs occur quite often in quadrant C sites and many of these site include small numbers of hand and weapon stencils.

2) East-west patterning *Guringai/Darug* language boundary

(drainage basins 10 - 13: 75 sites)

Capell puts the boundary between these two language areas along Berowra Creek. Both banks of this creekline were surveyed for Stage III of the Rock Art Project
(McDonald 1990b). Vertical engravings were located on both banks, and the art on both sides (albeit within only 40m of the creek) were observed to be fairly similar. For the purposes of testing this defined boundary, the drainage basin is divided according to the left and right bank of Berowra Creek. This analysis indeed indicates that the sites on either site of the creek do contain differences on the basis of motif (Figure 9.39).

**Figure 9.39:** *Darug and Guringai Language Areas. Bivariate plot of CA (Pigmot) scores.*

**Darug (26 sites)**

**Guringai (49 sites)**

**DARUG**

(26 sites)

<table>
<thead>
<tr>
<th>Core: 46%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3%</td>
<td>14.3%</td>
</tr>
<tr>
<td>29.6%</td>
<td>42.8%</td>
</tr>
</tbody>
</table>
GURINGAI

49 sites

Outliers

Core: 29% 22.8 8.6%

51.4% 17.1%

The Darug sites are more homogeneous than the Guringai sites (Figure 9.39). There is also a general change in focus between the more unusual sites in the two areas, with generally more human figures, land animals and birds occurring in the former and more hands occurring in the latter. On the basis of drainage basins, there is considerable variability within these groups.

Cattai: (Figure 9.40)

Outliers

Core: 50% 33.3% 66.6%
6 sites

0% 0%

This area has a very low number of sites, and thus the results are treated tentatively. There are three sites (50%) in the core zone and all of the outlier sites are on the positive side of the 2nd component. The outlier sites contain other land animals and other material objects.

(Darug) Berowra: (Figure 9.40)

Outliers

Core: 45% 9.1% 0%
20 sites

36% 55%

This group of sites are on the left bank of the Berowra Creek drainage basin. These sites are quite homogenous (45%: Figure 9.40), with the main outlier focus being in quadrant C and a lesser focus in quadrant D. Sites in quadrant C have a focus on terrestrial and anthropomorphic depictions. There are lots of sites with single macropods. Stencils (hand and weapons) land animals and eels combine in the quadrant D sites.

(Guringai) Berowra: (Figure 9.41)

Outliers

Core: 25% 22% 11%
12 sites

33% 33%
This group is considerably less homogeneous than its counterpart on the western side of this drainage basins (Figure 9.41). The focus of its outlier sites is also different from those on the other bank of Berowra Creek, this being more equally on the negative side of the second component and focussing on hand stencils and eels (quadrant D), and anthropomorphs, macropods and other land animals (quadrant C).

Figure 9.41: *Darug* drainage basins. Bivariate plot of CA (Pigmot) scores.
Figure 9.42: *Guringai* drainage basins. Bivariate plot of CA (Pigmot) scores.

Berowra *Guringai* (12 sites)

Cowan (29 sites)

Pittwater (8 sites)
Cowan: (Figure 9.41)  

<table>
<thead>
<tr>
<th>Core: 34.5%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 sites</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>53%</td>
</tr>
</tbody>
</table>

This group is again quite heterogeneous (34.5%) but is focused on the negative side of the 1st component (in the D quadrant and to a lesser extent in the A quadrant). The compositional focus of this area is on hands, hand variations and fish (quadrant D) and on marine, terrestrial and other material objects (quadrant A).

Pittwater: (Figure 9.41)  

<table>
<thead>
<tr>
<th>Core: 12%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 sites</td>
<td>14%</td>
</tr>
</tbody>
</table>

71% 14%

This group is the least homogenous (12%) of all those analysed in this more detailed analysis (NB., however, the small sample size). The focus of this group is heavily on hands and other motifs. The Great Mackerel site (Appendix 2) is the outlier site in quadrant A. This site has a large assemblage with mainly hand and material object stencils but also a range of other motifs.

3) The Tharawal language area (Basins 18 - 21)  

This last group involves 118 sites south of the identified style boundary of the Georges River. Sites fall within Capell's designated Tharawal and Darug language group areas. The shelter art sites are mainly from the Georges River and Woronora catchments, presenting a different distribution to the engraving sites (which have a coastal focus).

**THARAWAL**  

<table>
<thead>
<tr>
<th>Core: 33.8%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 sites</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

15.5% 64.4%

This group of sites is one of the least homogenous (34%) of those analysed according to language area (Figure 9.42).

**DARUG**
Core: 28%
50 sites

5.5%  11.1%

19.4%  63.9%

This group of sites is the least homogenous (28%) of those analysed according to language area. There are a few site with hand stencils in this area, but the definite focus in this area is on terrestrial animals and birds.

**Figure 9.42:** Tharawal and Darug language areas. Bivariate plot of CA (Pigmot) scores.
**Darug Georges River:** (Figure 9.43)

<table>
<thead>
<tr>
<th>Core: 27.3%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>33 sites</td>
<td>8.3%</td>
</tr>
<tr>
<td></td>
<td>16.7%</td>
</tr>
<tr>
<td></td>
<td>16.7%</td>
</tr>
<tr>
<td></td>
<td>58.3%</td>
</tr>
</tbody>
</table>

This group of sites is one of the least homogenous (27%) of those analysed according to drainage basin. There are a few site with hand stencils in this area, but the definite focus in this area is on terrestrial animals and birds.

**Darug Mill and Williams:** (Figure 9.43)

<table>
<thead>
<tr>
<th>Core: 29.4%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 sites</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>75%</td>
</tr>
</tbody>
</table>

This group of sites is slightly more homogenous (29%) than its neighbouring Darug drainage basin. There is even less diversity in terms of motif preference in this area, and the definite focus on terrestrial animals, anthropomorphs and birds.

**Tharawal George, Mill and Williams:** (Figure 9.43)

<table>
<thead>
<tr>
<th>Core: 37.5%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 sites</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>60%</td>
</tr>
</tbody>
</table>

There are too few sites in this (combined) drainage basin group to meaningfully discuss these results. These results have, however, been amalgamated into the larger language group for discussion.

**Woronora:** (Figure 9.44)

<table>
<thead>
<tr>
<th>Core: 34.5%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 sites</td>
<td>5.6%</td>
</tr>
<tr>
<td></td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>72.2%</td>
</tr>
</tbody>
</table>

This group of sites is more homogenous (35%) than the neighbouring Darug drainage basins. There is slightly more diversity in motif preference in this area, although still a definite focus on terrestrial animals, anthropomorphs and birds. **
Figure 8.42: Tharawal and Darug drainage basins. Bivariate plot of CA (Pigmot) scores.

Georges River (33 sites)

Darug Mill/Williams (17 sites)

Tharawal Georges/Mill/William (8 sites)

Synchronic Variation: Shelter Art
Figure 9.44: Tharawal drainage basins. Bivariate plot of CA (Pigment) scores.

Port Hacking (5 sites)

Outliers

Core: 20%
5 sites

25%  25%

50%  0%

This group is highly heterogeneous (20%), and has a different outlier focus to the other Tharawal sites. There are several sites in this area with hand stencils, and a definite focus on fish and other marine depictions. The very small sample size makes conclusions regarding this difficult.
Summary

The analysis of sites according to defined drainage basins and language areas again reveals a mosaic of stylistic heterogeneity. The core of homogeneous sites in this component occurs in the Darkingung (45%) and northern Darug (45%) sites. The Guringai and southern Darug sites are the least homogenous (30% and 28% respectively), while the Tharawal sites are also very heterogeneous (34%).

Subdivisions of language areas into drainage basins provided further insight into localised variability. In the Darkingung area, the assemblages from all three drainage basins reveal very similar levels of homogeneity (c.44%). There is clinically variation in motif preference, however, from a focus on hands in the Upper Macdonald; hand stencils, terrestrial animals and birds in Central Macdonald; and anthropomorphs, terrestrial animals birds and to a lesser extent, hand stencils in Mangrove Creek.

The proposed Darug/Guringai language boundary in the centre of the region, south of the Hawkesbury River was investigated. Again a strong separation between sites on either side of Berowra Creek was discovered here, further supporting the presence of a linguistic boundary along this waterway.

The Darug Cattai and Berowra sites had similar levels of homogeneity, although varying motif preferences were demonstrated in these areas. The Berowra darinage basin sites have a focus on terrestrial animals and anthropomorphic depictions, with stencils also providing a strong component. As was found in the engraving assemblage, the similarity between the Darug Berowra sites and those from Mangrove Creek (i.e. Darkingung) are striking.

The Guringai sites are highly heterogeneous. While demonstrating varying degrees of homogeneity, their outlier foci and therefore motif preferences, are fairly similar. Hand stencils, terrestrial and marine depictions are prevalent here.

The southern Darug and Tharawal sites are also highly heterogeneous. Both the drainage basins in the southern Darug sample demonstrate consistently high levels of heterogeneity and similar motif preferences. The Georges River groups is the most varied of all of these southern drainage basins, the majority being focussed on macropods, other land animals and birds. Port Hacking is the only drainage basin with a different outlier focus, due to several sites with hand stencils. The extremely small sample size in this basin makes this anomaly difficult to interpret.
9.4.2 Shelter Art Technique

Because technical information included unidentifiable motifs, all 564 shelter art sites were used for these analyses. The same drainage basin divisions were used in these analyses as described above.

1) Darkung language group
(drainage basins 1, 5 and 6).

**DARKINGUNG**

(180 sites; Figure 9.45)

<table>
<thead>
<tr>
<th></th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: 68.9%</td>
<td></td>
</tr>
<tr>
<td>32.1%</td>
<td>17.9%</td>
</tr>
<tr>
<td>17.9%</td>
<td>32.1%</td>
</tr>
</tbody>
</table>

*Figure 9.45: Darkung language area. Bivariate plot of CA (Pigtec) scores.*

The sites in this overall grouping are relatively homogeneous (69%), with a dual emphasis in the outlier sites on engraved motifs and black outlined and infilled motifs. There is clinal variation in technical emphases from the upper Macdonald to the Mangrove Creek groups.

*Chapter 9*
Upper Macdonald: (Figure 9.46)

Outliers

| Core: 42.1% | 36.4% | 0 |
| 19 sites    |       | 9.1% |
| 54.5%       |       |     |

This group is relatively homogeneous (42%) with a strong emphasis on white pigment and stencils. There are also a number of sites in this grouping with engraved motifs.

Central Macdonald: (Figure 9.46)

Outliers

| Core: 78.7% | 30.8% | 30.8% |
| 61 sites    |       |      |
| 23.1%       | 15.4% |     |

This group of sites is very homogenous (79%), with the technical emphasis of the outlier sites including sites with engravings, white pigment and stencils.

Mangrove Creek: (Figure 9.46)

Outliers

| Core: 68% | 31.3% | 18.8% |
| 100 sites |       |      |
| 3.0%      | 46.9% |     |

This group of sites relatively homogeneous (68%) with a decreased emphasis on stencils and white pigment, and increased use of black and red pigments. There are a number of sites in this group with engraved motifs (viz quadrant A).

2) East-west patterning Guringai/Darug language boundary

(drainage basins 10 - 13: 88 sites)

As indicated previously (Figure 3.1), Capell puts the boundary between these two language areas along Berowra Creek. This analysis (like the previous ones looking at motif in the two assemblages) indeed indicates that the sites on either side of the creek are technically different.

DARUG      (27 sites)

Outliers

| Core: 70.4% | 12.5% | 12.5% |
|            | 0     | 75%   |
Figure 8.46: Darkung Drainage Basins. Bivariate plot of CA (Pigtec) scores.

Upper Macdonald (19 sites)

Central Macdonald (61 sites)

Mangrove Creek (100 sites)
Figure 9.47: *Darug* and *Guringai* language areas. Bivariate plot of CA (Pigtec) scores.

- *Darug* (27 sites)

- *Guringai* (61 sites)

**GURINGAI** (Figure 9.47)

<table>
<thead>
<tr>
<th>Outliers</th>
<th>20.7%</th>
<th>13.8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: 52.5%</td>
<td>51.7%</td>
<td>13.8%</td>
</tr>
</tbody>
</table>

Synchronic variation: Shelter Art sites CA Results - Technique...
The Darug sites are much more homogeneous than the Guringai sites (Figure 9.46). There is also a general change in focus between the outlier sites in the two areas, with generally more black pigment occurring in the former and more stencils and white pigment in the latter. On the basis of drainage basins, there is further variation within these groups, indicating a complex mosaic of technical options being used. Engraved motifs occur in shelter sites from both areas, although less frequently in the Darug assemblage.

**Cattai:**

(Figure 9.48)

<table>
<thead>
<tr>
<th>Core: 83.3%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 sites</td>
<td>0% 100%</td>
</tr>
<tr>
<td></td>
<td>0% 0%</td>
</tr>
</tbody>
</table>

This area has a very low number of sites and thus the results are treated tentatively. There are five sites (83%) in the core zone and the only outlier sites lies in the positive quadrant (B).

**Darug Berowra:**

(Figure 9.48)

<table>
<thead>
<tr>
<th>Core: 67%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 sites</td>
<td>14% 0%</td>
</tr>
<tr>
<td></td>
<td>0% 86%</td>
</tr>
</tbody>
</table>

This group of sites are on the left bank of the Berowra Creek drainage basin. These sites are also very homogenous (67%) although less so than the Cattai sites. The main outlier focus is in quadrant C with a lesser focus in quadrant A. Sites in quadrant C have a emphasis on black pigment. The outlier site in quadrant A has an engraved motif.

**Guringai Berowra:**

(Figure 9.48)

<table>
<thead>
<tr>
<th>Core: 60%</th>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 sites</td>
<td>50% 0%</td>
</tr>
<tr>
<td></td>
<td>16.7% 33.3%</td>
</tr>
</tbody>
</table>

This group is slightly less homogeneous than its counterpart on the western side of this drainage basins (60%) but the technical emphasis of its outlier sites is completely different to that on the other bank of Berowra Creek. There are many more stencils in this group and a number of sites with engraved motifs (quadrant A).
Figure 9.48: Cattai and Berowra drainage basins. Bivariate plot of CA (Pigtec) scores.

Cattai (6 sites)

Darug Berowra (21 sites)

Guringai Berowra (15 sites)

Synchronic variation: Shelter Art sites
Cowan:  (Figure 9.49)  

| Core: 48.6%  
37 sites | Outliers |  
| 15.8% | 21.1% |  
| 52.6% | 10.5% |

This group is quite heterogeneous (49%) and is focussed in the D quadrant and to a lesser extent in the B quadrant. The technical emphasis in this area is on stencils (in white and red pigment: quadrant D). There are a number of sites with engraved motifs in this area also (quadrant A).

Pittwater:  (Figure 9.49)  

| Core: 55.6%  
9 sites | Outliers |  
| 0% | 0% |  
| 100% | 0% |

This group is relatively homogenous (56%), although the small sample size here should be noted. The technical emphasis in this group is on stencils, made with red and white pigment. There are no sites with engraved motifs in this group.

3) South of the Georges River style boundary: Tharawal and Darug language areas (Basins 18 - 21).

This last group involves 152 sites south of the identified style boundary of the Georges River. The boundary between Capell’s designated Tharawal and Darug language group areas falls within this area. Most of the sites here are from the Georges River and Woronora catchments, presenting a different distribution to the engraving sites (which are mostly located along the coastal strip).

**THARAWAL**

| Core: 61.4%  
88 sites | Outliers |  
| 0% | 2.9% |  
| 9.8% | 88.2% |

This group of sites is relatively homogenous (61%) with a technical focus on black drawings. There are a few outlier sites with stencils (and red and white pigment). There are no engraved motifs in this area.
**Figure 9.49:** Pittwater and Cowan Drainage basins. Bivariate plot of CA (Pigtec) scores.

**DARUG**

<table>
<thead>
<tr>
<th>Core: 64.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>64 sites</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

| 9.7%       |
| 91.3%      |

This group of sites is fairly homogenous (64%) with a technical emphasis on black drawings. There are a few outlier sites with stencils (and red and white pigment). There are no engraved motifs in this area.

The technical emphases and core homogeneity in these two areas are very similar (Figure 9.50), suggesting that the boundary between these may not be meaningful (cf. the results achieved with the motif analyses).
Figure 9.50: *Darug and Tharawal* Language Areas. Bivariate plot of CA (Pigtec) scores.

*Darug* South (64 sites)

*Tharawal* (88 sites)
Darug Georges River: (Figure 9.51)

Core: 63.4%
41 sites

Outliers
0% | 10%
7% | 93%

The technical variables at these sites are relatively homogenous (63%) with a definite outlier focus on black drawings.

Figure 9.51: Darug Georges and Mill/Williams drainage basins. Bivariate plot of CA (Pigtec) scores.

Darug Georges (41 sites)

2nd component

1st component

Darug Mill/William (23 sites)

2nd component

1st component

Darug Mill & Williams: (Figure 9.51)

Core: 65%
23 sites

Outliers
0% | 0%
13% | 88%

Synchronic variation: Shelter Art sites

CA Results - Technique...
These sites are relatively homogeneous (65%). As with the southern Darug group (above) the outlier focus is on black drawings while the one outlier site has numerous red and white stencils.

**Tharawal George, Mill & Williams:** (Figure 9.52)

<table>
<thead>
<tr>
<th>Outliers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: 57%</td>
<td>0%</td>
</tr>
<tr>
<td>14 sites</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

This small sample of sites in this (combined) drainage basin group are less homogeneous. The outlier emphasis here is on black drawings.

**Woronora:** (Figure 9.52)

<table>
<thead>
<tr>
<th>Outliers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: 63%</td>
<td>0%</td>
</tr>
<tr>
<td>68 sites</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>92%</td>
</tr>
</tbody>
</table>

This group is also quite homogeneous (63%). There is again a strong focus on black drawings. There are a few sites with stencils only (including yellow ones: quadrant D) and several which contain engravings.

**Port Hacking:** (Figure 9.52)

<table>
<thead>
<tr>
<th>Outliers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: 50%</td>
<td>0%</td>
</tr>
<tr>
<td>6 sites</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>33%</td>
</tr>
</tbody>
</table>

This group is less homogeneous (50%), than for the other Tharawal sites, but the small sample size makes conclusions in this regards difficult. This group has a different outlier focus to the preceding group. The two outlier sites in quadrant D contain stencils in red and white pigment.
Figure 9.52: Tharawal drainage basins. Bivariate plot of CA (Pigtec) scores.

Tharawal Mill, Georges, Williams (14 sites)

Woronora (68 sites)

Port Hacking (6 sites)
Summary

The shelter sites were found to demonstrate more homogeneity on the basis of technique variables than had been found on motif preference. Again, the Darkung and northern Darug sites are the most homogeneous (c. 70%). The southern Darug and Tharawal sites demonstrate moderate high and similar levels of technical variability (c.63%), while the Guringai sites are again the most heterogeneous (52.5%).

Outlier preferences shows a general trends, from north to south, in the use of white pigment to charcoal. The outlier foci in all but Darkung and Guringai areas is on black drawings. In the Guringai area, there is also an emphasis on the use of red pigment, while in the Darkung group, engraved motifs also play a part in the local diversity.

levels of internal variability were also observable within the different drainage basins. This was quite marked within the Darkung sample, with the Upper Macdonald sites being the most heterogeneous in the region (42%) and the Central Macdonald being one of the most homogeneous (79%). This disparity is marked, particularly in light of the highly consistent motif homogeneity and outlier foci in these two locations.

There is less disparity between the sites on either side of Berowra Creek using the technique variables, although the outlier foci on either side of the creek is markedly different. Again, the Darug Berowra sites are similar to the Mangrove creek sites in levels of overall homogeneity; although the outlier focus is different here, partly due to the high number of engraved motifs found in the latter.

The Tharawal and southern Darug sites show consistent levels of homogeneity, with again the small coastal (Port Hacking) sample being the least homogeneous. Interestingly, the sites in this area have the same outlier focus as the other coastal groups analysed in this fashion, the Guringai Cowan and Pittwater sites.
9.5 Rare Motifs

The distribution of rare and/or unique motifs was analysed in an effort to establish their geographic extent. It was thought that this type of investigation may elucidate localised stylistic traits. Non-economic motifs were chosen in an effort to explore cultural (i.e. not environmental) influences.

An inspection of the number of times that any individual motif occurred at a site in the region demonstrated some interesting and unexpected results (Table 9.6; Figure 9.53).

**Table 9.6**: Shelter Art Motif regional totals. Maximum motif incidence at any particular site, number of sites in the region with motif present, and % of sites with motif.

<table>
<thead>
<tr>
<th>Motif</th>
<th>Total</th>
<th>Max incidence</th>
<th>Sites with Motif present</th>
<th>% of Sites with Motif</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>244</td>
<td>34</td>
<td>86</td>
<td>16.0</td>
</tr>
<tr>
<td>Woman</td>
<td>104</td>
<td>7</td>
<td>50</td>
<td>9.1</td>
</tr>
<tr>
<td>Anthropomorph</td>
<td>552</td>
<td>26</td>
<td>154</td>
<td>29.0</td>
</tr>
<tr>
<td>Profile Person</td>
<td>81</td>
<td>9</td>
<td>31</td>
<td>5.6</td>
</tr>
<tr>
<td>Culture Hero</td>
<td>18</td>
<td>6</td>
<td>9</td>
<td>1.6</td>
</tr>
<tr>
<td>Macropod</td>
<td>803</td>
<td>45</td>
<td>219</td>
<td>40.0</td>
</tr>
<tr>
<td>Snake</td>
<td>176</td>
<td>22</td>
<td>84</td>
<td>15.0</td>
</tr>
<tr>
<td>Other Land Animal</td>
<td>473</td>
<td>17</td>
<td>161</td>
<td>29.0</td>
</tr>
<tr>
<td>Emu</td>
<td>36</td>
<td>6</td>
<td>21</td>
<td>3.8</td>
</tr>
<tr>
<td>Other Bird</td>
<td>320</td>
<td>38</td>
<td>98</td>
<td>19.0</td>
</tr>
<tr>
<td>Fish</td>
<td>206</td>
<td>21</td>
<td>77</td>
<td>14.0</td>
</tr>
<tr>
<td>Eel</td>
<td>155</td>
<td>16</td>
<td>75</td>
<td>14.0</td>
</tr>
<tr>
<td>Whale</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Other Marine</td>
<td>34</td>
<td>5</td>
<td>20</td>
<td>3.6</td>
</tr>
<tr>
<td>Shield</td>
<td>54</td>
<td>7</td>
<td>34</td>
<td>6.2</td>
</tr>
<tr>
<td>Boomerang</td>
<td>183</td>
<td>33</td>
<td>67</td>
<td>12.0</td>
</tr>
<tr>
<td>Axe</td>
<td>82</td>
<td>14</td>
<td>29</td>
<td>5.3</td>
</tr>
<tr>
<td>Other material object</td>
<td>117</td>
<td>12</td>
<td>50</td>
<td>9.1</td>
</tr>
<tr>
<td>Hand</td>
<td>3,588</td>
<td>417</td>
<td>206</td>
<td>37.4</td>
</tr>
<tr>
<td>Foot</td>
<td>69</td>
<td>9</td>
<td>36</td>
<td>6.5</td>
</tr>
<tr>
<td>Hand variation</td>
<td>609</td>
<td>79</td>
<td>86</td>
<td>16.0</td>
</tr>
<tr>
<td>Bird track</td>
<td>89</td>
<td>13</td>
<td>39</td>
<td>7.1</td>
</tr>
<tr>
<td>Roo track</td>
<td>24</td>
<td>5</td>
<td>12</td>
<td>2.18</td>
</tr>
<tr>
<td>Circle</td>
<td>81</td>
<td>30</td>
<td>24</td>
<td>4.4</td>
</tr>
<tr>
<td>CXNF</td>
<td>126</td>
<td>12</td>
<td>59</td>
<td>11.0</td>
</tr>
<tr>
<td>contact</td>
<td>45</td>
<td>22</td>
<td>16</td>
<td>2.9</td>
</tr>
<tr>
<td>other</td>
<td>266</td>
<td>43</td>
<td>63</td>
<td>11.0</td>
</tr>
</tbody>
</table>

The most frequently depicted motifs did not always necessarily occur at the most site locations. The motifs which occur at most sites in the region are the macropod (40%) and the hand (37.4%) followed by other land animals and anthropomorphs (c.29%). Unlike the engraving assemblage, where the most common motif (mumdees) was only located at relatively few sites, hand stencils appear to be ubiquitous. Similarly, although not having the same prevalence as hand stencils, macropods occur quite
commonly in the assemblage (5.5% overall; 9.4% of classifiable motifs) as well as occurring at a large number (219) of sites. These results suggest that on the whole motifs are much more dispersed (relatively fewer motifs are placed in many more sites) and that there are no particular geographic foci for particular motifs.

There are obvious exceptions to this overall general picture, as regional motif preferences have demonstrated. Similarly, an analysis of the maximum number of times that a particular motif occurs in a site, shows that there are some shelter sites in the region where there are large numbers of certain motifs (e.g. 417 hands at Yengo 1; 45 macropods at 45-3-917, and so on: see Table 9.6). The geographic distribution of sites with some of the rarer overall motifs were plotted, as were the particular language groups into which these fall (Table 9.7).

The distribution of the these motifs were also plotted (Figures 9.54- 9.57). These figures in conjunction with Table 9.7 demonstrate the apparent focus for particular motifs in different areas and the relative absence of these same from others. Women and snake motifs represent a proportionally higher contribution to the Darkungung sites, while profile people occur much more commonly than expected in the Tharawal sites. Similarly, foot and contact motifs occur much more frequently in the Guringai sample than expected, as do kangaroo tracks in the Darug assemblage and other marine animals in the Sydney assemblage.
Table 9.7: Rare Shelter Art Motifs: Distribution per Language Area (codes as defined in Table 9.4). Figures which appear to be significant in bold.

<table>
<thead>
<tr>
<th>Motif</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman</td>
<td>34</td>
<td>68</td>
<td>4</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Profile person</td>
<td>14</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Culture hero</td>
<td>6</td>
<td>67</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Snake</td>
<td>15</td>
<td>71</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other marine</td>
<td>2</td>
<td>10</td>
<td>3</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Shield</td>
<td>18</td>
<td>53</td>
<td>6</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>Axe</td>
<td>19</td>
<td>66</td>
<td>3</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Roo tracks</td>
<td>3</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bird tracks</td>
<td>16</td>
<td>41</td>
<td>5</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>foot</td>
<td>12</td>
<td>33</td>
<td>10</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>CXNF</td>
<td>37</td>
<td>63</td>
<td>3</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>contact</td>
<td>7</td>
<td>44</td>
<td>4</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Total motif sample</td>
<td>7725</td>
<td>52.9</td>
<td>1504</td>
<td>10.3</td>
<td>65</td>
</tr>
</tbody>
</table>

Other marine animals occur relatively infrequently in the Darkungung and Darug sites. All types of anthropomorphic depictions are extremely rare or absent from the Guringai sample. Culture heroes and snakes are absent or extremely rare in the Tharawal sites.

In order to test the statistical significance of these differences, an approximate randomization method (Noreen 1989, Wright 1991) was used on the figures presented in Table 9.8. If we take a probability level of 0.05 as statistically significant, we have the following significant differences between language areas (Table 9.8).

Table 9.8: Shelter art motifs. Significant values achieved for rare motifs in the five language areas.

<table>
<thead>
<tr>
<th>Language Areas compared</th>
<th>Significance value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.004</td>
</tr>
<tr>
<td>1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>1</td>
<td>.030</td>
</tr>
<tr>
<td>2</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Synchronic variation: Shelter Art sites

Rare Motifs ...
Figure 9.54: Shelter art sites. Distribution of sites with women and profile anthropomorph motifs.
Figure 9.55: Shelter art sites. Distribution of sites with culture hero and shield motifs.
Figure 9.56: Shelter art sites. Distribution of sites with human feet and macropod track motifs.
**Figure 9.57:** Shelter art sites. Distribution of sites with axe and contact motifs.
There are statistically significant differences between the Darkung language area (Area 1) and all other language areas, these being least strongly demonstrated between the Darkung and Guringai groups (Area 2: Table 9.8).

There are also statistically significant differences between the Guringai sites and those from the Darug and Tharawal areas. The most significant of these is between the Guringai and Tharawal (Area 5) groups.

Interestingly there is not a significant difference recorded for the Sydney group of sites with any other than the Darkung (confirming that sampling may be playing a part here). There is also not a significant difference between the Darug and Tharawal groups.

These analyses reveal that as well as general stylistic clines existing across the region that there are significant localised differences in the use of particular motifs. A comparison of these differences with those found in the engraved motif assemblage will contribute to the understanding of localised stylistic emphases across the region (Chapter 9).

9.6 'Compositional Details'

In this Section the compositional details of two rare motif categories - shields and culture heroes - will be analysed. These two are the same as those analysed in the engraved assemblage (Section 7.5). On the whole, the pigment motifs demonstrate less compositional 'rigour' than the engraved component. Officer (1984) argued that this was partly due to this art medium being 'less culturally fettered'. It is likely that the less constraining methods of production with this art form also contributed to a greater degree of freedom in motif production here.

Shields

Following the reasoning described previously in the analysis of engraved shields, the 34 sites with the 54 painted, drawn or stencilled shields were analysed (Figure 9.55). It was hoped that an analysis of pigment shield designs may contribute further to determining the interrelatedness of contacts around the region (see Section 7.5).

There is much less design structure per se in the pigmented shield motifs. The majority (83%) of the recorded motifs consist of either a simple outline or solid internal infill. In one site (Plate 27) there is a stencilled parrying shield (with no subsequent decorative infill).
There are several examples across the region (particularly from around the Warre Warren area) that included internal designs that correspond to the classification developed for the engraved shields (e.g. Plate 24). These involve a total of ten shields, from seven sites. The three identified forms are type 2B, 2C and 2E (Figure 8.26). All three of these were recorded in one site (45-3-970) in the Warre Warren area, while three other versions of type 2C were recorded at another Warre Warren site (45-3-1602), on the Colo River (45-2-292) and at Manly (45-6-1262).

Two previously unidentified forms were recorded, these being a double longitudinal line (restricted to two sites in Middle Harbour and Lane Cove drainage basins) and a chevron design, from the one shield at site 52-2-453 in Tharawal's Avon/Cordeaux drainage basin.

The small sample of shield with internal designs makes a detailed distribution analysis unnecessary. The relative absence of shield designs, in comparison with the engraved component, is interesting in itself, and again supports the general contention of a less stylistically fettered production in this medium. While the sample size of pigment shield designs is extremely small, there are certain similarities and differences in comparison with the engraved assemblage.

The double (horizontal) cross design (2C) was the most commonly found in the engraved assemblage, and 40% of the pigmented shields with designs were of this type;

The internally decorated pigment shields were located mainly in the Darkinung area with only one in the Guringai area, compared with a definite focus in the Guringai area for the engraved shield designs;

+ The only pigmented St George cross (Type 2B) design was located in a site in Darkinung language area in the Mangrove Creek catchment. In this same site two other design forms (2C and 2E) were also found. This form was focussed in the Guringai and Darug language areas in the engraved assemblage.

+ The one engraved shield example in Tharawal language area had no internal design; the drawn version has a quite definite and distinctive chevron design, not recorded amongst the engraved assemblage (but see Collins 1798[1975]: Appendix VI; Plates 5 and 6).

+ There were no pigment shields with a diamonds design element at either end of the shield. This design element was found to be concentrated in the Cowan and Middle Harbour catchments with the engraved component. With the pigmented shields,
however, a double longitudinal line design occurred in Middle Harbour and further west at Lane Cove; this form not occurring in the engraved component.

Culture Heroes

A total of 18 culture heroes are present at nine sites across the region (Figure 9.55). This discussion relates only to those 17 motifs from eight sites to the north of the region¹ (Table 9.9).

This motif is found in a range of assemblage sizes, including the largest recorded in the region (Swinton's; 45-3-252). There is a fairly even distribution of overall assemblage size categories represented by the sites which contain this motif: - >250 motifs; 20%: >100-250 motifs; 20%: 50-100 motifs; 30%: <20 motifs; 30%. Four of these motifs occur singly at sites and on two occasions they are paired male and female. In one site (45-2-189; Sim 1969) there are six culture heroes.

The two identified forms of culture hero are the 'Daramulan' and the 'Blaimi' types (see Section 7.5). These are determined by the perspective (i.e. profile or plan respectively) of the particular motifs. In the engraved component, excessive size comprised a major part of the classificatory requirements. The amount of decorative infill and/or the presence of animal characteristics was also important.

In the shelter art component, this motif's form and distribution is significantly more restricted than is demonstrated by the engraved component. All the pigmented culture heroes are of the 'Blaimi' type. As indicated by the analysis of rare motif distribution, this motif is restricted to Darkungung and Darug language areas. While the engraved component demonstrates a culture hero focus in the Guringai language area, no such focus occurs in this art component. No pigment culture heroes were recorded in the Guringai area.

Size is a highly consistent criteria here although with the pigmented form this is considerably smaller than found on the open engraving sites (mean size is 1.25m; standard dev. 0.6). The Canoelands culture hero (Clegg 1977, McCarthy 1961) is the largest of these motif (c.3.0m). Size appears in part to be due to the smaller 'canvas' size available in shelter sites; but the consistent size range demonstrated by these motifs and the fact that these are indeed larger than the majority of anthropomorphic

¹ The one culture hero to the south of the Georges River was recorded by the Sydney Prehistory Group (1983) and counted by me for Stage I of the Rock Art Project (McDonald 1985). The reanalysis of motifs for this composition analysis necessitated a reanalysis of the drawn recordings, which were previously held at NPWS. The original SPG drawings have gone missing from the NPWS Sites Register (Ian Johnson, then NPWS Sites Registrar, pers. comm.) and the motif from site 52-2-23 could thus not be reanalysed for this degree of detail.
figures depicted in shelter art sites suggests that scale is still a consideration in the production of this motif. This motif is also differentiated from ordinary anthropomorphs on the basis of infilled decoration and attachments (e.g. the double and single horned anthropomorphs in the Mangrove and Mogo Creek catchments).

Table 9.9: Shelter Art sites. Culture heroes: compositional details.

<table>
<thead>
<tr>
<th>Site</th>
<th>Max length (m)</th>
<th>Animal features</th>
<th>Headdress</th>
<th>Horns</th>
<th>Other features</th>
<th>Colour</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-2-189</td>
<td>1.25</td>
<td>-</td>
<td>√</td>
<td></td>
<td>redrawn</td>
<td>B, W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>1.15</td>
<td>-</td>
<td>√</td>
<td></td>
<td>redrawn, 3 W</td>
<td>B, W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>-</td>
<td>√</td>
<td></td>
<td>redrawn, W</td>
<td>B, W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>2.1</td>
<td>-</td>
<td>-</td>
<td></td>
<td>head &amp; arms</td>
<td>W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>2.1</td>
<td>-</td>
<td>-</td>
<td></td>
<td>only, W eyes</td>
<td>W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>0.9</td>
<td>-</td>
<td>-</td>
<td></td>
<td>4 W eyes</td>
<td>B, W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td>-</td>
<td>√</td>
<td></td>
<td>holding spear</td>
<td>B, W + R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+ bag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-3-252</td>
<td>1.1</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>late in</td>
<td>R</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>sequence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-3-317</td>
<td>1.4</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>female W</td>
<td>R + W</td>
<td>O/i d + w</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>female W</td>
<td>R + W</td>
<td>O/i d + w</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>female W</td>
<td>R + W</td>
<td>O/i d + w</td>
</tr>
<tr>
<td>45-3-568</td>
<td>3.0</td>
<td>√</td>
<td>-</td>
<td></td>
<td>sev’r’l prod’n</td>
<td>R,Y,B,W</td>
<td>O/l d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>episodes ?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-3-794</td>
<td>0.7</td>
<td>-</td>
<td>-</td>
<td></td>
<td>male</td>
<td>B</td>
<td>O/i d</td>
</tr>
<tr>
<td></td>
<td>0.75</td>
<td>-</td>
<td>-</td>
<td></td>
<td>female</td>
<td>B (+ E)</td>
<td>O/l d</td>
</tr>
<tr>
<td>45-3-814</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td></td>
<td>R</td>
<td>O/i d</td>
</tr>
<tr>
<td>45-3-1136</td>
<td>1.2</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>R</td>
<td>O/l d</td>
</tr>
<tr>
<td>45-3-1602</td>
<td>c.1.0</td>
<td>-</td>
<td>√ (1)</td>
<td></td>
<td>lower half</td>
<td>W</td>
<td>O w</td>
</tr>
<tr>
<td></td>
<td>1.15</td>
<td>-</td>
<td>√</td>
<td></td>
<td>weathered</td>
<td>R + W</td>
<td>O/i d</td>
</tr>
</tbody>
</table>

2 This has not been quantified on a large scale. A limited analysis of the 33 anthropomorphic figures (men, women, profile people and anthropomorphs) at the Swinton’s site indicated that the mean size for these was 0.46m (st dev. 0.2). The culture hero at this site was 1.1m long.

Synchronic Variation: Shelter Art sites  
'Compositional details' ...
The distribution of horned anthropomorphs indicates an extremely localised use of this particular culture hero form. Eight of the culture heroes (47%) are in the Mangrove Creek catchment and five of these comprise the red horned anthropomorph form (Plate 3). A sixth red horned anthropomorph is located near Mogo Creek less than 10km from the Mangrove Creek group. Another pair from the Mangrove Creek catchment (at 45-3-794) are drawn in black and have a very similar morphology (minus the horns).

Only one of the pigment culture heroes has a therianthropic component. The Canoelands (45-3-568) version has a macropod-like head (in profile) in combination with otherwise anthropomorphic characteristics (it also have seven fingers on one hand).

These motifs range include white, black and red monochrome versions (painted and drawn) to bichrome (mainly red and white; drawn and painted) to the one polychrome example (the Canoelands culture hero is a black, red, yellow and white drawing).

This analysis again provide contrary evidence to the analysis of this motif form undertaken in the engraved component. The main and most obvious difference is in the more restricted geographic distribution of this motif in the shelter art assemblage. There is almost no overlap in the distribution of this motif in the two different art components (cf Figures 8.29, 9.55).

The more restricted design type (e.g. the absence of Daramulan type pigmented culture heroes) is also very interesting. This however does correlate with the compositional detail discovered in the engraved component. With the exception of one Daramulan found at Maroota, all of the Daramulan type engraved culture heroes were restricted to Guringai territory.

9.7 Chapter Summary

As with the engraved component, the analysis of this art context commenced with a general investigation of regional characteristics. This investigated technical options and motif focus. While again revealing broad regional characteristics, the variables analysed indicate varying stylistic preferences across the region.

In terms of motif assemblages, the Tharawal language area is clearly differentiated from all other language areas by its relative absence of hand stencils. The absence of stencilling, and paucity of white pigment, has meant a predominance of black pigment in

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3 The distribution of this motif is highly suggestive in light of the mythical creature called Ghindaring described for the Darkindung group (Chapter 3). This malevolent creature was said to inhabit the rocky places on sides of mountains and have a body 'with a red glow like burning coals' (Mathews 1904: 345).
this area. Red and yellow appear rarely in this assemblage. All other areas reveal varying levels of similarity and dissimilarity in their motif assemblages.

There is no clear focus on marine animals in the sheltered contexts of either coastal *Guringai* or *Tharawal* areas. This finding contrasts markedly with the engravings component.

There are several motif classes which are present at the northern and southern ends of the region but which are 'missing' from the central area of the Basin. Profile people, for instance are common in the *Darkungung*, *Darug* and *Tharawal* sites. None of these motifs is found in the *Guringai* or Sydney areas. This result is again in contrast with the engraved component: no engraved profile anthropomorphs occur south of the style boundary.

The investigation of *Darug* sites north and south of the Cumberland Plain revealed that some 'bedrock design notions' (Sackett 1990) transcend the geographic distance between these two assemblages. Both sets of *Darug* sites have a predominance of hand stencils with macropods, other land animals and anthropomorphs dominating (cf. *Tharawal* where macropods clearly predominate).

Distance, however has created some fundamental differences in assemblage characteristics between the *Darug* sites north and south of the Cumberland Plain. These are obvious in terms of certain motif preferences, but mostly in terms of schema. The schematic peculiarity of these southern sites, the use of four legs on terrestrial animals and two legs on birds (cf. two and one used, respectively, to the north), is present in the southern *Darug* and *Tharawal* sites, but not the northern *Darug* sites. This stylistic convention creates an overriding cohesion between the southern sites and suggests that the proposed boundary between these two language groups was unimportant. In the context of pigment art, there may have been more interaction between the southern *Darug* group and *Tharawal* speakers as there was between southern and northern *Darug* members.

Colour usage in the different language areas reveal definite stylistic (cultural?) preferences across the region. It would seem unlikely that this preference demonstrates availability of pigment resources. In the south of the region there is a definite preference for black pigment. In the north of the region there is a definite focus on white pigment, and while this reflects the prevalence of stencilling, white drawings and paintings are also common in this area. This dominance of white in this area also supports a model of contact between this part of the Sydney region and the Hunter Valley, where white is prevalent (Moore 1981; see Appendix 1 this work).
While black dominates in the *Guringai* area, there is a much more even usage of this colour with red and white. Red is commonly used here for stencilling and drawing.

Yellow is only rarely used (c.1%) in all language areas, although its highest percentage contribution to any assemblage is in the *Darkungung* area (4%). There are many sites with yellow stencils in this area, but relatively few drawings and paintings, except in the Warre Warren area in the Mangrove Creek catchment (McDonald 1988a).

The regional analyses (CA) of motif and technique provided more detailed information and indicated that there is a core of greater homogeneity amongst sites in the centre-west of the Sydney Basin. Again, radiating out from this central area there is increasing variability (Figure 9.5 and 9.6). This homogeneous focus is not mirrored by the engraved assemblage. Nor does the technical set of shelter art variables reveal the same levels (or foci) of homogeneity as the investigation of motif.

The results based on the technique variables indicate that there is a higher degree of technical homogeneity than there is similarity in subject preference. That is, the variability demonstrated by technique variables is less than that demonstrated by motif variables.

The CA demonstrated the levels of stylistic variability across the Sydney region in this art context. Again, in only one area is this variability distinctive enough to be classified as a style boundary. In other parts of the region, stylistic changes are clinal.

The degree of stylistic homogeneity is generally less in this component than in the engraving component. A major contrast was noted in the *Guringai* area which had the core engraving assemblage. The shelter art sites in this area are highly heterogeneous.

This variation can be explained in terms of the defined language areas, and there are varying degrees of stylistic variability in each. Variability on the basis of drainage basins also exhibited more localised traits can be distinguished.

The analysis of sites according to defined drainage basins and language areas confirmed a mosaic of stylistic variability. The core of homogeneous shelter sites in this component occurs in the *Darkungung* (45%) and northern *Darug* (45%) sites. The *Guringai* and southern *Darug* sites are the least homogenous (30% and 28% respectively), while the *Tharawal* sites are also very heterogeneous (34%).

In the *Darkungung* area, the assemblages from all three drainage basins reveal very similar levels of homogeneity (c.44%), with clinal variation in motif preference.
The proposed location of the *Darug*/*Guringai* language boundary was again supported by shelter motifs, with a strong separation between sites on either side of Berowra Creek. As was also found in the engraved component, there are striking similarities in motif preference between the *Darug* Berowra sites and those from Mangrove Creek to its north.

The *Guringai* sites are highly heterogeneous. The sites in the drainage basins of this area, however, have fairly similar outlier foci and therefore demonstrate similar motif preferences. Hand stencils, terrestrial and marine depictions are prevalent.

The southern *Darug* and *Tharawal* sites are also highly heterogeneous. Both the drainage basins in the southern *Darug* sample exhibit internally consistent levels of heterogeneity and similar motif preferences. Port Hacking is the only of the *Tharawal* group, and indeed southern area generally, where sites have a different outlier focus. This is owing to several sites in this extremely small sample having hand stencils.

These analyses of motif variability, when married to those of variability in technique, reveal great complexity in the mosaic of variability across the region.

The shelter sites were found to be more homogeneous on the basis of technique variables than had been found with motif preference. Again, the *Darkingung* and northern *Darug* sites are the most homogeneous (c. 70%). The southern *Darug* and *Tharawal* sites demonstrate similar and moderately high levels of technical variability (c.63%), while the *Guringai* sites again demonstrate the highest levels of heterogeneity (52.5%).

Outlier preferences confirm a general trend, from north to south, in the relative prevalence of white pigment to charcoal. The outlier foci in all but *Darkingung* and *Guringai* areas is on black drawings. In the *Guringai* area, there is also an emphasis on the use of red pigment, while in the *Darkingung* group, engraved motifs also play a part in the local diversity.

Internal variability was also observable within the different language areas and according to drainage basins. In the *Darkingung* sample, the Upper Macdonald sites demonstrate the most heterogeneity in the region (42%) while those from the Central Macdonald show the most homogeneity (79%). This disparity is marked, particularly in light of the highly consistent motif homogeneity and outlier foci in these two locations.

There is less disparity between the sites on either side of Berowra Creek using the technique variables, although the outlier foci on either side of the creek are markedly different. Again, the *Darug* Berowra sites are similar to the Mangrove Creek sites in
levels of overall homogeneity, although the outlier focus is different, partly owing to the high number of engraved motifs found in the latter.

The Tharawal and southern Darug sites show consistent levels of homogeneity, with the small coastal (Port Hacking) sample being the least homogeneous. Interestingly, the sites in this area have the same outlier focus as the other coastal groups analysed in this fashion, the Guringai Cowan and Pittwater sites.

The analysis of rare motifs has demonstrated significant differences in the focus in the two art components, as represented by their rarer and perhaps more localised traits. For instance, the amount of potentially information-laden detail in the engraved shields, and the localised distribution of certain shield designs in the Guringai language area, was not mirrored by similar design detail in the sheltered component. It would appear that there were differences in the accepted or permitted range of motifs in the different art media. These results support a model for the expression of very different social behaviours in the two art contexts. These findings are discussed further in Chapter 10.
Chapter 10

The theory, the model, the facts: Dreamtime superhighway

This thesis has focussed on the interrelatedness of prehistoric art and other archaeological evidence in the Sydney region. Sources of stylistic variability in open engraving sites and sheltered pigment sites have been explored. Diachronic and synchronic variation have been investigated, as have the effects of medium and site location. The contemporaneity of art and occupation deposit in shelter sites was examined as a means of testing assumptions about the age of the art. This work was also important for developing models about how the two art components may have functioned across this area. A model for the social interaction across the region which is founded in information exchange theory has been developed. The model adopts the view that style is a means of non-verbal communication used to negotiate identity (Wiessner 1990). It is proposed that the rock art in the Sydney region functioned as a prehistoric information superhighway. Through stylistic behaviour, groups around the region, who were not in constant verbal contact with each other, were able to communicate important social messaging and demonstrate both broad-scale group cohesion and within-group distinctiveness.

This research was predicated on two assumptions; that the two art components are relatively recent and that they were produced contemporaneously. Some of the analyses undertaken here were directed at testing these assumptions, and concluded that these assumptions are valid.

10.1. Summary of art characteristics, both contexts

Engraving sites characteristics

The engraving assemblage is composed of 717 sites and a total of 7,804 motifs. The average engraving assemblage contains 11 motifs. The majority, however, contain less than eight motifs. Most engraving sites are located on open horizontal expanses of sandstone, but a number has been found on vertical boulders in close proximity to major waterways.

The topographic distribution of engraving sites is wider than previous work suggested. Only slightly more than half of the engraving sites are located on ridgelines, with 40% of this site type occurring in the hillslopes zone.
The predominant motif in the region is the human track or *mundoe*, followed by fish, macropods, men and bird tracks. The distinction made between Panaramitee and Simple Figurative assemblages, based on the different proportions of tracks *per se* (Maynard 1976), is diminished by this result. Human tracks, however, do not figure highly in Panaramitee sites.

**Shelter art site characteristics**

The shelter art sample included 546 sites and a total of 14,424 motifs. The average shelter art assemblage is larger than its engraved counterpart, and contains 26 motifs. Most sites, however, contain less than ten motifs.

The topographic distribution of this art context is more focussed than the engraved component, with the majority (70%) of shelter art sites being located on hillslopes. The remainder are found equally often in ridgetop and valley bottom locations.

A substantial proportion (c.30%) of shelter art sites also has surface evidence for occupation deposit, although this is considered to be an underestimate. Excavation programmes around the region directed at testing PADs (Potential Archaeological Deposits) have revealed that a large proportion of sites with no surface manifestations are indeed occupation sites (e.g. Attenbrow 1987, McDonald and Rich 1993).

The predominant identifiable motif in the region is the hand stencil. Macropods, anthropomorphs and land animals dominate the depictive motifs. The pigment art is generally in a fairly poor state of preservation. This, combined with its more *ad hoc* production and relatively 'culturally unfettered' nature has meant that slightly more than 40% of all pigment motifs in the region are unclassifiable, i.e. 'unidentified'.

**General comparisons of the two contexts**

A general comparison of the two art components reveals several points about the nature of these extensive regional art bodies, including:

1) While demonstrating inherently distinctive stylistic traits as a result of their particular technical options, the two art bodies represent different manifestations of the same art tradition;

2) Shelter assemblages are generally larger than open engraving assemblages;

3) There are striking similarities in the motif preferences demonstrated in the two components, although several major differences occur, e.g. the dominance of
marine depictions amongst the engraving assemblage, but relative absence of these themes from the shelter art assemblage;

4) Stylistic clines and boundaries are demonstrated by both art components, and there is considerable congruence in their locations;

A previously identified style boundary within the region (McMah 1965, McDonald 1985a) is confirmed at the Georges River. This boundary is based on the presence and proportions of different motifs and on overriding schematic differences, i.e. there is a complete absence of certain motifs and disparate stylistic conventions on either side of this river. In this analysis, both art contexts confirm the location of this boundary on the basis of motif preferences and technical options;

5) Shelter art sites are present in great numbers across the entire Hawkesbury sandstone landscape, while the distribution of engraving sites is more restricted geographically. There is a dense core of engraving sites in the central coastal area of the Basin. Such sites decline in number towards the north-west, although assemblage sizes in this area are very large, i.e. more engraving effort is concentrated in a smaller number of locations. At the southern end of the Basin, particularly south of the Georges River, both the number and size of engraving sites diminish.

It was initially thought that this uneven distribution may have been the result of recorder bias, i.e. sites in closer proximity to the city might have been the focus of attention. However, systematic survey in areas with otherwise low numbers of engravings has revealed a real absence of this site type in parts of the region (e.g. Attenbrow 1987, Attenbrow and Negerevich 1984, McDonald 1988a, 1990b; although cf. McDonald 1986a).

The distribution of engraving sites, particularly the apparent focus in the Guringai area and relative paucity south of the identified style boundary in Darug and Tharawal territories, may be indicative of different social mechanisms operating across the region.

The ubiquitous art production in shelter locations across the region is again suggestive that these two art contexts provided the means for distinctly different symbolic behaviour. It would appear that all local groups across the region used pigment art to negotiate identity. This type of behaviour occurred on both sides of the style boundary, and while major stylistic (cultural?) differences are indicated across this boundary, it would appear that the behaviour, using this medium, could have been the same. This is discussed further below.
10.2 Contemporaneity of art and deposit

The contemporaneity of art and occupation deposit was demonstrated at three shelter art sites. In all three sites tested, there was a strong suggestion that the main phase of pigment art production coincided with the most intensive period of shelter occupation. In multi-phased art sites, earlier low-intensity occupation could be argued to have an artistic component, also of low intensity. However, proving this earlier association is almost impossible in most cases.

Prior to this study, more than 30 shelter sites with art had been excavated across the region. While only one of these was excavated expressly to investigate the context of the art, an analysis of this group of shelters demonstrates broad contemporaneity of art and domestic and/or economic activities across the region. A significant finding in this analysis was that the patterns of occupation in shelter art sites mirror the indices exhibited by occupation sites generally. This result suggests there are no intrinsic differences in the nature of occupation between shelters used for art production and those without it. Only the inconclusive evidence from UDM shelter indicates that art production in sheltered locations may have continued once shelters were abandoned as places of occupation.

This evidence suggests an important role for this art context in an information exchange system. If pigment art was produced in shelters, where it would have been accessible to a wide audience, then the art was fulfilling a function very different from an art form which was produced 'in private' or for a restricted audience. This argument is developed further below.

The analyses of contemporaneity provides evidence for diachronic change in the art of the region during its occupation. The clearest evidence for this is in shelter sites with pecked intaglio motifs, interpreted as 'residual Panaramitee'. While the majority of these engravings are not in datable contexts, the Yengo 1 excavation supports the contention that this style of art predates the majority of the art and occupation in the Sydney region, as has been demonstrated in numerous other art regions in Australia (e.g. central, south-eastern and northern Queensland, Victoria River Downs, etc.).

There is only a small number of shelter sites containing residual Panaramitee engravings. This evidence for an earlier, low-density artistic tradition predating the main occupation and artistic period of the region matches the evidence for low-density early occupation (e.g. Attenbrow 1987). This match suggests a continuing tradition over time for the contemporaneity of art and occupation in the region's sheltered locations.
It would appear that in some parts of the region, there are more sites which were used to produce art during the earlier, residual Panaramitee phase. There are 55 shelter sites with engravings amongst their assemblages in the north of the region, and only two such sites to the south. While approximately half of the northern shelters contain non-Panaramitee engraved motifs, i.e. the miniature-Sydney or the incised versions, a large number of sites with pecked circles and animal tracks is located in the Macdonald River and Mangrove Creek drainage basins. This suggests that early occupation of the region may have been in these particular areas branching off the Hawkesbury River (see Bowdler 1977)\textsuperscript{1}. This distribution matches that of the earlier occupation sites which have been located in the region (e.g. Attenbrow 1987, Kohen \textit{et al.} 1984).

10.3 Diachronic change in the shelter art

A detailed analysis of 65 shelter art sites in the Mangrove Creek Valley was undertaken to ascertain whether there was diachronic variability, and to determine the likely effect of diachronic change on stylistic variability across the region. On the basis of superimpositioning, motif preference and multivariate analyses of motif and technical variables, three phases of art production were discerned in this location. On the basis of broadly similar patterns identified in a number of sites in different locations (Chapter 6), this sequence is extrapolated to the region as a whole. This art sequence is:

**Sydney Basin Art Phase 1**
pecked engravings of tracks and circles.

**Sydney Basin Art Phase 2**
red paintings, red hand stencils, and possibly white hand stencils (the latter two do not co-occur).

**Sydney Basin Art Phase 3**
a proliferation of techniques and colour usage, perhaps starting with plain dry black and dry red motifs and then developing into a range of paints, dry bichromes, stencils of varying colours, polychromes and incised motifs. Outline-only motifs end the sequence in many shelters, although contact motifs have also been recorded in white stencils and drawn red and white outlined and infill forms.

Across the region, within Phase 3, there may be localised variation in technique proportions, motif preference and timing. These have been identifiable through the synchronic analyses (Chapters 8 and 9; see below).

\textsuperscript{1} The two southern sites with engraved macropod and bird tracks are located in the Georges and Wollondilly River catchments, the latter being in the upper reaches of the Hawkesbury-Nepean. There are also two sites with engraved bird tracks in the Blue Mountains, around the headwaters of the Grose Valley (another tributary of the Hawkesbury River).
A chronology for the Mangrove Creek art sequence was proposed on the basis of associated dates in particular shelter sites (Chapter 7). This has been correlated with the identified lithic phases, and on the basis of association in certain sites, has been assigned tentative dates. These are

<table>
<thead>
<tr>
<th>Art Phase 1</th>
<th>Pre- or Early Bondaian</th>
<th>&gt; 4,000 years BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Phase 2</td>
<td>Early Bondaian</td>
<td>&lt; 4,000 - c.1,600 years BP</td>
</tr>
<tr>
<td>Art Phase 3</td>
<td>Middle to Late Bondaian</td>
<td>c.1,600 - European contact</td>
</tr>
</tbody>
</table>

Difficulties were encountered in accurately dating this chronology because of the scarcity of sites with art in dateable contexts, and inconsistencies in dating the Stone Tool Phases in particular sites. A correlation of Art Phases with broader Lithic phases appears to be the most judicious categorising of the material. It is argued that the main art production period in most sites is contemporaneous with the most intensive period of stone tool production in shelters, the Middle Bondaian. It is thought, however, that art production continued into the late Bondaian and indeed up until contact.

The production of the art in shelter contexts continued without appreciable stylistic change with the changeover from the Middle to late Bondaian. The significance of this finding is discussed below, in terms of the model for stylistic behaviour in the region.

The diachronic analyses indicated that appreciable changes did not occur over the main period of art production. Thus, variability investigated on the basis of geography should not be unduly affected by diachronically significant 'noise'. As indicated above, 'older' art sites may be focussed on tributaries of the Hawkesbury-Nepean, particularly in its middle reaches. Shelter sites in these locations do exhibit a degree of variability on the basis of engraved motifs, although only half of these motifs are of the older style (see below).

It has also been argued (Chapters 3, 7) that there was rapid decline of the cultural context for art production in the post-contact period, and the production of art appears to have ceased very soon after 1788. The cultural upheaval which occurred with the arrival of Europeans, particularly as a result of the devastating small pox epidemic, thus has not been reflected in the art and nor should it have unduly affected the synchronic distribution of prehistoric art traits.
10.4 Synchronic variability; both components

Engravings

An investigation of site size, density and motif preference discerned broad differences amongst engraved assemblages across the region (Section 8.3.1). These included some expected economically-related differences, i.e. a marine emphasis on the coast and terrestrial focus further inland, but also indicated differing motif preferences across the region which could not be explained in such terms.

The multivariate analyses indicate that the region's engravings are relatively homogeneous, and that there were no distinctive internal divisions. This result is as would be expected in a regional art body. The CA results do demonstrate, however, that stylistic variability can be discerned across the Sydney region. In only one area is this variability significant enough to suggest a style boundary. In other parts of the region, stylistic changes are clinal. The CA of the entire region indicated that the sites in the central coastal core demonstrated the greatest homogeneity (Figure 8.4). Radiating out from this central area, the heterogeneity of the assemblages increased. The sites at the very north and south of the region were considerably more heterogeneous than those found in the centre of the region.

After these geographic trends were identified, the assemblage was investigated in terms of drainage basins and language areas at contact. These analyses focussed on three areas: the north-western inland zone, the Daringung; the central coast and inland south of the Hawkesbury River, the Guringai and Darug; and southern coastal area, south of the Georges River, the Tharawal. The Daringung and Guringai language areas were found to have the most homogenous engraving assemblages (45%), followed by the Darug (35%). The engravings in the Tharawal area are the least homogenous (20%).

Sackett (1990) has proposed that style is found wherever isochrestric options exists and factors allied to ethnicity dictate the choices made among them. This view of style is allied to the proposal that 'themes may well be the [things] that give congruence to isochrestric choices' (Sackett 1990: 41). The foregoing motif classification and analyses have demonstrated that there are thematic differences across the region, reinforcing the idea that a significant degree of stylistic information can be provided by motif analysis.

To complement this broader level of analysis, rare motifs and 'compositional details' (Sackett 1990) were also investigated, in an effort to explore these more specific levels of information, and to determine the degree of vernacular variability.
The analysis of rare motifs confirmed the localised character of the engraving assemblages in different parts of the Basin. It also confirmed the separation between the Tharawal language group and all other language areas.

Sites with culture heroes, profile anthropomorphs, axes and contact motifs are focussed in the western part of Guringai territory and to a lesser extent in Darkungur territory. The distribution of these motifs suggests a design 'link' between these two language areas, which is also suggested by similar levels of overall homogeneity in the CA results. The apparent focus of these motifs has implications for aggregational contact (defined by Conkey 1981) between members of these language groups.

An analysis of compositional detail on certain engraved motifs also revealed design contact between Guringai, Darkungur and Darug language areas, but not between these groups and the Tharawal. Design variability on shield motifs was found to be extraordinarily diverse in the Guringai area, with both less motifs and a marked decrease in design options being exercised outside this language area. Again, design focus is indicated in the Guringai area, and design influence would appear to flow from this area into these other areas.

These findings have significance in light of ethnohistoric evidence for the inequality of groups around Port Jackson area. The Guringai speaking group to the north of Sydney was noted to be the largest and strongest by the 'influence of their numbers and muscular appearance' (Collins 1798[1975]:453). Collins continued that 'there is no doubt of their decided superiority over all tribes with whom we are acquainted' (ibid.). The large number of engraving sites and the design influence that this assemblage indicates will be discussed further below (Section 10.5).

Shelter Art Sites

The analysis of this art context also commenced with a general investigation of regional characteristics. This focussed on technical options and motif focus. While again revealing broadly similar regional characteristics, the variables analysed indicates varying stylistic preferences across the region.

In terms of motif assemblages, the Tharawal language area is clearly differentiated from all other language areas by its relative absence of hand stencils. All other areas reveal varying levels of similarity and dissimilarity in their motif assemblages.

There is no clear focus on marine animals in the sheltered contexts of either coastal Guringai or Tharawal areas. This finding contrasts markedly with the engravings component.
Colour usage in the different language areas reveal definite stylistic (cultural?) preferences across the region. It would seem unlikely that this preference demonstrates availability of pigment resources. In the south of the region there is a definite preference for black pigment. In the north of the region there is a definite focus on white pigment, and while this reflects the prevalence of stencilling, white drawings and paintings are also common in this area. This dominance of white supports a model of contact between the Hunter Valley and this part of the Sydney region (Moore 1981; see Appendix 1 this work), as white is prevalent in the latter region.

The results based on the technique variables indicate that there is a higher degree of technical homogeneity than there is similarity in subject preference. That is, the variability demonstrated by technique variables is generally less than that demonstrated by motif variables.

The CA demonstrated that there is stylistic variability in shelter art component across the Sydney region. In most parts of the region, stylistic changes are clinal. The degree of stylistic homogeneity is generally less in this component than in the engraving component. A major contrast was noted in the Guringai area which had the core and highly homogenous engraving assemblage. The shelter art sites here are highly heterogeneous.

This variation can be explained in terms of the defined language areas, and there are varying degrees of stylistic variability in each. The analysis of sites according to defined drainage basins and language areas confirmed a mosaic of stylistic variability. The core of homogeneous shelter sites in terms of motif occurs in the Darkung (45%) and northern Darug (45%) sites. The Guringai and southern Darug sites are the least homogenous (30% and 28% respectively), while the Tharawal sites are demonstrate high levels of heterogeneity (34%).

On the basis of technique variables, again, the Darkung and northern Darug sites are the most homogeneous (c. 70%). The southern Darug and Tharawal sites demonstrate moderately high and similar levels of technical variability (c.63%), while the Guringai sites are again the most heterogeneous (52.5%).

In the Darkung area, the assemblages from all three drainage basins reveal very similar levels of homogeneity (c.44%), with clinal variation in motif preference. However, internal variability was quite marked within the Darkung sample in terms of technique. The Upper Macdonald sites demonstrate the highest levels of heterogeneity in the region (42%) while those from the Central Macdonald are some of the most homogeneous (79%). This disparity is marked, particularly in light of the highly consistent motif homogeneity and outlier foci in these two locations.

Conclusions ...
The location of the proposed Darug/Guringai language boundary was again supported by shelter motifs, with a strong separation between sites on either side of Berowra Creek. There is less disparity between the sites on either side of this boundary based on technique, although the outlier focus on either side of the creek is markedly different.

As was also found in the engraved component, there are striking similarities in motif preference between the Darug Berowra sites and those from Mangrove Creek to its north. The Mangrove Creek sites, however, have a much higher number of engraved motifs.

The Guringai sites demonstrate high level of motif heterogeneity. The sites in these drainage basins, however, have fairly similar outlier foci and therefore motif preferences. Hand stencils, terrestrial and marine depictions are prevalent, and there is also an emphasis on the use of red pigment.

The southern Darug and Tharawal sites are also highly heterogeneous in terms of motif. Both the drainage basins in the southern Darug sample exhibit high levels of internally consistent heterogeneity and similar motif preferences. In terms of technique, the Tharawal and southern Darug sites show consistent levels of homogeneity, with the small coastal (Port Hacking) sample being the least homogeneous. The sites in these areas indicate considerable interaction between these language groups, and while there are clinal associations indicated between the northern and southern Darug sites, there are strong associations between the southern Darug and Tharawal areas in terms of shelter art. These include the schematic differences described above, and the fact that neither is associated with an extensive engraved component.

The analysis of rare motifs has demonstrated significant differences in the focus in the two art components, as represented by their rarer and perhaps more localised traits. For instance, the amount of potentially information-laden detail in the engraved shields, and the localised distribution of certain shield designs in the Guringai language area, was not mirrored by similar design detail in the sheltered component.

The ornate and impressive engraved culture heroes found mainly in the Guringai area are not matched either in extent or in the range of variation in the shelter art component. Certain design features and motif variations have only been practiced in certain parts of the region. It would appear that there were differences in the accepted or permitted range of motifs in the different art media. These results support a model for the expression of very different social behaviours in the two art contexts.
10.5 Social context and stylistic information

Shelters vs engravings

In order to investigate the stylistic variability in these two art contexts, it was necessary to consider the potential for heterogeneity in each. A method for assessing the significance of stylistic heterogeneity needed to be established. If a basic potential for variability exists in either medium, then any variability demonstrated needs to be greater than the intrinsic potential for variability, before significance can be claimed.

The motif classes used for the two assemblages were almost identical, with two extra motifs being counted in the shelter art assemblage (Chapter 5). Is it possible, using very similar motif classifications, to differentiate the potential of either medium for greater heterogeneity (e.g. Gamble 1982 vs Soffer 1987)? Would the overriding similarities in the art, and thus the classification systems used, conspire against any demonstration of heterogeneity?

One potential source of greater heterogeneity in the shelter art assemblage is found in assemblage size. Shelter art assemblages are considerably larger than their open engraved components (see above).

The general statistics for site size (Table 10.1) indicate that the potential for heterogeneity of motif assemblages based on this factor is far greater for shelter art sites than it is for engraving sites. The variability inherent in shelter art sites is three times as great as that demonstrated by the engraving sites. When looking at the numbers of motifs used in the different sites for the two media, however, this variability is substantially decreased (Table 10.2). While the maximum number of motifs present at any one site is greater for shelter sites than engraving sites, the standard deviations for the two are very similar.

Table 10.1: Statistics for assemblage sizes in the two art components across the region.

<table>
<thead>
<tr>
<th></th>
<th>Shelter Art sites</th>
<th>Engraving sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maximum</td>
<td>857</td>
<td>174</td>
</tr>
<tr>
<td>Mean</td>
<td>26.4</td>
<td>10.9</td>
</tr>
<tr>
<td>Stand Dev.</td>
<td>55.4</td>
<td>18.0</td>
</tr>
</tbody>
</table>
Table 10.2: Statistics for total number of motif categories recorded in sites from the two art components across the region.

<table>
<thead>
<tr>
<th></th>
<th>Shelter Art sites</th>
<th>Engraving sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maximum</td>
<td>24</td>
<td>19</td>
</tr>
<tr>
<td>Mean</td>
<td>4.5</td>
<td>3.4</td>
</tr>
<tr>
<td>Stand Dev.</td>
<td>3.8</td>
<td>4.0</td>
</tr>
</tbody>
</table>

An analysis of the motif occurrence (maximum number of times a motif is present at any one site), and the motif emphasis (percentage of sites at which certain motifs have been depicted), indicates that while there are different foci in the two media, both show a general consistency of motif use. There is no indication of any particular emphasis on particular important/common motifs in either context. **Mundoes**, fish and macropods are the most commonly depicted motifs in the engraved assemblage. These occur in 22% (157), 35% (250) and 34.5% (247) of sites respectively (Tables 8.5). The most commonly depicted motifs in the shelter art assemblage are hands and macropods. These occur in 37% (206) and 40% (219) of sites (Table 9.7).

In comparing motif emphasis in Arnhem Land bark paintings with that found in Western Desert acrylic art, Claire Smith (1989) found a figure of 20% for the former and 80% for the latter. The contrast between the Sydney engravings and shelter art sites is significantly less, and indicative of the inherent similarities of the two art components. The potential for variability here would appear to be minimal, and on this basis neither component has a greater potential for variability.

The potential for heterogeneity was thus calculated on the basis of the motif classifications used and the maximum number of times that motifs occurred in the two assemblages.

Following Smith (1989: 126) the formula for potential combinations is

\[
F(n) = \frac{n!}{r!(n-r)!}
\]

where 'n' equals the number of elements available in the system, and 'r' equals the number of elements combined.

For the engraving sites, 27 variables were used with no site having more than 19 different motifs. With the shelter art sites, 29 variable were used with no sites having more than 24 variables.
Engraving sites: 

\[ n = 27 \]
\[ r = 19 \]

\[ F(n) = \frac{27!}{19!(8)!} = 2,220,075 \]

Shelter art sites: 

\[ n = 29 \]
\[ r = 24 \]

\[ F(n) = \frac{29!}{24!(5)!} = 118,755 \]

From these equations it is clear that the potential for heterogeneity in terms of motif combinations is in fact greater for the engraving sites, by a factor of 20, than it is for the shelter art sites. These baseline analyses indicate that significantly greater amounts of heterogeneity would be expected in the engraving component than in the shelter art component.

The multivariate analyses undertaken in this research (Chapter 8 and 9) found that both art components in the Sydney region exhibit synchronic stylistic variability on the basis of motifs and technique. However, the degree of stylistic homogeneity is less in the shelter art component than is found in the engraving component, when comparing motif, i.e. the analysis comparable to both contexts. This is not the result which would be expected, based on the calculated potential of either component to be heterogeneous.

Homogeneity was calculated in terms of percentage frequencies of sites per area in drainage basins and language areas. Results indicate that the shelter art sites are either equally homogenous or considerably less homogenous than engraving sites in each of the language areas and drainage basins (Sections 8.4.2 and 9.4.1). The fact that the engraving component is generally more homogenous than the shelter art component is considered a significant result.

It is argued that these varying levels of heterogeneity reveal different types of social information. The higher level of homogeneity in the engraving medium demonstrates larger scale group cohesion. The more heterogeneous medium demonstrates localised group identifying behaviour. This argument can be supported by the archaeological data, and by following Wobst's (1977) principles, as refined by Wiessner (1989, 1990).
The idea of audience and social context is important in developing this argument, and is discussed further below.

The variable distribution of engraving sites around the region also suggest the geographic focus for cohesiveness in the region. The Guringai language area, on the basis of homogeneity demonstrated by its engraving sites and by the design influence which is apparent in terms of rare motifs and compositional details, appears to be the ‘source’ of cohesion. The effect of the Guringai influence, can be seen as diminishing to the north-west of the region and non-existent to the south of the region. The relative absence of engravings south of the style boundary indicates either a reduced need for broader-scale group cohesion, transcending this boundary, or alternative social mechanisms. This result is also discussed further below.

**Public vs Private engravings**

Social context and levels of visibility was also investigated using engraving sites in the Guringai language area. The art sites in the foreshore zone at the bottom of steep cliffs and hillslopes provide a different social context from the open engraving sites on the less economically-productive plateaux above.

The sites around the foreshore are close to estuarine resources and indeed most would have been accessed either by canoe or on foot around the foreshore. The estuarine foreshores in this area are characterised by extensive and often continuous Aboriginal open middens and middens in shelters. Many of these are associated with rock art, both the pigment form and an unusual open vertical engraving type (Chapters 5, 8). The foreshore zone was the focus for women’s shellfish collecting and men fishing. There are reports (Chapter 3) of women beaching their canoes and eating their catch on shore.

It is argued that the art around the foreshore should inform us of very different artistic behaviours from art sites which are viewed by fewer people or by people operating in a less casual context. The art produced in this highly visible context should reflect bounding behaviour while that occurring in socially less visible locations should demonstrate bonding (Wobst 1977, Wiessner 1990). The art produced around the foreshore should function much as in shelter art sites, since the audience to this art’s production includes the entire group in their daily economic round.

The analysis of open ridgetop engravings on horizontal platforms and foreshore engravings on vertical boulders was done within a single language area. While the overall motif emphases in these locations was similar, stylistic expression was not. CA results of the engraving sites in the two contexts confirms that those located around the foreshores are less homogeneous than those occurring on the plateaux (Section 8.5).
The presence and use of the vertical engraving sites around the foreshore zones, in a different social local context, provides supplementary evidence for bounding behaviour in the region. The analysis of selected aspects of stylistic variability in the region generally has confirmed a number of predictions about the use of style as non-verbal communication.

10.6 The model

The environmental conditions within the Sydney region, while varying slightly in terms of localised biomass (coastal, estuarine, hinterland) are those of a fertile coast. In terms of modelling behaviour and social interaction in the region, the environmental and seasonal conditions were fairly predictable. Owing to these more predictable resources and the increased social pressure induced by larger population sizes (Morwood 1987), well-developed group identity and formalised group membership would be expected as a result of increased exclusivity and territoriality.

The art of this region is expected to be stylistically more heterogeneous than that of an arid or unpredictable environment (C. Smith 1989) because the nature of social interaction is demonstrably different. However, it is argued that the concept of open and closed networks, and the likely differences which would be demonstrated through the art of such social systems (Gamble 1982, C. Smith 1989), is too crude a model for this particular region.

Madden's (1983) model of social interaction fields and an aggregated social network system improves upon this grosser environmental model and provides a description which appears to fit more closely the general Australian ethnographic literature on social organisation and which appears to have existed in the Sydney region at contact. Again, it depends on the scale of investigation, i.e. regional or intra-regional, as to which of her models is the most appropriate. Madden's (1983: 194) 'differentiated network system due to imposed social boundaries' appears well-suited to the Sydney region. In her other models, the boundaries are vague owing to distance (Model 1) or unenforced, owing to lack of communication (Model 2). Neither of these two versions describe the situation in Sydney at European contact, although Model 1 might be appropriate for the Early or Pre-Bondaian period.

The differentiated network system envisages boundaries as relatively formalised and structured linkages. A high level and frequency of exchange is demonstrated by the bounded groups in this situation. Recognition and maintenance of social boundaries would have depended on the degree of internal integration and on the level of cultural
distinctiveness of the bounded groups. In a relatively non-stratified society, such as in the Sydney region at contact, significant within-group differentiation on grounds other than age or gender would not be expected. The Sydney region may have presented a closed and cohesive cultural system to the groups outside its boundaries, but within this system interactive networks were probably open. The fact that there were overriding similarities among the groups across the area suggests that while bounding behaviour may have been practised, the lack of between-group cultural distinctiveness would result in less significant levels of inter-group differentiation. Different local groups did exist across the region, as for example as expressed in language, but the social differences between them were less than the overriding culture-area similarities.

In the Sydney region, while the population density was generally high, there was probably not fierce competition over scarce resources, i.e. because there were localised resources scattered across the entire region. Social interaction within but also across linguistic boundaries was observed at European contact. Organised social events, e.g. initiation ceremonies and dances, as well as the exploitation of windfall resources such as feasts on beached whales, resulted in aggregations of large numbers of people of mixed language groups. There is no ethnographic evidence documenting a rigid demarcation of territorial boundaries, although many of the initial observations did occur on the resource-rich coastal strip and possibly within a single linguistic group. This territorial organisation, and the overriding regional similarities, suggested that the spatial organisation of art traits would probably not demonstrate characteristics of smaller-scale boundary maintenance (Wobst 1977).

Madden identified three variants which condition the permutations of her models; population, competition over scarce resources and the distance between local groups. The distances between local groups is the most difficult of these variants to reconstruct on the basis of the ethnohistoric and linguistic sources.

Four languages have been identified across the study area at contact. These are the Daringung, Guringai, Dharug and Tharawal (Capell 1970). Previous reconstructions (e.g. Kohen 1986) tend to suggest that a number of dialectic or local groups existed in each of the identified language groups (Kohen and Lampert 1988). The distances between local groups, then, while probably varying according to local biomass, were probably small. The analysis based on drainage basins undertaken in this work (Chapters 8 and 9) was an attempt to achieve meaningful subdivisions within the larger language areas, and successfully demonstrated patterning in the art within language areas. This patterning may well represent that of these smaller dialectic or local groups, and suggests that conscious group territoriality did operate on a smaller scale than the
language area. Again, it would appear that the ethnohistoric evidence is not an accurate record of the territorial complexities.

Previous archaeological work suggests that there has been considerable change in settlement patterns over the period of the region's occupation. By 5,000 years ago, occupation was well established, and widely ramified social change took place probably owing to population pressure resulting from the sea level rise. Evidence for this change is the introduction of the Bondaian. Phases identified for south-eastern Australia generally, i.e. the Eastern Regional Sequence, have been refined by recent work. Habitation indices, particularly where they and the interrelationship of art have been investigated, suggest that these patterns can now be expanded beyond technological description.

Detailed work in the Mangrove Creek valley for this research has built on the model proposed by Attenbrow (1987). This research has investigated local intra- and intersite patterns in an effort to seek an understanding of the specific prehistoric processes involved (see Conkey 1987). These results, in light of an extensive body of data already investigated across the region, can now be extrapolated for discussions at a regional scale. The more specific analyses undertaken here have reinforced the variability inherent at the local level. Broadly consistent patterning, however, justifies the extrapolation of these patterns to the regional level.

The current analysis suggests that the timing for the transition between the Middle and Late Bondaian requires modification. Discussion with Val Attenbrow confirm that her recent work in Port Jackson has led her to a similar conclusion (Attenbrow pers comm., 1994). The introduction of fishhooks c.1,000 BP and a number of more recent Middle Bondaian dates (e.g. Yengo 1, >540 BP: UDM; c.1,200 BP: and Loggers? at c.780 years ago) suggest that the changeover between these phases may have been considerably later than the 1,600 BP changeover she initially posited (Attenbrow 1987). A transition which coincides with the introduction of fish-hooks on the coastal strip and with the declining shelter occupation rates in the most recent millennium would be parsimonious, and thus a date of c.1,000 years is proposed for this changeover.

The following amended dates are thus proposed for phases within the Sydney Region Bondaian:

- Early Bondaian  c.5,000 years to c.3,000 years BP
- Middle Bondaian  c.3,000 years to c.1,000 years BP
- Late Bondaian  c.1,000 years to European contact.

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Throughout these phases settlement patterns are expected to have varied.

Early Bondaian

Population densities were still relatively low at this stage. Use of rock shelters was increasing or at least artefact discard increased so as to be archaeologically visible. Early development of the figurative pigment art and possibly also open engraved art could be expected at this time in keeping with developing social interactions and stresses.

Middle Bondaian

There was a dramatic increase in population densities. Following the increased use of rock shelters, there was a dramatic increase in these locations for artefact discard. Social pressures resulting from the increased population necessitated social mechanisms to control interaction and to make such interaction less stressful. There was a proliferation in the use of symbolic behaviour, particularly that which allowed the definition of local group social affiliation. This symbolic behaviour probably took many forms including body decoration and scarification. The pigment and engraved art of the region would have developed in this atmosphere.

Late Bondaian

There is no real evidence for population decline but there is a suggestion of changing social organisation during this period. Settlement indices show that rock shelters continued to be used during this period but that occupation rates dropped slightly along with artefact deposition in these locations. It is argued that the focus may have shifted at this time to open camp site locations as a result of changes to the social system (viz. Walters 1988).

The period of most intensive shelter usage appears to have been between 3,000 and 1,000 years ago, when enormous numbers of artefacts were deposited in these sites. The beginning of this major increase coincides very well with the beginning of the Middle Bondaian phase, when backed blade production was at its peak and the assemblages began to be dominated by bipolar flakes of quartz in particular. This culmination slightly postdates an increased habitation establishment rate, but coincides well with the beginning of a relatively stable period of shelter occupation.

The combined occupation indices indicate that over the last 3,000 years there was continual use of shelters. Artefact accumulation rates suggest that the use of shelters as foci in the landscape, at least for stone tool manufacture, declined in the last millennium. This decline may have resulted from a shift in focus from rockshelters to open locations.
Consistent habitation rates indicate that people continued using shelters but that they were depositing fewer artefacts within these locations.

The ethnohistoric evidence suggests that the focus for habitation in recent prehistory may have been in open 'villages ... on the sea coast' (Beaglehole 1955, Collins 1802[1975]: 460, Phillip 1789[1970], Tench 1793[1961]) accommodating upwards of 50 people (Chapter 3). A late move to open sites is supported by the establishment dates for open middens generally along the south-east coast (Sullivan 1987). A similar pattern can be discerned in SE Queensland (Hall and Lilley 1987, Morwood 1986, Walters 1992a).

The archaeological results and ethnohistorical evidence in combination suggest that over the last millennium, occupation patterns involved a move away from shelters as a focus for habitation. The ethnohistoric literature also supports the model of bands consisting of larger territorial groupings, i.e larger than single residence groups. Studies of camping behaviour and spatial relationships indicate that most rockshelters do not have a large enough floor area to accommodate, on a permanent basis, a group larger than a single residence group.

The move out of rockshelter sites, then, can be seen not as a shift in perceptions about these locations (cf. Morwood 1986, 1987) but as a pragmatic move into more suitable habitation locations. The move out of shelters did not occur because the symbolic importance of these sites increased but was rather a pragmatic reaction to increased spatial requirements of a larger group. An explanation for the increasing size of residence groups over time can be found in the changing social system which accompanied the introduction of fish hooks at c.1,000 years BP (Walters 1988).

Technological changes (particularly the decline of backed blades and the introduction of fish hooks) suggest that there may have been an increase in socially-shared food procurement activities (group hunting pursuits, women fishing). Such changes may have increased the reliability of food supplies, as would be required by increasing group sizes (Bowdler 1981).

The use of shelters on an ad hoc basis would have continued thoughout this time, although increased mobility (compared to the preceding phase) is not suggested by the habitation indices (cf. Attenbrow's 1987 results). The continued, but lower intensity occupation of shelters throughout the last millennium can be explained in terms of the patterns of aggregation and dispersal observed at contact (Bowdler 1976, Poiner 1971, Ross 1976). During times of seasonal abundance, groups lived in large, semi-permanent open 'villages'. In times of resource stress these larger groups dispersed

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and continued to exploit their range of already-established rockshelters, in smaller groups.

Pressures resulting from this type of change in social interaction may have further increased the necessity for social mechanisms to control interaction and enforce group identity, but could also have increased the need for mechanisms which required larger-scale group cohesion. The use of symbolic behaviour would have thus continued, throughout the last millennium, to be an important facilitator of interaction. It is possible that a large number of engraving sites was produced during this late period. The increasing social complexity would have produced the required conditions described by Wiessner (1989) for demonstrations of group cohesion: fear, real or potential inter-group competition and aggression and a need for co-operation to achieve certain goals.

On the periphery of the region there is evidence that this cohesion is reduced. The engraved assemblages show a marked decline in numbers and higher levels of heterogeneity to the south of the region. The relative absence of engravings, and high levels of heterogeneity south of the style boundary, indicates that the need for broader-scale group cohesion did not transcend this boundary.

The Guringai language area appears to be the 'source' and centre of cohesion. The effect of the Guringai influence, can be seen as diminishing to the north-west of the region and non-existent to the south of the region. The relative absence of engraving sites south of the style boundary indicates either a reduction there in broader-scale group cohesion, or alternative social mechanisms operating to the south.

The varying levels of heterogeneity demonstrated by shelter art sites across the region but particularly at its periphery, support this model. The high levels of demonstrated homogeneity between shelter sites in drainage basin groupings on the margins of the region indicate that bounding behaviour in these locations was of increased importance. The nature of the territorial interaction suggested by these art analyses is depicted in Figure 10.1.

This model is based on the argument that these varying levels of heterogeneity reveal different types of social information. The higher levels of homogeneity in the engraving medium demonstrate larger scale group cohesion. The more heterogeneous medium demonstrates localised group identifying behaviour. Complex patterns in the levels of variability across the region in both contexts demonstrate the nature of the contacts between language groups, as well as areas where the tensions resulting from these contacts were greatest.
Figure 10.1: Model for territorial organisation and interaction across the Sydney region.
This model is supported by the archaeological data, and by applying Wobst's (1977) principles, as refined by Wiessner (1989, 1990). The idea of social context has been extremely important in developing this argument. So has the view that style is a means of non-verbal communication used to negotiate identity (Wiessner 1990). Shelter art sites, with their evidence for contemporaneous occupation, and vertical engraving sites in the economically productive foreshore zone both have demonstrated higher levels of heterogeneity. These results are interpreted on the basis of the social contexts of these locations.

The rock art in the Sydney region functioned as a prehistoric information superhighway. Through stylistic behaviour, groups around the region, who were not in constant verbal contact with each other, were able to communicate important social messages and demonstrate both broad-scale group cohesion and within-group distinctiveness.
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Omissions


