7

Relative Temporal Sequence

The Sydney Basin rock art has been previously identified as possessing temporal variability, and various relative and chronological sequences have been proposed (McCarthy 1988a; McDonald 1994:336, 2008a:343). However, the temporal ordering of the sheltered rock art of the Upper Nepean catchment has not yet been subject to detailed analysis. Officer (1984) and Sefton (1988) both analysed spatial variability in the northern Woronora rock art based on an assumption of general contemporaneity.

This research aims to investigate if temporal change can be identified in the study area and, if so, to characterise that change over time in terms of the nature and form of the rock art, and also in regard to the environmental and micro-topographic locations chosen for marking. In the first section of this chapter, previous research that focused on temporal change in the Sydney Basin rock art is reviewed. Next, the methodology employed in the analysis is defined. This is followed by an analysis of superimposed relationships identifiable in the Upper Nepean rock art. A temporal sequence is then presented, which sets out the nature of the rock art in terms of colour and technique in each of the identified 'phases'. This sequence will be used as a framework for charting change over time in the rock art for analysis and discussion in subsequent chapters.

7.1 Introduction

This introductory section presents a review of the temporal ordering of Sydney Basin pigment rock art, as defined by previous researchers. All previous work, other than two Accelerated Mass Spectrometry (AMS) radiocarbon dating projects, is based on superimpositioning analysis and, in the case of McDonald's research, a chronology has been proposed based on posited correlations between rock art and archaeological deposit (McDonald 1994; 2008a). The pigment characterisation project undertaken in the Upper Nepean catchment by Huntley (née Ford) (Ford 2006; Huntley et al. 2011) has implications for the likely recent age of white stencilled rock art. Hughes's (1976:52) analysis of the high rates of weathering of the Sydney Basin sandstone provides a framework for considering the potential longevity of the pigment rock art in the study area, and that it may be relatively recent in age. The age of the open context engraved rock art in the Sydney Basin has not been subject to a detailed analysis. However, Sefton (2003a) argues that it is likely to be recent due to high rates of weathering, and McDonald (2008a:350) suggests that many engravings may have been produced during the last millennium.

Officer (1984:3) considers the rock art of the upper and central Georges Basin to be no more than 2,000 years old based on a consideration of the high rates of weathering of the Hawkesbury Sandstone. McDonald (1994:336; 2008a:343) subsequently produced a relative chronology for the rock art sequence of the Sydney Basin based on her analysis of 65 sites in the Upper Mangrove Creek catchment. Her sequence suggests an antiquity for the pigment rock art in the region at c. 4,000 years BP, and she also defined a three-phased sequence of change. McDonald (2008a,

2008b) and others (e.g. Clegg 1986:60; McCarthy 1988a:16) recognise that rock art production continued to be practiced in sheltered and open contexts in the Sydney Basin into the contact period. Assuming a broadly comparable archaeological context for this part of the Sydney Basin, rock art in the Upper Nepean also was likely to have been produced from at least the mid-Holocene and into the colonial period.

Early studies of (usually) individual shelters identified superimpositioning in the Sydney Basin pigment art, although an exploration of the chronological implications of this was rarely undertaken (e.g. Mathews 1895:271). Mathews refers to black drawings over white hand stencils in two (north Sydney Basin) shelters. In a northern Woronora Plateau site, Clegg (1971:38) identifies 'two pieces of evidence that the drawings [in the shelter] were made during at least two periods'. The first is that red drawn 'lines' (being parts of motifs) were underneath black and white lines, and the second is that newer marks were on a fresh erosional surface that once would have contained the upper parts of motifs, which now only remain at the bottom of the panel. However, Clegg (1986:56) was generally not hopeful of establishing a relative sequence.

McCarthy (1979; 1988a:18) proposes the first relative sequence for the pigment rock art based on his recordings of superimpositioning at individual sites across the wider Sydney Basin, including Conjola in the south and Canoelands in the north (McCarthy 1959, 1961). McCarthy does not recognise an engraved component in the shelter art, nor does he attempt to correlate the art with the archaeological sequence of the region (McDonald 1994:162).

McCarthy's relative sequence was subject to critical review. Clegg (1977:262) argues that he found no evidence of different phases at Canoelands, and Officer (1984:3), likewise, argues that there was no evidence of this sequence in the Georges River area. In defence, McCarthy (1988a:18) refers to numerous other early studies, which he argues confirm the sequence (including Cox et al. 1968; Vinnicombe 1980; Smith 1983). McCarthy (1988b:40) later emphasised that at least two major phases exist, one being an early stencil phase and the other a later black drawing phase (i.e. his phases 1 and 3 respectively: Table 7.1). As stated by McDonald (1988) in a series of review papers, McCarthy's model does not 'stand up' to the increased data produced by subsequent research. McDonald (1988) questions the validity of McCarthy's single motif Polychrome phase, and the usefulness of a sequence that has several probable contemporaneous phases, and a lack of a chronological and cultural, or archaeological, alignment.

Table 7.1 McCarthy's Sydney–Hawkesbury shelter art sequence.

Phase	Description	Period
1 Stencil phase (wet paint)	Stencils of hands, feet and artefacts, in red and white, also yellow. Also imprints of hands and feet. An occasional outline figure.	Earliest
2 Red-and-white phase	Drawings in dry pigment in outline, solid and various infilled styles of culture heroes, humans, animals and artefacts.	Not specified
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*.	Recent
4 Polychrome phase	Known only in one figure: a culture hero in four colours.	Recent (probably contemporaneous with Phase 5)
5 White stencil phase	A very rich phase of stencils of hands, feet, animal paws, a wide variety of artefacts, parts of plants and other subjects.	Recent (probably contemporaneous with Phase 4)

Source: Table reproduced from Dibden (2011).

Officer (1984:3) does not consider 'sequential change over time' in his study of the Georges River sheltered rock art due to a lack of evidence of a clear chronological sequence, and also because of the high rates of rock art deterioration. Officer (1984:3) draws attention to problems associated with differential rates of weathering, which make cross-correlations as a relative dating technique 'impossible to verify'. He suggests that, given the rate of deterioration of the Hawkesbury Sandstone, the rock art of the Georges River is unlikely to exceed an age of 2,000 years. Officer considers all pigment rock art in his study to be roughly contemporaneous. Officer (1984:25–26) does not record any graphic rock art made with wet pigment applications, a technique identified by McDonald in one of her art phases (see below). However, while Officer (1984:37) identified systematic superimpositioning of drawn figures over stencils (this partially supporting McCarthy's model), he questions the extent to which this sequence was systematic across the broader region, and argues that its chronological significance was, at that time, impossible to determine.

Sefton (1988:154–157) does not explicitly explore chronological patterns (as this was outside the focus of her research), but identifies superimpositioning patterns relating to stencils in her study area. The following notable relationships were identified (Table 7.2):

- white drawings are always above any other colour/technique combination when in a superimposed relationship
- white stencils are always above any other colour/technique combination, including red stencils, when in a superimposed relationship
- charcoal drawings are mostly over any colour/technique combination in a superimposed relationship, although one instance of being under a red stencil, and two of being under a red painting are identified. However, the four instances of red paintings under charcoal drawings, and 11 of charcoal being over red stencils may indicate the dominant trend.

Table 7.2 Sefton's superimposition sequence in the Georges/Woronora and Cataract rivers area.

Over	White drawing	White stencil	Charcoal drawing	Red drawing	Red stencil	Red painting
Charcoal drawing	8	11	—	0	1	2
Red drawing	2	3	10	—	0	0
Red stencil	0	5	11	0	—	0
Red painting	0	2	4	0	0	1

Source: Table reproduced from Dibden (2011).

While it was acknowledged that differential rates of preservation between red and white stencils may be relevant, Sefton (1988:156) argues that, chronologically, red stencils are earlier than white stencils. Sefton (1988:56) also notes that there is greater object diversity in the more recent white stencils, than when compared with the earlier red stencils, which further emphasises temporal difference and its nature.

Sefton (1988) finds that black drawings generally occur over red drawings and, in a subsequent paper, she identified differences in motif types between red and black drawings (Sefton 1992:3). In particular, an absence of profile human motifs was identified in red drawings, and Sefton concludes that this reflected a chronological shift. This proposition was further tested using a correspondence analysis for 62 shelters from Heathcote National Park and 91 from the Cordeaux catchment. The correspondence analysis (CA) supports a chronological difference between red ochre and charcoal drawings (Sefton 1992:3, 4). Sefton (2003b:40) also argues that the high levels of weathering of red drawings, which are comparable with that of black drawings, are further confirmation of an age difference, given that red pigment adheres in a stronger bond with stone and would generally be expected to survive longer than charcoal.

McDonald et al. (1990) conducted an AMS dating program that sought to test the feasibility of the technique and to date rock art from the Sydney Basin. Pigment, presumed to contain charcoal, was extracted from motifs in three shelters, although five samples collected from Native Animals shelter on the McDonald River in the north Sydney Basin had insufficient carbon for dating (McDonald et al. 1990:86, 89). Two dates were obtained from two separate indeterminate painted motifs (with charcoal in the matrix) collected from Waterfall Cave in the south Sydney Basin, one being 635±50 BP and the other modern. These dates were considered to reflect a late relative position within the rock art sequence. In regard to the modern date, it was suggested that this probably indicated rock art production being undertaken during the contact period (McDonald et al. 1990:90). It is noted here, however, that the technique represented in the motifs at the Waterfall Cave site is rare, and localised to the area in question, so that extrapolating the results from this site broadly across the Sydney Basin is of limited utility. Two widely divergent dates (6,085±60 BP and 29,795±420 BP) were obtained from a single black-and-red non-figurative motif from Gnatalia Creek (another southern Sydney Basin site). The interpretation of these two dates is unresolved, but it clearly demonstrates the problems associated with dating organic materials in rock art pigments (see also Ridges 1995).

McDonald (2000:91, 2008a:181) reports further AMS dates for rock art in the Sydney Basin. Four samples, taken from two charcoal drawings in UDM shelter in the Central Sydney Basin, produced dates ranging from c. 280±90 BP to indistinguishable-from-modern (three of the latter). McDonald (2000:91) questions these dates, suggesting that the modern dates may indicate contamination, although she canvasses the possibility that the dates could indicate the art production during the contact period. Dates were eventually obtained from Native Animals shelter, three from a charcoal macropod, and one from a 'koala' motif. The age estimates produced from the macropod ranged from 760±205 to 1770±205 BP, and that for the koala was 1080±210 BP (McDonald 2000:91). The range in age-estimates for the macropod suggests the possibility of contamination; the very small size of the charcoal samples was also argued to be problematic (McDonald 2000:91). The range of different dates, from individual motifs, was suggested by McDonald (2000:4) to demonstrate more about sampling difficulties in the application of AMS analysis than they do about the age of charcoal drawings in the Sydney Basin sandstone shelters.

McDonald (2008a:342) sought to explicitly define the temporal significance of rock art variability and produced a broad relative sequence and chronology for the Sydney Basin, based on an examination of 65 shelter sites in the Upper Mangrove Creek catchment (Table 7.3). She assumes that the majority of the art coincides with the more recent archaeological evidence in the region—that is, the late Holocene Bondaian sequence with its three dated phases. At Yengo 1, McDonald explored the correlation of intaglio engraved rock art with excavated deposit, and she tested three other rock shelters to explore the contemporaneity of the art with the occupation deposit. McDonald (2008a:241, 249) defines the earliest art (Phase 1) as being the small assemblage of intaglio engravings, which occur in a very restricted range of motifs (and sites). She assigns Phase 1 a minimum age of 4,000 years BP, possibly extending back c. 6,000 years BP. These intaglio engravings are rarely found in a superimposed relationship, as they are mostly located at the base of shelter walls or sloping rock floors. However, when they are, McDonald (2008a:236) found that they were always under pigment motifs. Notably, the engravings at Mount Yengo were covered by deposit that was 4,000 years old, hence the minimum age designation given to them. More recently, an oxalate skin overlying a pecked emu track (a 'Panaramitee'-style intaglio engraving) sampled from a vertical wall in Emu Cave in the Blue Mountains returned an AMS date of 1,900±220 BP, thus establishing a minimum age for the engraving (Taçon et al. 2006:231). In comparing the pecked engravings from Emu Cave with

similar forms in sheltered sites elsewhere in the region, Taçon et al. (2006:234) conclude that this art is the earliest in the Sydney region. McDonald (1994:179) argues that Phase 1 and Phase 2 are probably temporally discrete.

McDonald's Phase 2 rock art consists of red paintings in a relatively restricted range of motifs that includes 'other' (mostly dots), macropod tracks, circles and men, similar to that found in Phase 1. Additionally, anthropomorph, goanna, snake, quadruped and complex non-figurative motifs, and red and white stencils were found to occur in Phase 2 rock art. This phase was placed between 4,000 years and c. 1,600 BP (McDonald 1994, 2008a:249). The most recent art phase, which includes a proliferation of techniques, colours and motifs (with a greater focus on figurative motifs), was argued to extend from 1,600 years BP through until European occupation (McDonald 2008a:249).

The dating of these phases was inferred by assuming contemporaneity between the main phases of occupation deposit in the shelters and the rock art phases. There are notable differences in the dating of the sequence as proposed initially, and then subsequently published (cf. McDonald (1994:336, 2008a:249, 343). McDonald now considers that Phase 2 is likely to be older than 4,000 years, while Phase 3 is designated to extend from 4,000 years to the contact period (McDonald 2008a:343, 349). This adjustment has been made to correlate the rock art sequence with a more recently defined chronology in the regional Bondaian sequence (McDonald 2008a).

Table 7.3 Relative chronology for the Mangrove Creek Art Sequence produced by McDonald (1994). Note text in italics denotes changes made by McDonald (2008a).

Art Phase	Correspondence with Bondaian Sequence	Description	Period
Art Phase 1	Pre- or Early Bondaian	Pecked engravings of tracks and circles.	>4,000 years BP ~ (*minimum*)
Art Phase 2	Early Bondaian	Red paintings and red and white hand stencils that do not co-occur.	<4,000–c. 1,600 years BP ~ *>4,000 years BP*
Art Phase 3	Middle to Late Bondaian	A proliferation of techniques and colour use, perhaps starting with plain dry black and dry red motifs and developing into a range of paints, dry bichromes, stencils of various colours, polychromes and incised motifs. Outline only motifs end the sequences of many shelters, with contact motifs in white stencils and drawn in red-and-white outlined and infilled forms.	c. 1,600 years BP – European contact ~ *4,000 years BP – European contact*

Source: Table based on McDonald (1994:191, 196, 2008a:343).

Huntley (Ford 2006; Huntley et al. 2011) conducted characterisation analyses of pigment harvested from nine sites in the Upper Nepean catchment. The pigment was recovered from graphics and gestural marks, the latter including white stencils and white 'amorphous smears', both of which have been applied to the rock by blowing from the mouth. The temporal implication, which arose from Huntley's (Ford 2006) findings, relates primarily to the white stencil pigments. Carbon was found to be present in the six samples taken from stencils, and largely absent from white graphics. Huntley (Ford 2006:92) argues that the presence of carbon in the stencil pigment is derived from saliva, as a result of both the preparation and process of blowing pigment from the mouth. On the basis that organic specimens in paint are fragile and do not survive long, Huntley (Ford 2006:94) argues that the presence of carbon implies a very recent age (not more than a few centuries) for the white stencils. It is also notable that red stencil pigment, which Huntley had sought to analyse, was unable to be collected because it remained

as a stain in the rock only; the red stencils did not possess any residual surface pigment. Sefton (1988) previously described this feature of red stencils and argues that it suggests that they are of some antiquity.

To conclude, it is clear from previous research in the Sydney Basin, and within the Woronora Plateau, that there is some basis for anticipating that an analysis of superimposed rock art motifs in the study area will reveal the presence of a relative sequence. In the absence of direct dates for the rock art, or of any associated archaeological deposit, establishing the timing of this sequence for the Upper Nepean catchment with any certainty is not possible. However, as discussed above, for a variety of reasons that include consideration of the unstable nature of the Hawkesbury Sandstone, the composition and characteristics of much of the pigment used, and reference to other direct dates obtained (or inferred, see Ford 2006; McDonald 2008a; Huntley et al. 2011) from rock art in the Sydney Basin, the period encapsulated by the sequence, particularly relating to pigment rock art, is unlikely to be long.

7.2 Relative Sequence Analysis: Methods and Limitations

The superimpositioning analyses were conducted on the two separate databases: Illawarra Prehistory Group Database (IPG/DB) and the Research Database (R/DB). The results of these separate analyses will be synthesised.

In establishing the relative sequence of the Upper Nepean rock art, consideration was given to the material properties of various pigments used to infer the potential antiquity, or otherwise, of imagery. Generally, drawn charcoal imagery is believed to be of a relatively recent age because, as a dry application, it does not bond well with the rock (Rosenfeld, pers. comm., 2003). White pigment imagery that survives on rock surfaces is generally thought to be of a recent age (cf. Lewis 1988:46; Rosenfeld 1991:141; David 2002:195) because the pigment is fragile. It is noted that McDonald (1994:173) indicates that all stencilled European contact objects are white in the Sydney Basin. On the other hand, red pigment is more chemically durable and tends to penetrate and bond with rock surfaces. Red pigment has the potential to survive longer and, therefore, to be relatively older than black or white pigment (cf. Lewis 1988:46).

Superimpositioned relationships do not encompass the full suite of motifs in the study area, and this limits the potential to reveal more than very broad trends. Furthermore, given high rates of weathering of the rock art and relatively high levels of formal diversity, identifying detailed temporal trends for the full range of motif variability is also likely to be limited. Another substantive issue is that early rock art occurs in low frequency and distributional density. Panaramitee-style rock art occurs extremely infrequently in Sydney Basin rock shelters. Accordingly, the potential for superimposed relationships to occur, with respect to this type of rock art, is correspondingly low. Further, if at any time artistic production proliferated in a suite of shelters for the first time, such art is unlikely to be superimposed over older art, so determining where it falls within the sequence is difficult. Motifs from earlier sociocultural contexts may be deliberately curated by subsequent generations by either avoidance of those areas, image re-marking or even image 'repair'. Conversely, there may also be continuity of graphic or gestural expression between different sociocultural phases. These scenarios recognise some of the fundamental limitations inherent in temporal ordering via superimpositioning analyses. However, disentangling the archaeological signatures is likely to offer illumination in regard to not only temporal variability itself, but also to the nature of change and the meaningful use of rock art in processes of social change and transformation.

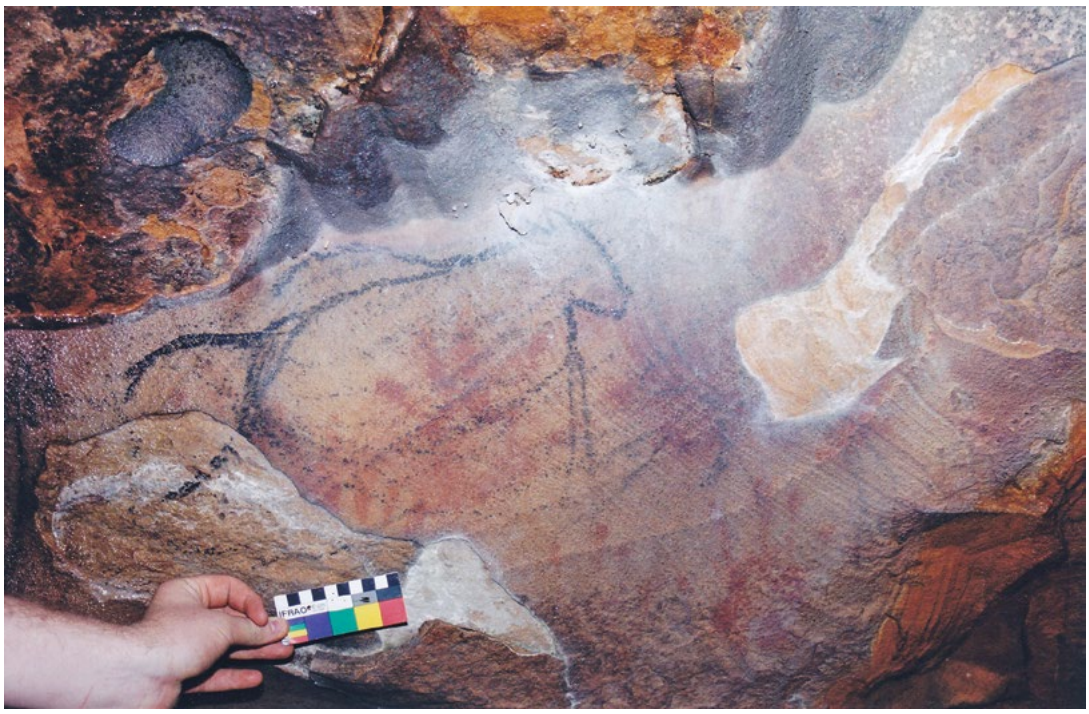

Plate 7.1 Superimposed imagery (rock shelter BR32). A black drawn graphic is over red handprints and stencils.

Note: white is mineral skin.

Source: Photograph by Julie Dibden, 2011.

Discernment of the exact superimpositioning relationships between motifs in the rock art of the study area is often difficult (see Plate 7.1). This is not unique and is often remarked upon as a problem elsewhere (e.g. Haskovec 1992:64). However, this is not always the case, and many instances of pigment from a particular motif clearly overlying another have been identified in the study area. In the Research Database, where a superimposed relationship has been established for this analysis, the stratigraphical relationship is believed to be unambiguous.

Another consideration is determining whether or not a superimposed relationship between images has a temporal significance of sufficient magnitude as to have a historical dimension. (cf. Maynard 1979:90). Superimpositioning was regarded by Leroi-Gourhan and Laming (cited in Ucko & Rosenfeld 1967) in regard to European Palaeolithic cave art as compositions and, accordingly, they deny its relevance for establishing relative chronologies (Ucko & Rosenfeld 1967:145). Ross and Davidson (2006:322), in reference to rock art panels that have a dense overlay of imagery, suggest that these may indicate that the locale may represent 'specified contexts' and, hence, may hold a particular significance within a broader complex. In such instances, the motivations that result in superimposed relationships can occur as the result of events separated in time by minutes or years, rather than centuries or millennia. An awareness of the various possible permutations of the temporal significance of superimposing is thus necessary for establishing chronological patterns on the one hand, and the variability of rock art practice in synchronic contexts on the other.

7.2.1 Analysis of IPG Database Superimpositioning

In this section, superimposed rock art relationships recorded by the IPG are analysed. The individual superimposed relationships upon which this analysis is based are listed and described in Dibden (2011:Appendix 9). The analysis describes the relative positions of motifs in accordance with pigment colour and technique variables. An additional analysis was carried out on the relative positions of the IPG motif categories. It is not included here, as it was not considered to be interpretively useful, particularly given that most are formally indeterminate, and because of the arbitrary nature of motif categorisation (see also Dibden 2011:Appendix 9).

The following patterns emerge from the IPG superimpositioning data (Table 7.4). The location of the rock art sites referred to are shown in Appendix 2 in Dibden (2011).

Stencils

Red stencils are in superimposed relationships in 13 cases. In all instances except one, they are located below other motifs, including four white stencils, one red drawn graphic, five charcoal graphics, one white graphic, and two scratched graphics. Red stencils and red wet graphics do not co-occur in superimposed relationships. In two additional cases in the one shelter (Gill1, these stencils are not listed in Table 7.4), red stencils occur in a three-part superimposed relationship as follows: charcoal eel over red drawn snake over red stencils; and charcoal macropod over red drawn snake over red stencil. These two examples hint at a three-part pigment sequence of red drawn graphics being younger than red stencils, but older than charcoal graphics.

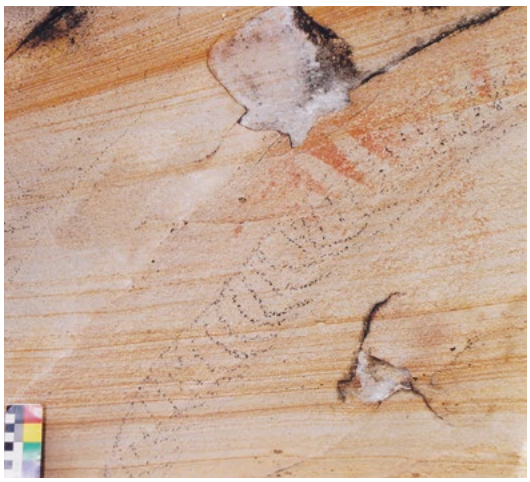

Plate 7.2 Superimposed imagery (rock shelter SCR3). A black drawn graphic over a red hand stencil.

Source: Photograph by Julie Dibden, 2011.

While red stencils are almost always under any other motif in superimposed relationships (Plate 7.2), this contrasts with white stencils, which in 11 relationships are over any other motif, including four red stencils, five charcoal graphics and two red drawn graphics. White stencils do not occur in superimposed relationships with red wet, white or scratched graphics.

Graphics

Red wet graphics occur in only two superimposed situations and, in each, are situated under charcoal drawings. One red drawn graphic is over a red stencil, and six red (including one red-and-black bichrome) graphics and one orange drawn graphic are located under charcoal drawings. As noted above, the examples in Gill1 also indicate that red drawn graphics (included in the count of six) overlie red stencils, but occur under black graphics.

Charcoal graphics occur over red stencils in five instances, and over red graphics in eight. The notable exception is one recording of a black graphic situated under a red stencil. There are no recordings of charcoal graphics over white stencils or white graphics, whereas they occur under white graphics twice.

Scratched graphics occur in three superimposed relationships twice over red stencils and once over a charcoal graphic.

Three additional superimposition relationships of pigment within individual bichrome motifs (all of which are eels) are noted by the IPG, and both entail charcoal outline and infill overlying the red component of the graphic. This example may have no temporal significance, and might simply represent the bichrome construction of the motif with charcoal being the last pigment application; alternatively, the charcoal may be a later redrawing of an earlier image and, hence, this may have a temporal dimension.

Table 7.4 Numbers of superimposed relationships per pigment colour and technique (IPG/DB).

Colour and technique combinations	Superimposition	Number of instances	Superimposition	Number of instances
Red and white stencils	White over red stencils	4	Red over white stencils	Nil
Charcoal graphics and red stencils	Charcoal graphics over red stencils	5	Red stencils over charcoal graphics	1
White graphics and red stencils	White graphics over red stencil	1	Red stencils of white graphics	Nil
Scratched graphics and red stencils	Scratched graphics over red stencils	2	Red stencils over scratched graphics	Nil
Red wet graphics and red stencils	Red wet graphics over red stencils	Nil	Red stencils over wet red graphics	Nil
Red drawn graphics and red stencils	Red drawn graphics over red stencils	1	Red stencils over red drawn graphics	Nil
Charcoal graphics and red wet graphics	Charcoal graphics over red wet graphics	2	Red wet graphics over charcoal graphics	Nil
Charcoal and red (and orange) and red-and-black bichrome drawn graphics	Charcoal graphics over red and red-and-black bichromes graphics	6	Red and red-and-black bichromes graphics over charcoal graphics	Nil
Charcoal graphics and white stencils	White stencils over charcoal graphics	5	Charcoal graphics over white stencil	Nil
Red drawn graphics and white stencils	White stencils over red drawn graphics	2	Red drawn graphics over white stencils	Nil
White graphics and white stencils	White stencils over white graphics	Nil	White graphics over white stencil	Nil
Charcoal and white graphics	White graphics over charcoal graphics	2	Charcoal graphics over white graphics	Nil
Scratched and charcoal graphics	Scratched graphics over charcoal graphics	1	Charcoal graphics over scratched graphics	Nil
Scratched and white graphics	Scratched graphics over white graphics	Nil	White graphics under scratched graphics	Nil
Scratched and wet red graphics	Scratched graphics over wet red graphics	Nil	Wet red graphics over scratched graphics	Nil
Scratched and red dry graphics	Scratched graphics over red drawn graphics	Nil	Drawn red graphics over scratched graphics	Nil
Scratched graphics and white stencils	Scratched graphics over white stencils	Nil	White stencils over scratched graphics	Nil

Source: Table reproduced from Dibden (2011).

Summary—IPG Database

This small IPG Database suggests the following basic temporal trends in regard to extant rock art based on the superimposition relationships of pigment and technique:

- Red stencils are likely to be a component of the earliest pigment rock art.
- Red drawn graphics may typically be more recent than red stencils, but older than many charcoal graphics.
- Charcoal graphics typically appear to occupy an intermediate position, as they occur over older red stencils, wet red graphics and red drawings, and under recent white stencils, and white and scratched graphics. They are, nevertheless, likely to be a component of the most recent art.
- White graphics and stencils are likely, normally, to be a component of the most recent rock art.
- Scratched graphics are likely to be a component of the most recent rock art.

7.2.2 Analysis of Research Database Superimpositioning

Of the 2,565 motifs in the Research Database, 524 (20.4%) have been identified to be in superimposed relationships. The majority of these are stratified associations involving two motifs, although a number of associations include three or more. These superimposed relationships occur in 42 of the 110 rock art shelters recorded for this research. The comparatively high number of shelters with superimposition in the Research Database reflects the intentional selection for more detailed recording, based on previous IPG observations, of shelters that contain these relationships. For heuristic purposes, not all motifs in superimposed relationships are included in the superimpositioning analysis documented below. For example, where one graphic is superimposed over several red stencils, one stencil only is counted.

The frequency in which pigment colour and mark type occurs, either over or under in superimpositions, including those that include two, three or four motifs, are shown in Table 7.5. For superimpositions including three or more motifs, *under* refers to the motif on the bottom and *over* is ascribed to any subsequent motifs. The following patterns are evident:

- Black charcoal pigment occurs most frequently in superimpositions (n = 192), and is typically (79.2%) situated over other coloured pigments. However, in 20.8 per cent of superimpositions, it is under other colours. All except one black motif occur as graphics or indeterminate (probably graphic) mark types. One instance of the gestural category, *black pigment marking*, is recorded as being over in a superimposed relationship (in EC5b: over a red indeterminate drawing).
- Red pigment is also common in superimpositions (n = 164) and is most frequently (95.1%) situated under other coloured pigments. Eight red motifs (all graphic or indeterminate marks) are over other colours. The majority of red pigment motifs are graphics or indeterminate (either graphic or gestural marks). Forty-six marks are gestural, including 42 handprints and/or hand stencils, and four are pigment blobs or smears. All red gestural marks are under other marks in superimpositions.
- Crimson is present in one superimposition and is under another colour. Orange is also infrequently superimposed and, in all instances, is under other colours.
- White pigment occurs in 39 superimpositions and is most frequently (89.7%) over other colours. The majority (n = 29) of white motifs in superimpositions are gestural marks, including stencils, pigments blobs and smears. There are four instances where white stencils are under in superimpositions.
- All cream-coloured pigment, all of which are gestural marks (stencils and pigment blobs), are over any other colour.

- Yellow (a graphic) is recorded once in a superimposition and is over another mark.
- Scratched marks, both graphics and gestural (in this tabulation defined as a colour), occur in 14 superimpositions, and are always over any other colour. Likewise, rubbed and pitting marks are always over other colours.

Table 7.5 Numbers of marks in superimposed relationships by mark type and pigment colour (R/DB).

Colour and mark type	Over #	Over %	Under #	Under %	Total
Black (total)	**152**	**79.2**	**40**	**20.8**	**192**
graphic	106	77.4	31	22.6	137
indeterminate	45	83.3	9	16.7	54
pigment marking	1	100			1
Black and white (total)	**7**	**87.5**	**1**	**12.5**	**8**
graphic	7	87.5	1	12.5	8
Black and yellow (total)	**1**	**100**			**1**
graphic	1	100			1
Brown (total)	**1**	**100**			**1**
pigment smear	1	100			1
Cream (total)	**7**	**100**			**7**
pigment blobs	2	100			2
stencil	5	100			5
Crimson (total)			**1**	**100**	**1**
graphic			1	100	1
Gestural subtractive (total)	**6**	**100**			**6**
pitting	2	100			2
rubbing	4	100			4
Orange (total)			**5**	**100**	**5**
Graphic			5	100	5
Red (total)	**8**	**4.9**	**156**	**95.1**	**164**
graphic	4	6.9	54	93.1	58
indeterminate	4	6.7	56	93.3	60
pigment blobs			2	100	2
pigment smear			2	100	2
print			8	100	8
stencil			34	100	34
Red and black (total)	**3**	**60**	**2**	**40**	**5**
graphic	3	60	2	40	5
Scratch (total)	**14**	**100**			**14**
graphic	4	100			4
indeterminate	2	100			2
scratching	8	100			8
White (total)	**35**	**89.7**	**4**	**10.3**	**39**
graphic	3	100			3
indeterminate	3	100			3
pigment blobs	1	100			1
pigment smear	1	100			1
stencil	27	87.1	4	12.9	31
Yellow (total)	**1**	**100**			**1**
graphic	1	100			1

Source: Table reproduced from Dibden (2011).

The sequential position of three or more motifs in superimpositions (17 instances) confirms previously identified trends and clarifies some other relationships (Table 7.6). Red and orange dominate the lowest positions and are the first in the sequence in 88 per cent of superimpositions as either graphic, indeterminate or stencil mark types. A white stencil occurs as the top layer in the one sequence containing four marks. However, in sequences of three marks, white motifs are relatively equally distributed between second (n = 5; 38.5%) or third layers (n = 7; 53.8%). All cream motifs are in the top of the sequence in the three instances they occur in these superimpositions. Likewise, black motifs are similarly relatively equally distributed between second (n = 10; 62.5%) and third (n = 6; 37.5%) layers. These data suggest that black and white can co-occur in the recent phase of the overall relative rock art sequence.

Table 7.6 Sequential position of the motifs in superimpositions of three or more (1 = first in sequence, 2 = second, and so on) (R/DB).

Colour	1		2	3	4	Total
Black (total)			10 (62.5%)	6 (37.5%)		16
graphic			8	5		13
indeterminate			2	1		3
Black and white (total)			2 (66.7%)	1 (33.3%)		3
graphic			2	1		3
Black and yellow (total)				1 (100%)		1
graphic				1		1
Cream (total)				3 (100%)		3
pigment blobs				2		2
stencil				1		1
gestural			1 (50%)	1 (50%)		2
rubbing			1	1		2
Orange (total)	2 (100%)					2
graphic	2					2
Red (total)	15 (88.2%)		1 (5.9%)	1 (5.9%)		17
graphic	5		1			6
indeterminate	7			1		8
stencil	3					3
Red and black (total)			1 (100%)			1
graphic			1			1
Scratch (total)				1 (100%)		1
graphic				1		1
White (total)			5 (38.5%)	7 (53.8%)	1 (7.7%)	13
graphic			1			1
indeterminate				3		3
pigment blobs			1			1
stencil			3	4	1	8

Source: Table reproduced from Dibden (2011).

The superimpositions in the Research Database, as set out in accordance with the IPG recordings (and including those as recorded by the IPG in Table 7.4), are listed in Table 7.7. This demonstrates that the superimposition relationships in the Research Database are in general agreement with the IPG recordings. The following points are made:

- While recorded infrequently in superimpositions, white stencils are always over red stencils.
- Unlike the IPG Database, there are no instances of charcoal graphics being under red stencils and, instead, 23 instances of the reverse in the Research Database. The dominant trend is that charcoal graphics overlie red stencils in superimposed relationships.
- Red stencils do not occur in superimpositions with red wet graphics.
- White and scratched graphics occur infrequently in superimpositions with red stencils and, where they do, white and scratched are over red.
- Two instances of red drawn graphics overlying red stencils have been recorded. This result suggests that, generally, red drawn graphics were not produced in locales in which red stencils occur, and the two superimpositions tentatively indicate that red stencils may be older than red drawn graphics.
- The instances of 43 black graphics overlying red wet graphics (and red wet indeterminate marks) in the Research Database far outweigh the recordings of this relationship in the IPG Database. A dominant trend is inferred and, notably, this is comparable with that obtained between black graphics and red stencils. In the Research Database, there is one instance of a red wet graphic overlying a black graphic. It will be argued below that a small number of red graphics do occur in the most recent temporal phase in the study area.
- The 56 black graphics overlying red drawn graphics in the Research Database are greater than the number encountered in the IPG Database. Again, a dominant trend is inferred, however, as only four red drawn graphics over black graphics are recorded in the Research Database (these are all a component of the most recent rock art).
- Generally, white or cream stencils occur over black graphics. One instance of the reverse is recorded in the Research Database.
- Two instances of a superimposed relationship between white stencils and red drawn graphics occur, with the former being over the latter in the Research Database. This result suggests that, typically, white stencils were produced in locales where red drawn graphics do not occur, and that white stencils may be younger than red drawn graphics.
- White stencils and white graphics do not co-occur in superimpositions. This may indicate that different locales were used for each type of mark.
- White graphics occur infrequently with black graphics in superimpositions and, where they do, white is over black.
- Eleven instances of scratched graphics or non-graphic marks overlying black graphics are recorded in the Research Database, while one instance only of this superimposition is in the IPG Database. There are no instances of black graphics overlying scratched marks.
- Scratched marks and white graphics do not co-occur in superimpositions, and this may indicate that different locales were used for each type of mark.
- Scratched marks and white stencils do not co-occur in superimpositions, and this may indicate that different locales were used for each type of mark.
- Scratched marks and red wet or dry graphics occur infrequently in superimpositions, and, where they do, scratches overlie red graphics.

Table 7.7 Comparison of recorded superimposition relationships between the Research Database and the IPG Database.

Motif types	Superimposition	Number of instances	Superimposition	Number of instances
Red and white stencils	White (including cream) over red stencils	3 (IPG: 4)	Red over white stencils	Nil (IPG: Nil)
Charcoal graphics and red stencils	Charcoal graphics over red stencil and print	23 (IPG: 5)	Red stencil over charcoal graphics	Nil (IPG: 1)
White graphics and red stencils	White graphics over red stencil	Nil (IPG: 1)	Red stencils of white graphics	Nil (IPG: Nil)
Scratched graphics and red stencils	Scratched graphics over red stencils	Nil (IPG: 2)	Red stencils over scratched graphics	Nil (IPG: Nil)
Red wet graphics and red stencils	Red wet graphics over red stencils	Nil (IPG: Nil)	Red stencils over wet red graphics	Nil (IPG: Nil)
Red drawn graphics and red stencils	Red drawn graphics over red stencils	1 (IPG: 1)	Red stencils over red drawn graphics	Nil (IPG: Nil)
Charcoal graphics and red wet graphics (including red wet indeterminate)	Charcoal graphics over red wet graphic	43 (IPG: 2)	Red wet graphic over charcoal graphics	1 (IPG: Nil)
Charcoal and red (and orange and crimson) and red-and-black drawn graphics	Charcoal graphics over red or red-and-black drawing	56 (IPG: 6)	Red or red-and-black drawing over charcoal graphics	4 (IPG: Nil)
Charcoal graphics and white (and cream) stencils	White stencils over charcoal graphics	13 (IPG: 5)	Charcoal graphics over white stencil	1 (IPG: Nil)
Red drawn graphics and white stencils	White stencils over red drawn graphics	2 (IPG: 2)	Red drawn graphics over white stencils	Nil (IPG: Nil)
White graphics and white stencils	White stencils over white graphics	Nil (IPG: Nil)	White graphics over white stencil	Nil (IPG: Nil)
Charcoal and white graphics	White graphics over charcoal graphics	3 (IPG:2)	Charcoal graphics over white graphics	Nil (IPG: Nil)
Scratched (including non-graphic) and charcoal graphics	Scratched graphics over charcoal graphics	11 (IPG: 1)	Charcoal graphics over scratched graphics	Nil (IPG: Nil)
Scratched and white graphics	Scratched graphics over white graphics	Nil (IPG: Nil)	White graphics under scratched graphics	Nil (IPG: Nil)
Scratched and wet red graphics (and wet red indeterminate)	Scratched graphics over wet red graphics	2 (IPG: Nil)	Wet red graphics over scratched graphics	Nil (IPG: Nil)
Scratched and red dry graphics	Scratched graphics over red drawn graphics	1 (IPG: Nil)	Drawn red graphics over scratched graphics	Nil (IPG: Nil)
Scratched graphics and white stencils	Scratched graphics over white stencils	Nil (IPG: Nil)	White stencils over scratched graphics	Nil (IPG: Nil)

Source: Table reproduced from Dibden (2011).

In conclusion, red stencils and red wet graphics (and red wet indeterminate marks) occur frequently in superimpositions with black graphics. The dominant trend is that the former occurs under the latter. Based on a consideration of the assumed relative fragility of charcoal compared with red pigment, this trend is likely to have a temporal significance.

Red stencils and red wet graphics do not co-occur in superimpositions. Given that both mark types are comprised of red wet ochre and, therefore, both have the potential to be of an age greater than the majority of other pigment rock art in the study area, it is possible that these were produced more or less contemporaneously. Given that they do not co-occur in superimpositions, this is suggestive that they were, by choice, produced in different locales. The schema of red wet graphics is often comparable with the small intaglio engravings of the Sydney Basin.

These graphics are also qualitatively similar to McDonald's (1994:176) Phase 2 graphics. In the Upper Nepean catchment, their position within the relative sequence has been established to represent the earliest red graphic rock art.

Red stencils and red drawn graphics occur in four superimpositions (including those in the three-part sequence in Gill1 described earlier), but this is clearly an infrequent relationship. This result indicates the possibility that red drawn graphics are younger than red stencils and, or perhaps, a general preference to avoid the production of red drawings over red stencils.

The high numbers of superimpositions involving red drawn and black drawn graphics reveal a dominant trend for black drawings to occur over red. Given the relative fragility of charcoal compared with red ochre, it is probable that black drawings are younger than red drawn graphics, and that this relationship has a diachronic significance (see also Sefton 2003a:40).

Both white stencils and white graphics occur infrequently in superimposed relationships with any other motif, but, where they do, they each predominantly overlie other motifs. Charcoal and white pigment are relatively fragile, and it is assumed that both white and black motifs are of a generally comparable and relatively young age. In the Upper Nepean catchment, charcoal and white pigment do co-occur as bichromes in motifs, and one motif in site BR29 contains black and white pigment in two reversed superimpositions. Also, for example, site SCR10 contains a number of formally similar graphics in black and white that occur in superimpositions, thus strengthening the argument for their contemporaneity. Scratched motifs and non-graphic marks have been identified to occur above black graphics in 11 instances, above red wet marks in two, and above a red drawn graphic in one. Given that these marks never occur below other techniques, they are, therefore, most likely to be a part of the final art production phase.

7.3 Proposed Relative Sequence of the Upper Nepean Rock Art

A proposed relative sequence of rock art, and other marks, based on pigment colour and technique is listed in Table 7.8. This sequence is based on a consideration of the superimposed trends, and also the likely antiquity of the various pigment types. Two shelters in the Upper Nepean catchment contain intaglio engravings and these are added to the sequence, with reference to McDonald (2008a).

Table 7.8 Temporal sequence of sheltered art based on colour and technique.

Phase	Age	Mark type	Rock art
Phase 1	>4,000 years BP	Graphic	Intaglio engraved motifs
Phase 2	Uncertain; possibly <4,000 – >500 years BP	Gestural	Red hand stencils and handprints Red pigment smears usually over large areas
		Graphic	Red painted motifs Red, yellow and orange drawn motifs
Phase 3	Recent; possibly <500 years BP or even considerably less	Gestural	White and cream stencils Non-graphic pigment applications, including pigment blobs, circles, rock surface marking strokes and random Non-graphic scratched, pitted and rubbed marks
		Graphic	Charcoal drawn motifs (and black and white bichrome) Redrawing (usually outline only) of earlier red drawn graphics White painted or drawn motifs Scratched motifs Very small numbers of red drawn or wet motifs

Source: Table reproduced from Dibden (2011).

Plate 7.3 An example of a red wet 'trident' motif, which is assigned to Phase 2a (rock shelter EC5b).
Source: Photograph by Julie Dibden, 2011.

The analysis has identified a sequence of change that is comparable, in its broad structure, with that defined by McDonald (2008a:342–243), based on superimpositioning in the Upper Mangrove Creek catchment (see also Taçon et al. 2008:202). In the Upper Nepean, the two rock shelters with intaglio engravings do not contain pigment rock art. However, this type of rock art does occur in a shelter in the Southern Highlands (discussed further in Chapter 8), where it is superimposed under red hand stencils (pers. observ.), and so it is possible that the intaglio motifs are the earliest sheltered rock art in the study area. If such is the case, it is in agreement with McDonald's (2008a) Sydney Basin sequence.

The Upper Nepean Phase 2 rock art is not, however, entirely comparable with McDonald's Phase 2. There is no evidence that white stencils belong to this phase. The pigment rock art, which was identified as occurring frequently under other colours and techniques in the Upper Nepean catchment, includes red stencils and prints, gestural applications of red wet smeared pigment, and red painted motifs (simple forms, e.g. see Plate 7.3), and red drawn animal motifs (figurative forms). Based on four instances of red drawn motifs overlying red stencils, as discussed above, the Upper Nepean Phase 2 may contain a finer level of temporal ordering.

It is possible that the Phase 2 rock art, comprised of red drawn and yellow and orange painted animals and anthropomorphs, may be more recent than the stencils and, also, more recent than a small suite of red wet motifs that include simple forms (tridents and so on), which are formally comparable with the intaglio motifs (Plate 7.3). The superimpositioning analysis of the Upper Nepean rock art has defined the early relative position of the red wet simple form motifs, which McDonald (1994:176) placed within Phase 2 of her sequence. This will be discussed further in later chapters, but, for now, it is asserted that these motifs in the Upper Nepean catchment are also likely to be the earliest pigment rock art, and may be representative of an earlier sub-phase of Phase 2 (Phase 2a). It is also believed that some anthropomorphic motifs may also belong to Phase 2a.

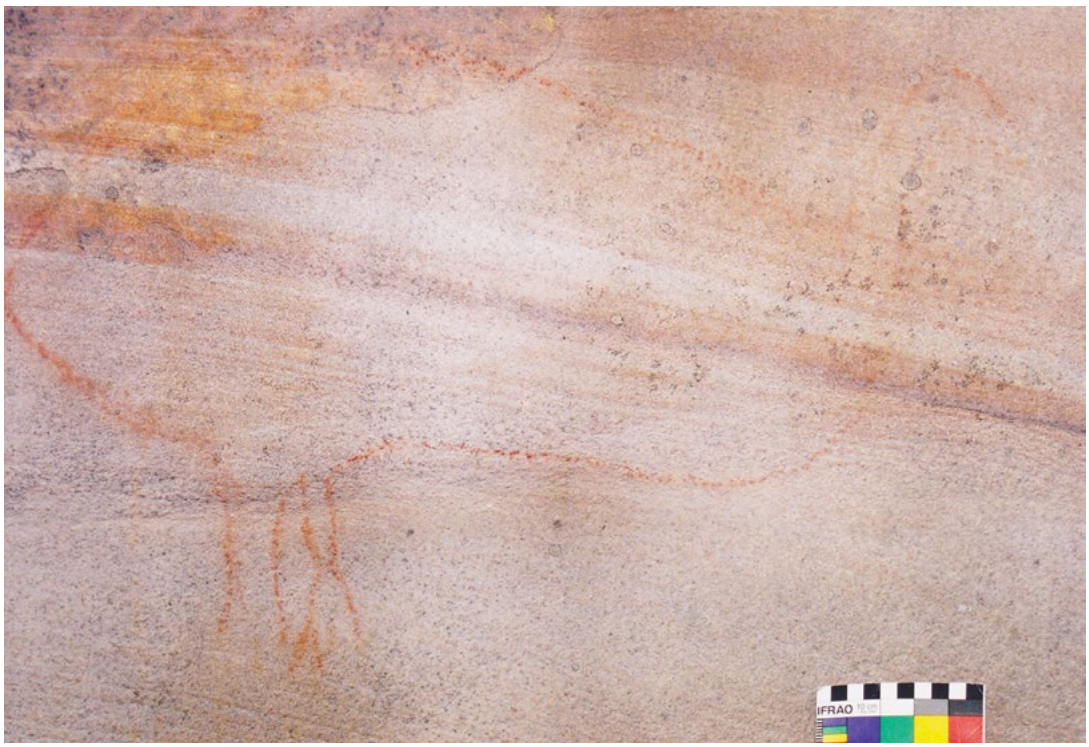

Plate 7.4 Example of red drawn animal motif, which is assigned to a possible later sub-phase of Phase 2 (rock shelter EC36).

Source: Photograph by Julie Dibden, 2011.

The red drawn animal motifs may be later in the Phase 2 sequence (Phase 2b). The analysis of the Upper Nepean superimpositioning has identified a dominant trend for red drawn graphics, most of which are large animal motifs (e.g. see Plate 7.4), to underlie charcoal and white motifs. This relationship was not identified by McDonald (1994:176), who placed them all within Phase 1. It is proposed that in the Upper Nepean catchment, these red drawn motifs, which are assigned to Phase 2, may represent an intermediate position between earlier red wet simple graphics, and the later charcoal and white motifs would, hence, be a later sub-phase of Phase 2.

The Upper Nepean Phase 3 rock art is, similar to the sequence identified in the Upper Mangrove Creek catchment (McDonald 1994:176), represented by a greater diversity of rock-marking behaviours, techniques and colours. Stencils in this phase are of white or cream pigment (also black), and a wide range of new gestural marks occur, produced by the addition of pigment or subtraction of the rock matrix. Graphics in this phase are predominantly charcoal drawings. In addition, black-and-white bichrome, white drawn and painted, scratched, and a small number of red (wet and dry) motifs occur (these latter motifs are the anomalous recordings in the superimposition analysis). Notably, in comparison with the Upper Mangrove Creek catchment sequence, Phase 3 rock art in the Upper Nepean catchment does not contain red pigment figurative (animal) motifs in either dry or wet applications. However, in Phase 3, the re-marking, and even 'repair', of older red animal imagery with charcoal is frequent (discussed further in Chapters 8 and 9).

While there are no direct dates yet available for the Upper Nepean rock art assemblages, the analysis of superimposition, in conjunction with a consideration of the likely longevity, or otherwise, of pigment indicates that rock art has been produced in this area for a considerable period of time, and is likely to have extended from at least the mid-Holocene through to the contact period (cf. McDonald 2008a:249). As discussed, McDonald employed a range of absolute and relative dating evidence to assign a broad temporal framework to her sequence. This

included excavated evidence from a number of shelters, including buried panels of small intaglio engravings identified to represent Phase 1, and dated by their association with archaeological deposit (> 4,000 years BP or c. 6,000 years BP), buried ochre of the same colour as paintings in Dingo and Horned Anthropomorph shelter located above a dated horizon of 581 BP (Phase 3), and the identification of contact imagery that falls within Phase 3. McDonald (2008a:248) notes the absence of associated evidence for Phase 2, and indicates that defining the timing between Phases 2 and 3 is problematic.

Therefore, McDonald (2008a:247–248) defines the earlier and terminal rock art phases, but notes that assigning dates to the intervening period is more problematic. This same situation applies for the Upper Nepean catchment, although here the question of when rock art production ceased is even less secure as no obvious colonial imagery has been identified (this will, however, be discussed further in subsequent chapters). The small intaglio engraved rock art that occurs in two shelters, and several others in the immediate region, in accordance with McDonald's chronology, are likely to represent the earliest rock art in the Upper Nepean.

In the Upper Nepean catchment, red hand stencils (Plate 7.5), and a small suite of red painted graphic imagery (e.g. as shown in Plate 7.4), represent the earliest pigment art. McDonald (2008a:343) argues that the production of Phase 2 rock art in the Upper Mangrove Creek catchment commenced at some time prior to 4,000 years BP. It is possible that the earliest Phase 2 rock art in the Upper Nepean has a comparable antiquity; however, this cannot be confirmed at this time. The antiquity of the later Phase 2 rock art, comprised of large animal imagery, will be discussed further in Chapters 9 and 10. It is almost certainly not as old as the red stencils and red painted rock art.

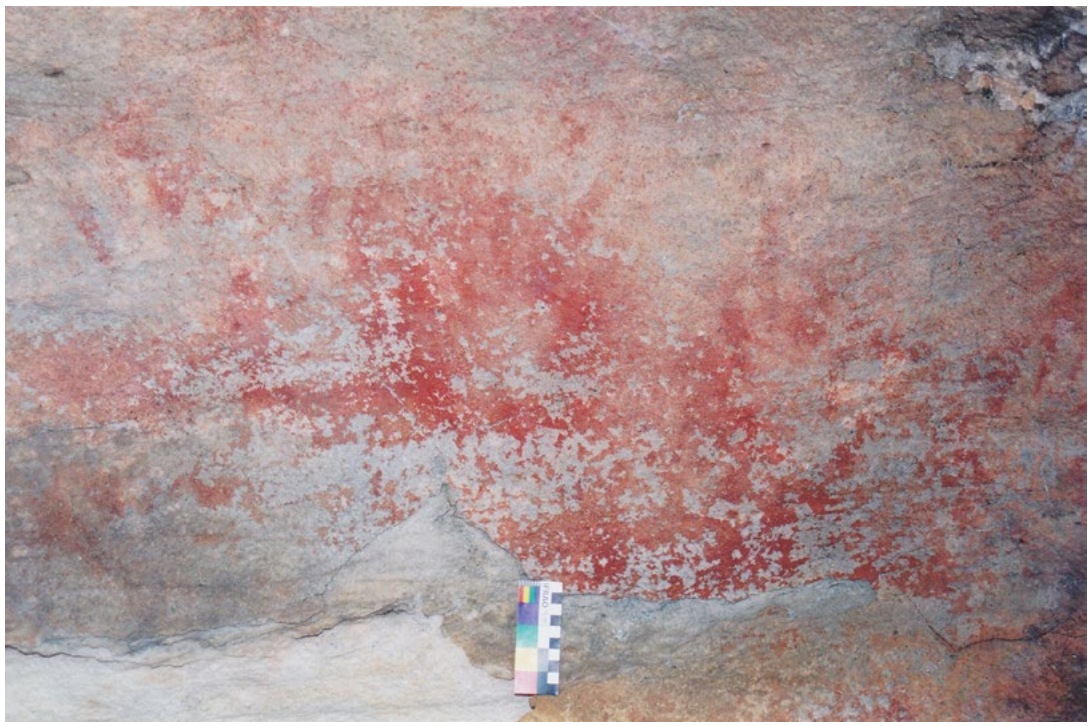

Plate 7.5 Note the high degree of weathering of red stencil pigment (rock shelter SCR25).
Source: Photograph by Julie Dibden, 2011.

Phase 3 rock art in the Upper Nepean catchment is considered to be relatively recent. This conclusion is based on an assumption of the likely antiquity and durability of charcoal and white pigments (Plate 7.6 and 7.7); a consideration of Huntley's (Ford 2006) argument relating to the age of white stencils and pigment blobs in the Upper Nepean; and McDonald's (2000; 2008a) direct dates for charcoal motifs in the Upper Mangrove Creek catchment. However, Huntley's work was a trial project and the results, at this time, should perhaps most properly be considered as suggestive, rather than conclusive. Likewise, the AMS dating program of charcoal drawings in the north Sydney Basin produced results that are clearly not conclusive regarding the age of this rock art (McDonald 2000). It is proposed that Phase 3 rock art in the Upper Nepean may not be any older than 500 years BP. This is in general accordance with the AMS dates for charcoal drawings of the Sydney Basin, except for those obtained from Native Animals shelter. However, it is recognised that the organic environment of rock art pigments is so complex that any AMS dates should be viewed with caution (cf. Ridges 1995).

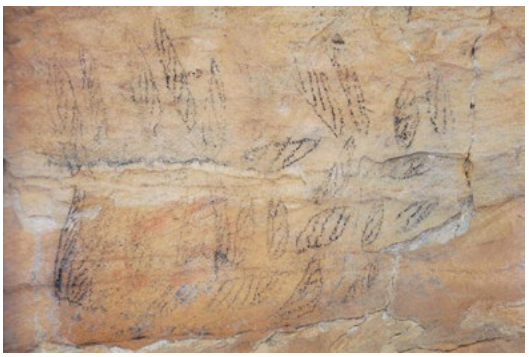

Plate 7.6 Phase 3 imagery (rock shelter A16). Black graphics.
Source: Photograph by Julie Dibden, 2011.

Plate 7.7 Phase 3 imagery (rock shelter SCR10).
Source: Photograph by Julie Dibden, 2011.

It is concluded that the Upper Nepean relative sequence is coarse grained, and is likely to be more nuanced than defined in the analyses. In addition, it is emphasised that the sequence is without firm chronological anchors. The rock art in each of the three phases in the Upper Nepean temporal sequence will be explored further in Chapters 8 and 9.

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