

The past 500 years of rock art at Nawarla Gabarnmang, central-western Arnhem Land

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Introduction

The Arnhem Land plateau in northern Australia contains a particularly rich rock art assemblage. The area has a small number of large rockshelters with numerous and extensive suites of superimposed motifs (c. 2 per cent of 630 recorded shelters have >200 images). Studies of the rock art of Arnhem Land have primarily been concerned with attempting to understand the age of the art, with particular interest on the Pleistocene to mid-Holocene periods (Chaloupka 1977, 1984, 1985, 1993; Chippindale and Taçon 1993; Haskovec 1992; Lewis 1998; Taçon and Chippindale 1994). Most of these efforts have largely relied on interpretations of styles and their respective patterns of superimposition. Taçon (e.g. 1987, 1989a, 1989b, 1992) has written extensively on X-ray rock art from the northern perimeter of the plateau, and his work on 'recent' period art remains the most important study on this subject. The production of X-ray art has also been shown to have been popular during the European-contact period of the past 200 years or so (Chaloupka 1993; May et al. 2010; Wesley 2013). The most detailed study of rock art in the late Holocene period is the extensive radiocarbon dating of beeswax figures by Nelson et al. (2000), most of which fall within the past 500 years (but see Bednarik 2001).

Taçon (1989b:318) has noted, 'The most recent period of rock painting in western Arnhem Land ... was one of great diversity and elaboration. It differs from earlier periods in terms of subject matter, form, use of colour and symbolic content. It is this art that is still very important to Aboriginal people'. He found that, other than X-ray art, solid or stroke infill were common conventions that differed from X-ray only in their pattern of infill and that, in opposition to their Kunwinjku neighbours to the east (Taylor 1996:12), the 'Aboriginal people [of western Arnhem Land] argue that [monochrome paintings] depict "dead" or "cooked" beings while x-ray paintings depict living creatures' (Taçon 1989b:320). He also suggested that X-ray art reached its 'full potential' during the Freshwater Period of less than 3000 years ago (Taçon 1989b:330).

Other recent forms of art that Taçon (1989b:320–324) identified from western Arnhem Land are:

- Stick-figures, both static and active, depicting common activities (hunting, domestic, ceremonial or warfare).
- Hand stencils – some with finely painted patterned infill – and stencils of human and animal feet.

- Painted sacred symbols and other geometric shapes, lines or patterns.
- Appliqué images in pressed beeswax.
- European-contact images (boats, horses, rifles, cattle, etc.).
- Sorcery images.

Overall, Taçon (1992:210–211) found that Aboriginal peoples of western Arnhem Land recognise five classes of rock art:

- ‘Sacred Beings’: images of Dreaming Beings who put themselves onto the rock face.
- ‘Dreaming’ paintings: mostly related to Dreaming stories or beliefs.
- ‘Mimi’: all older (predominantly red) paintings are said by local Aboriginal people to be produced by Spirit-Beings who dwell in the rock, and which some archaeologists assume to be >6000 years old (Taçon 1993:114).
- ‘Sorcery’ paintings: ‘paintings used for revenge or to inflict harm, but these were relatively rare’ (Taçon 1991:211). Berndt and Berndt (1977:323) viewed sorcery paintings of deformed or skewered figures, which were painted to cause death or illness to the victim, as a practice of social constraint. Chaloupka (1993:207) considered the majority of sorcery paintings to have been produced during the recent, European-contact period.
- ‘Casual’ paintings: including some hand stencils, recent stick-figures and European-contact motifs.

These five classes of rock art are essentially the same as those identified by Chaloupka (1993:87) who further includes the category ‘*bim bawarde garruy*’ (petroglyphs made in the ‘Ancestral past’).

In a study of regionalism in the rock art of western Arnhem Land, Taçon defined a Jawoyn sub-style (that Chaloupka [1984:21] had first noted to be distinctive) as being:

composed primarily of red-and-white bichrome x-ray paintings, with some red-and-yellow, as well as solid red or solid white images. Some yellow solid infill figures can be found but they are much rarer. Depictions of x-ray and solid/stroke infill macropods and humans predominate. Hand stencils are found but painted hand or hand-and-arm stencils, typical of areas to the north, are not. Small, delicate strokes are characteristic of outlines and infill. Very small numbers of other forms, such as static stick figures, subjects and motifs are found at Jawoyn sites in comparison to those associated with other language groups (Taçon 1993:115).

In contrast to more northern sub-styles, where fish are the predominant faunal taxa depicted, the Jawoyn sub-style of X-ray art was said to be dominated by paintings of macropods (Taçon 1993:117). This contrast between fish-dominated art sites of the north and macropod-dominated sites of the south also highlights a substantial difference between the beliefs of the Jawoyn and those of their northern neighbours. This is well exemplified by an emphasis on the macropod Dreaming Beings Gupu and Barrk (Gunn 1992:180) in the south versus fish and ‘brightness’ with a visual reference to the Rainbow Serpent in the north (Taçon 1992:197). A further significant difference is the predominant use of red and white for bichrome paintings by the Jawoyn, while those groups to the north utilised a greater variety of colour combinations (Taçon 1989:125).

In this chapter, the relative chronology of motifs at the highly decorated rockshelter of Nawarla Gabarnmang in Jawoyn lands of the Arnhem Land plateau (see Figure 1.1) is examined, to test and refine the findings of these previous studies. Through patterns of superimposition and absolute ages that enable particular layers of art to be dated, the range of depicted styles and subjects that can be shown to be less than c. 500 years old within the shelter are illustrated and discussed.

Nawarla Gabarnmang

Nawarla Gabarnmang is a large sandstone shelter (c. $25 \times 15 \times 2$ m) with a horizontal ceiling supported by a number of freestanding pillars (Figures 12.1 and 12.2). The pillars divide the ceiling into a series of panels, most of which have been decorated with art (Figure 12.3). Many of the central pillars have also been decorated with both recent paintings and, in some cases, very old petroglyphs (cupules and abradings). Occupation at the site has been dated to >45,000 cal BP (David et al. 2011; Geneste et al. 2010). The interior of the shelter has been substantially modified through the removal of pillars and the collapse or removal of layers of rock ceiling to produce a large, central occupation area (Delannoy et al. 2013; see Chapter 10).



Figure 12.1 Nawarla Gabarnmang shelter from the northwest.

Source: Photograph by Robert Gunn.



Figure 12.2 Interior of shelter showing the highly decorated ceiling.

Source: Photograph by Robert Gunn.

Throughout this chapter, the radiocarbon dates undertaken directly on rock art are calibrated as cal AD rather than cal BP ages in order to facilitate correlations with European-contact period historical events and documentary records. Within Nawarla Gabarnmang, the individual ceiling panels with art have been allocated unique codes for ease of identification (Figure 12.3). Two beeswax figures on Panel F1 have each been radiocarbon dated to the period 1433–1631 cal AD, with another two beeswax figures on nearby Panels H and K4 dating to the period

1658–1952 cal AD (Table 12.1). The two beeswax figures on Panel F1, and that on Panel H, are superimposed by paintings. The beeswax figure on panel K4 superimposes yellow paintings, but it is not itself superimposed by any art. Panel J1 has a fifth beeswax figure also dating to c. 400 cal BP, but it is still being analysed and thus does not feature in this chapter. Panel D has a painted motif interpreted as a representation of a horse. As horses were unknown on the plateau before 1845 AD, the motifs that overlie the horse image must be more recent (Gunn et al. 2012; see also Chapter 9). The overlying motifs of the individual panels are discussed below prior to a general comment on the nature of the more recent art found in the shelter.

Table 12.1 Radiocarbon dates on beeswax rock art.

Laboratory code	Panel	Image #	¹⁴ C Age (BP)	Calibrated age AD (95.4% probability)
Wk-26414	F1	28	406 ± 30	1430–1530 1570–1630
Wk-26416	F1	27	383 ± 30	1440–1530 1550–1640
Wk-28101	H	122	173 ± 30	1650–1700 1720–1820 1830–1880 >1910
Wk-26418	K4	100	153±30	1660–1890 >1900

Calibrations undertaken using OxCal v4.2.4 (Bronk Ramsay 2013), IntCal13 (Reimer et al. 2013). For full sample details, see Gunn et al. (2012).

Source: Authors’ data.

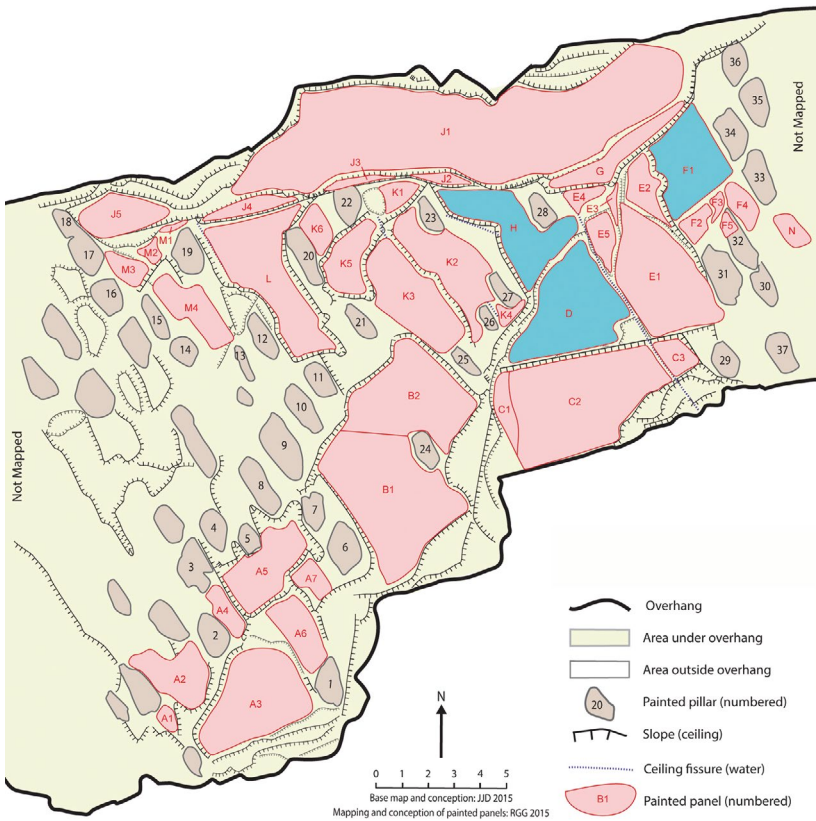


Figure 12.3 Plan showing location of the ceiling art panels. Panels D, F1 and H are highlighted.

Source: Illustration by Jean-Jacques Delannoy and Robert Gunn.

Panel F1

Panel F1 is one of the largest art panels in the shelter, 3.8 × 2.7 m in size and generally rectangular in shape (Figure 12.4). It contains 126 identified images widely distributed across the panel (Figure 12.5). The only visually prominent motif is an X-ray snake (94 × 48 cm) placed in the very centre of the panel. Other prominent images on the panel are the smaller of a pair of white macropods with red linear infill, and three female figures in white. Some of the many images on this panel appear to be among the most recent in the shelter in that they appear very ‘fresh’ relative to the other paintings, include fragile white pigments and occur as, or adjacent to, the top layer in the pattern of superimposition. Yet, Panel F1 has none of the painted X-ray fish that dominate the other large panels (Panels D, E1 and H; see Gunn et al. 2012; Chapter 11, this volume).

Panel F1 has at least 35 layers of superimpositions involving all of the 126 identified images (Gunn 2016). A Harris Matrix was produced relating all instances of superimposition (Figure 12.6). The Harris Matrix was then sorted into layers, each layer seen as representing an artistic episode of relatively short duration (Figure 12.7). In this sorting, images were allocated to particular layers on the basis of their relative location in the superimposition sequence coupled with common artistic traits – colour, form, infill, state of preservation, etc. The layers were then grouped into six broad phases by similarities in artistic traits between adjacent layers (Table 12.1).



Figure 12.4 Photomosaic of Panel F1.

Source: Photographs by Robert Gunn.

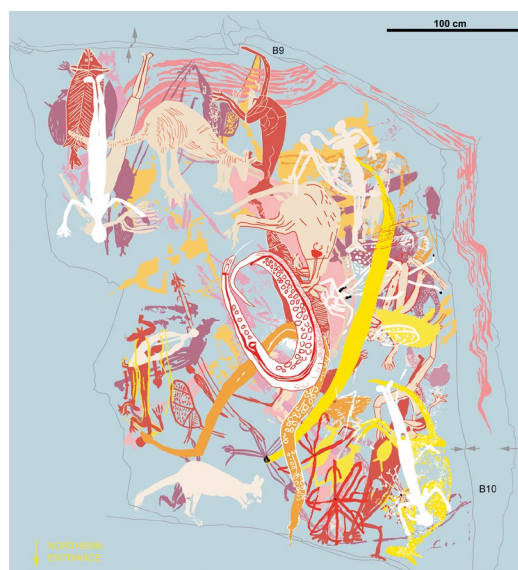


Figure 12.5 Tracing from the photomosaic of the Panel F1 art (colours approximate).

Source: Photo-tracing by Robert Gunn.

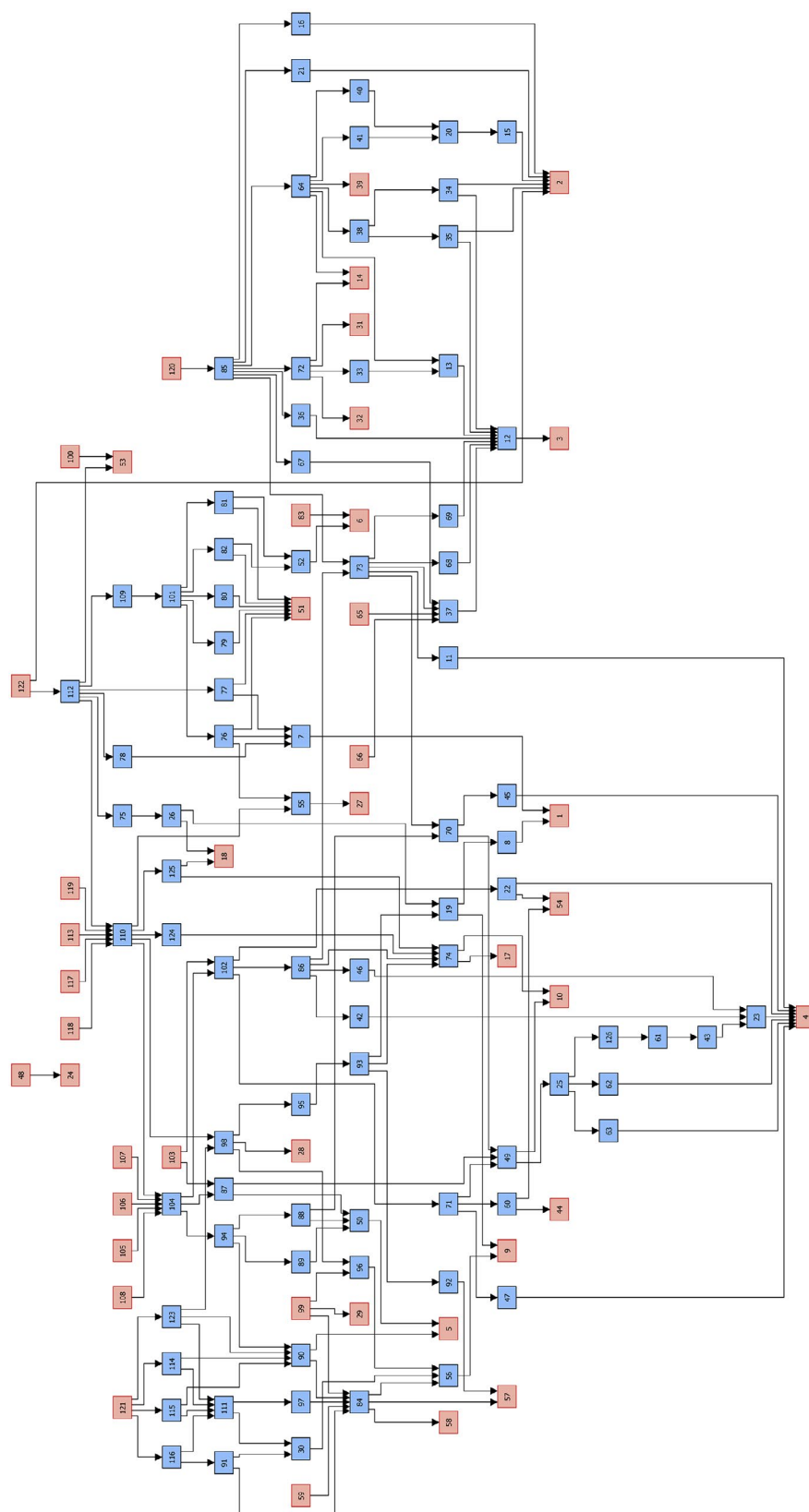


Figure 12.6 Harris Matrix of the Panel F1 superimpositions.

Red boxes = images at beginning or end of a superimposition sequence; blue boxes = images within a superimposition sequence.

Source: Illustration by Robert Gunn.

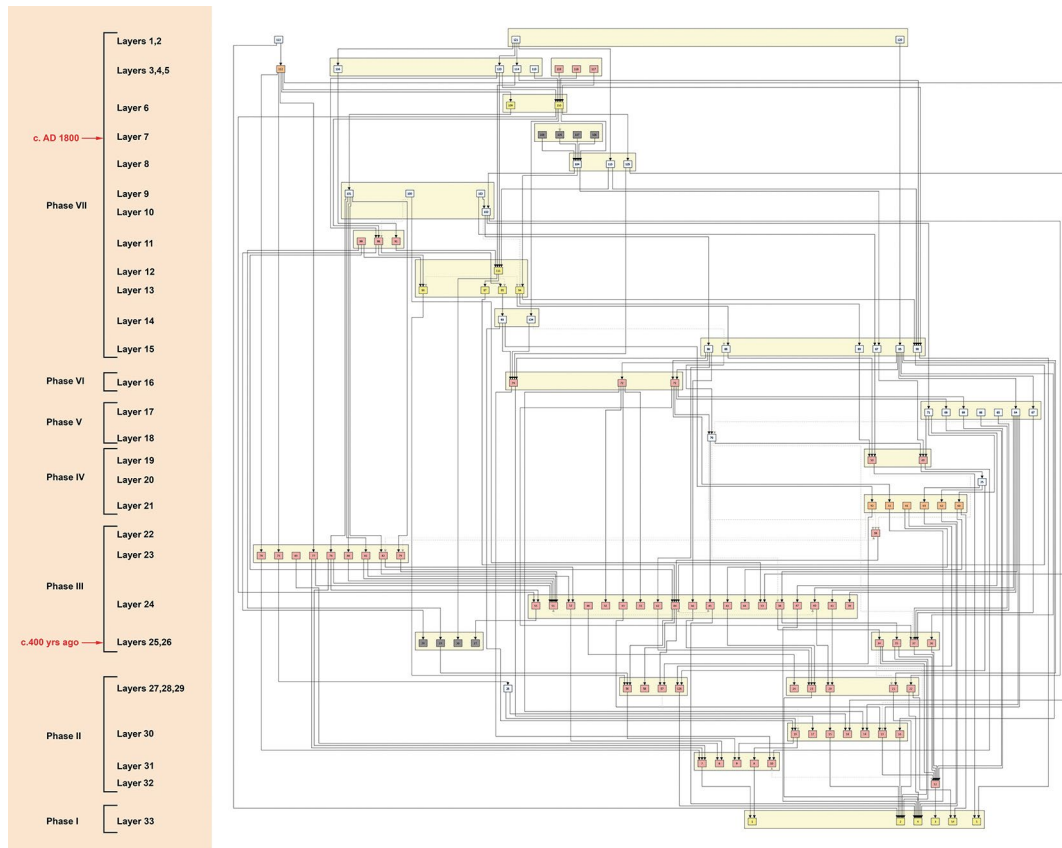


Figure 12.7 Interpretation of the Panel F1 Harris Matrix, grouping the motifs into contemporaneous layers on the basis of stylistic attributes and preservation.

Source: Illustration by Robert Gunn.

Beeswax pellets made before the painting were incorporated in four painted images, and one was added to a fifth image after it was painted. The pellets, each allocated an individual image number, are in two spatially distinct groups: pellets F-27 to F-30, associated with paintings F-55, F-91, F-98 and F-99; and pellets F-105 to F-108, associated with painting F-104. Pellets F-27 to F-30 are individual beeswax dots making the centres of red-painted radial designs (Figure 12.8). Pellets F-105 to F-108 are elaborations on a white-painted female figure (Figure 12.9). Radiocarbon dates on pellets F-27 and F-28 each calibrate within the period 1430–1640 cal AD (Table 12.1). As all four of the pellets within this group (F-27 to F-30) are in similar states of preservation, located within 85 cm of each other and positioned at the same level in the pattern of superimposition, it is likely that they were applied during a single artistic event. Pellets F-28 to F-30 are all small and central to red-painted radial designs, while pellet F-27 is larger and underlies a design in a darker shade of red and a yellow snake. Pellet F-28 also underlies the radial design, indicating that it was applied before the red radiating lines were painted; its relationship to an apparently underlying yellow flying-fox remains unclear.

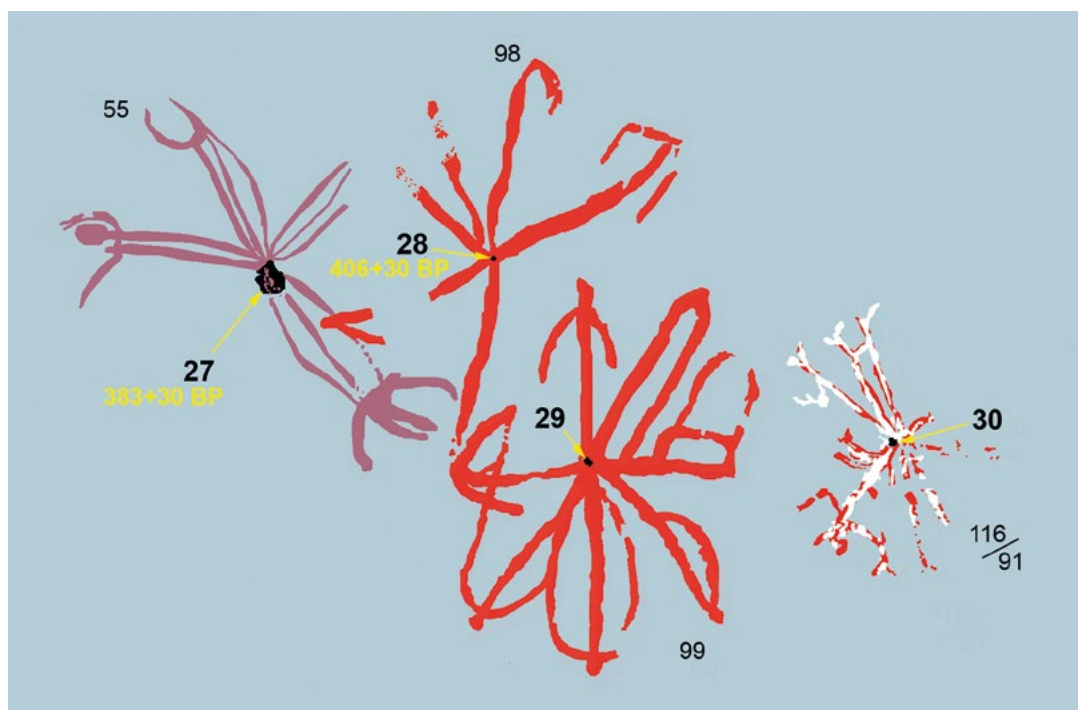


Figure 12.8 Beeswax pellets F-27 to F-30 showing overlying radial designs.

The two dated pellets were radiocarbon dated to 1430–1640 cal AD.

Source: Photo-tracing by Robert Gunn.

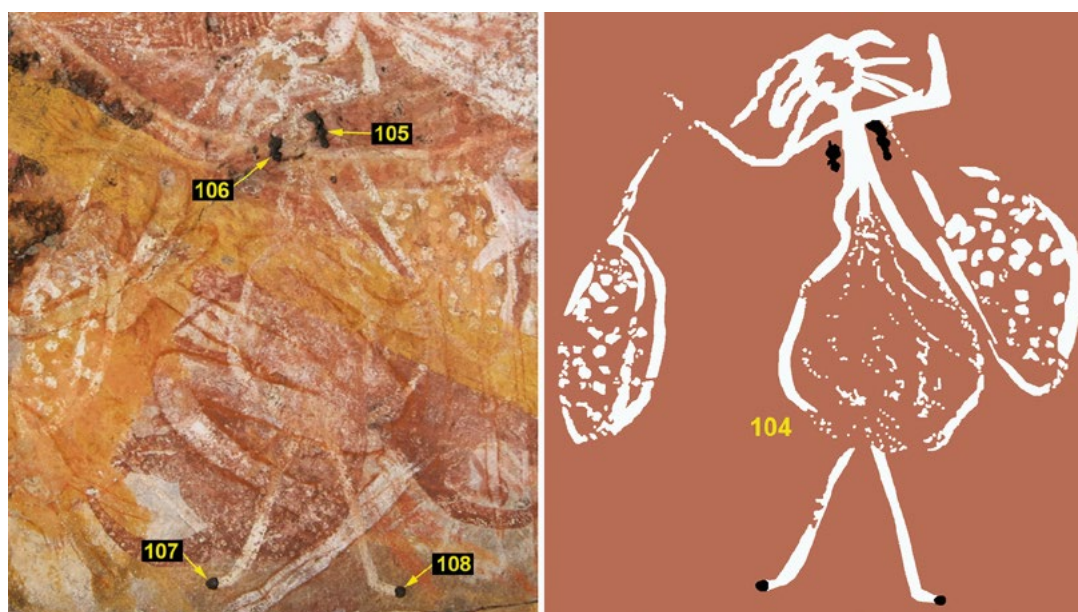


Figure 12.9 Beeswax Pellets F-105 to F-108 overlying painting F-104.

Source: Photograph and photo-tracing by Robert Gunn.

Most of the art that underlie these dated pellets consists of poorly preserved fragments in monochrome pigment. The exceptions are a poorly preserved but intact long monochrome snake that encircles the panel, three paintings in red with fine-line white, hatched infill- and a yellow fragment partially outlined in red. These four bichrome paintings indicate that bichrome art was practised sometime before c. 400–500 years ago, as they underlie the beeswax pellets dated to that age.

The beeswax pellets F-105 to F-108 are undated. We know that, with time, beeswax pellets deteriorate from a shiny black to a crazed grey (Nelson 2000). Although these pellets are in comparable positioning under the well protected shelter, they are darker in colour than the beeswax of pellets F-27 to F-30 and lack the crazing of the c. 400–500-year-old pellets. This suggests that pellets F-105 to F-108 are younger than the dated pellets F-27 and F-28. Pellets F-105 to F-108 are in a comparable state of preservation to a beeswax figure on Panel K4 nearby (Figure 12.10), where a radiocarbon date calibrated to 1633–1953 cal AD has been obtained. We conclude that these two sets of beeswax pellets are likely to be of similar age, within the past 400 years.



Figure 12.10 Beeswax figure dated to 1660–>1900 cal AD on Panel K4.

Source: Photograph by Robert Gunn.

These radiocarbon dates place four of the art phases on Panel F1 Phases III–VI in the period after 1430 cal AD. These four phases contain 97 images, or over three-quarters of the visible art of Panel F1. The 17 images in the most recent layer were all made after c. 1650 cal AD, as indicated by the extrapolated ages of pellets F-105 to F-108 (Table 12.2).

Table 12.2 Summary of the Panel F1 art phases.

Panel F1 phase	# of layers	# of images	Techniques	Colours	Major motifs
Vib	15	40	paintings	white, white+red, orange+white, yellow+red, yellow, red, black	Bichrome snakes; Solid white anthropomorphs (females); Outline+infill weapons
1660->1900 cal AD (age of beeswax pellets extrapolated from Panel K4)					
Vla			paintings, stencil	white, yellow, red, white+red	Solid white anthropomorphs (male and female) and macropod; Area of sprayed pigment; Outline+infill radial designs, fish and bags; Solid yellow flying fox, echidna and macropod; Bichrome 'Jawoyn Ladies' and macropod
V	1	3	paintings	white+red	Bichrome anthropomorph (female), X-ray macropod and fish

Panel F1 phase	# of layers	# of images	Techniques	Colours	Major motifs
IV	5	17	paintings	white, white+red, red, orange	Bichrome anthropomorphs, Solid white anthropomorph (females); Outline+infill snake and fish; Solid red possum; Solid orange fish and echidna
III	7	37	paintings	red	Red solid or outline+infill fish, anthropomorph, weapons and bags
1430–1640 cal AD (dated beeswax pellets)					
II	6	23	paintings	red, red+white	Striped red snake; Solid red anthropomorph with fine white-line infill; Fragments of pigment art
I	1	6	paintings	yellow, yellow+red	Mainly yellow fragments (2 solid and solid+outline animals)

Note that for bichrome paintings, the base colour is listed first and the later, additional colour second. For example, white+red is a white solid silhouette with red outline and/or infill.

Source: Authors' data.

Tabulation of motif types by phase for Panel F1 suggests that little change in artistic conventions took place over the past 400–500 years (Table 12.3). During that same period, there appears to have been a seven-fold increase in the use of white pigment and white-based bichrome painting, correlating with both a relative and an absolute decrease in the number of red and red-based bichrome motifs (Table 12.4). Panel F1 is a horizontal ceiling panel that is well protected from the elements, and beyond reach of passing animals. Consequently, it is unlikely that the observed increase in white pigment is simply a function of taphonomic factors, nor can it explain the absolute decline in the use of red pigment.

Table 12.3 Panel F1 motifs by art phase.

Panel F1 phase	Motif												Total # of images
	Anthropomorph	Snake	Implement	Non-figurative design	Beeswax	Macropod	Fish	Echidna	Flying-fox	Possum	Other	Fragment	
Vib	2	3	3	4	4						1		17
1660→1900 cal AD (age of beeswax pellets extrapolated from Panel K4)													
Vla	6		1	6		4	1	1	3		1		23
V						1	1				1		3
IV	2	1		1			2	1		2	6	2	17
III	6		8	1	4	1	12				4	1	37
1430–1640 cal AD (dated beeswax pellets)													
II	3	1		3							2	14	23
I											2	4	6
Total	19	5	12	16	8	6	16	2	3	2	16	21	126

Source: Authors' data.

Table 12.4 Panel F1 colours by art phase.

Panel F1 phase	Colour									Total # of images
	Orange+white	White+red	White	Black	Red+white	Red	Yellow	Yellow+red	Orange	
Vib	1	1	6	4		3	2			17
1660→1900 cal AD (age of beeswax pellets extrapolated from Panel K4)										
Via		6	9			3	5			23
V					3					3
IV		1	8		1	1			6	17
III				4		33				37
1430-1640 cal AD (dated beeswax pellets)										
II			1		4	18				23
I							5	1		6
Total	1	8	24	8	8	58	12	1	6	126

Source: Authors' data.

Panel H

Panel H is a large, elongated panel forming a rough T-shape, 4.0 × 2.9 m long along its two axes (Figure 12.11). It contains 132 widely distributed images, but the panel is visually dominated by two large polychrome X-ray barramundi (180 × 84 cm and 143 × 53 cm respectively) that may hide many underlying images. Panel H has at least 21 layers of superimposition involving all except for two of its 132 images (Images H-7 and H-116). Interpretation of the Harris Matrix (Figure 12.12) suggests at least six phases of art production on this panel (Table 12.5; Figure 12.13). The two outlying motifs were included in the Harris Matrix by allocating them to particular layers following artist traits that matched those of other nearby motifs.

Table 12.5 Summary of the Panel H art phases.

Panel H phase	# of layers	# of images	Techniques	Colours	Major motifs
VI	1	2	painting	white+red+black	Fish in polychrome X-ray
Vb	6	15	painting, appliqué	white, white+red, red, black	White solid anthropomorphs and fish; Red linear anthropomorph; Solid white+red outline+infill anthropomorphs and macropods
1660→1900 cal AD (dated beeswax anthropomorph)					
Va	2	22		white	Solid white+red outline+infill anthropomorphs and turtle; White outline+infill anthropomorphs, emu, dillybag and digging stick
IV	2	17	painting, stencils	white, yellow	White hand stencils; White-painted outline+infill non-figurative designs and macropod; Yellow fragments of pigment art
III	2	10	painting	red, red+white	Solid red macropods and turtle; Solid red+white outline+infill macropod and snake

Panel H phase	# of layers	# of images	Techniques	Colours	Major motifs
II	7	46	painting, stencils	red, white, yellow	White hand stencils; White-painted arc design; Red outline+striped infill anthropomorph and macropod; Yellow outline+infill bird
I	1	20	painting	red	Solid red animals and fragments of red, yellow and white pigment art

Source: Authors' data.

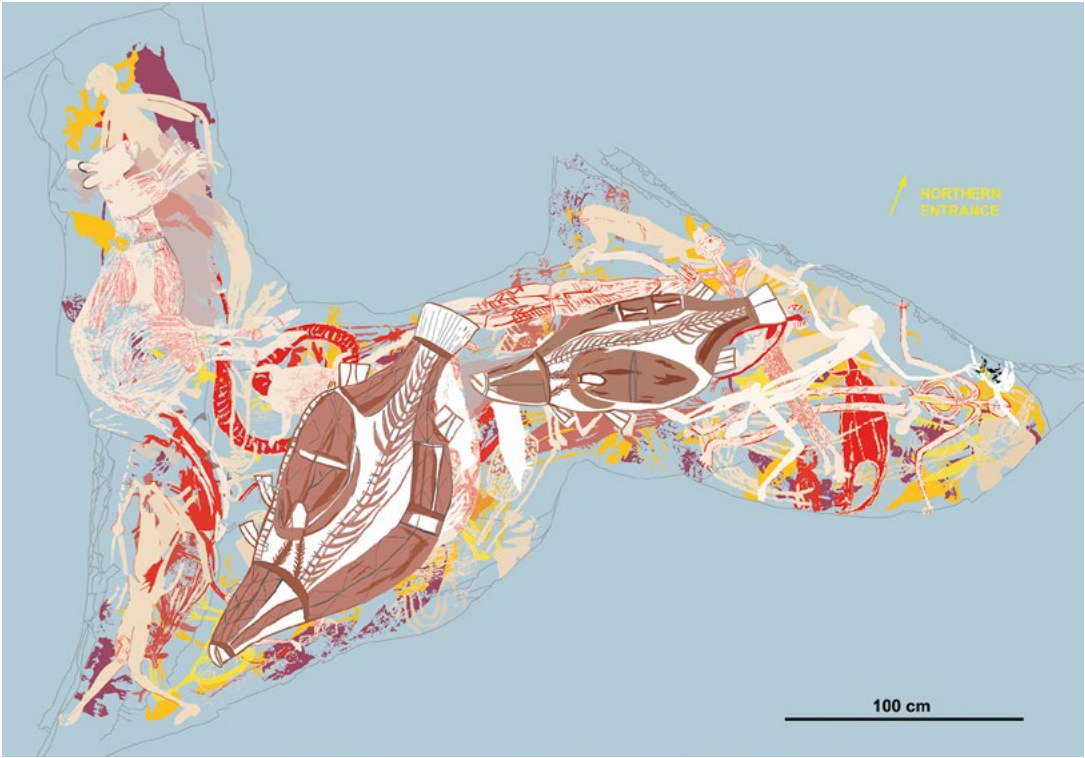


Figure 12.11 Photo-tracing of Panel H.

Source: Photo-tracing by Robert Gunn.

Motif H-122 is a beeswax figure radiocarbon dated to 1650→1910 cal AD (Wk-28101) (Table 12.1). The beeswax figure is overpainted by two white paintings (Figure 12.14), which are in turn overlain by a polychrome barramundi. Beeswax Image H-122 occurs midway within Phase V in the pattern of superimpositions. It is likely that other motifs within this phase, although in some cases produced prior to the beeswax figure, are roughly contemporaneous with each other due to similarities in their artistic traits.

As with Panel F1, there appears to have been little overall change in the range of motifs portrayed on Panel H over time (Table 12.6). Again, however, over the time period represented in Panel H, there has been a clear replacement of red and yellow by white pigment (Table 12.7).

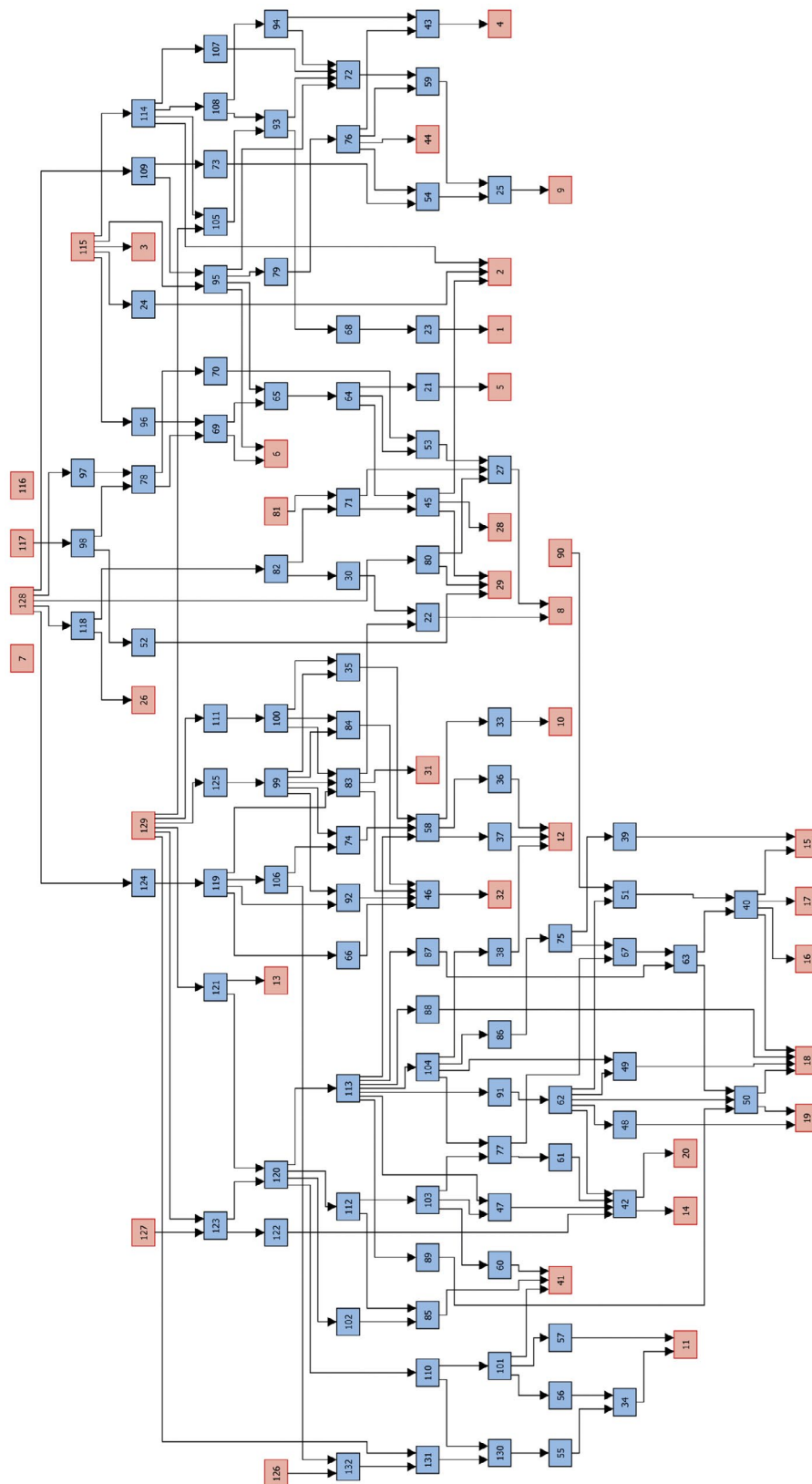


Figure 12.12 Harris Matrix of the Panel H superimpositions.

Red boxes = images at beginning or end of a superimposition sequence; blue boxes = images within a superimposition sequence.

Source: Illustration by Robert Gunn.

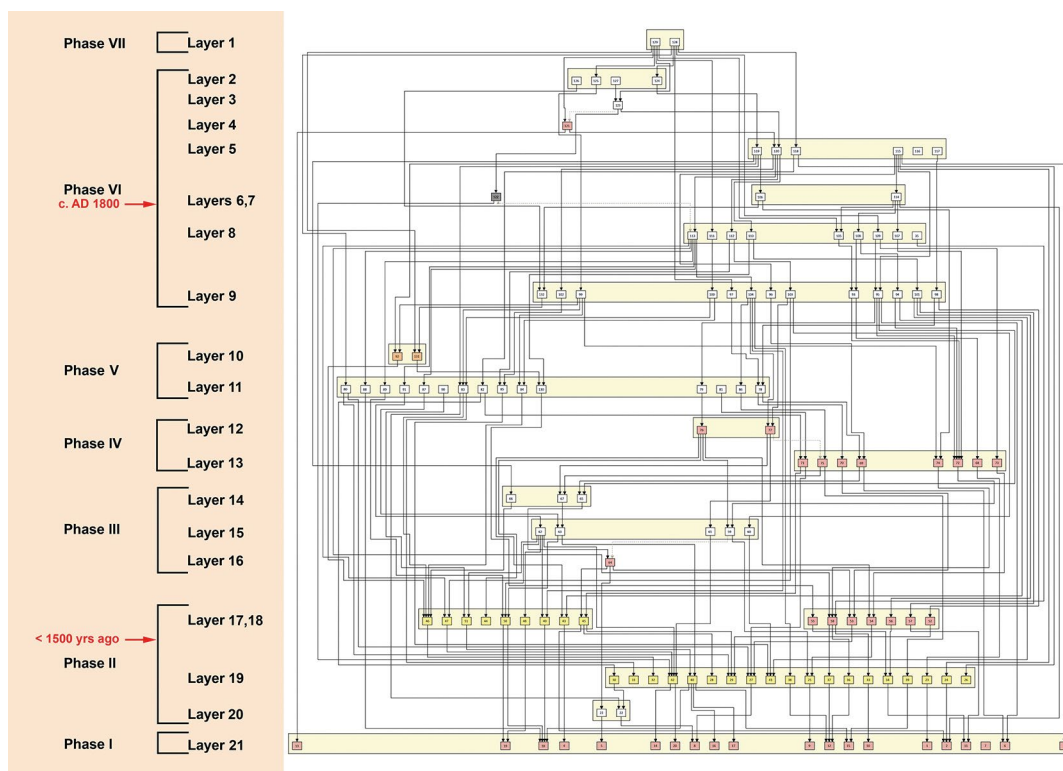


Figure 12.13 Interpretation and phasing of the Panel H Harris Matrix.

Source: Illustration by Robert Gunn.



Figure 12.14 Beeswax Image H-122 (arrowed) dated to 1650->1910 cal AD.

Source: Photograph by Robert Gunn.

Table 12.6 Panel H motifs by art phase (excluding fragments).

Panel H phase	Motif													Total # of images
	Fish	Smear	Implement	Turtle	Snake	Anthropomorph	Macropod	Bird	Hand	Non-Figurative Design	Other Animal	Unknown	Fragment	
VI	2													2
Vb	2	2				4	2	1		2		2		15
1650->1910 cal AD (dated beeswax anthropomorph)														
Va			2	1		9	2	1				4	3	22
IV							1		2	9		5		17
III			1	1	1		3					4		10
II						2	5	2	5	3	1	22	6	46
I										1	3	10	6	20
Total	4	2	3	2	1	15	13	4	7	15	4	47	15	132

Source: Authors' data.

Table 12.7 Panel H colours by art phase.

Panel H phase	Colour									Total # of images
	White+red+black	Pink	Black	White+red	Orange	White	Yellow	Red	Red+white	
VI	2									2
Vb	1	2	1	3		7		1		15
1650-->1910 cal AD (dated beeswax anthropomorph)										
Va				5		17				22
IV					2	15				17
III								8	2	10
II						7	28	11		46
I								20		20

Source: Authors' data.

Panel D

Panel D is roughly triangular in shape, 4.8 × 3.3 m in size and has at least 15 layers of superimposition involving all but one of its 66 images. The art is visually dominated by polychrome paintings of two large barramundi and a range of smaller bichrome fish (Figure 12.15). These fish paintings are the most recent art on the panel. The largest motif here (Image D-48), however, is that of a horse (4.4 × 2.9 m; Figure 12.16) that underlies 17 paintings in five layers. Horses first entered the plateau in 1845 AD (Leichhardt 1847). Consequently, all of the motifs overlying the horse painting are less than 170 years old. These overlying images include two fish in a Jawoyn X-ray convention, six fish in X-ray conventions common to the north of Jawoyn Country and three 'Jawoyn Lady' paintings (see Gunn 1992:180). Interpretation of the Harris Matrix (Figures 12.17 and 12.18) divides the art into four phases, with the horse motif occurring mid-way through Phase III (Table 12.8).

Table 12.8 Summary of the Panel D art phases.

Panel D phase	# of layers	# of images	Techniques	Major colours	Major motifs
IV	2	8	p	white+red+black, white+red+purple, white+red+yellow, white+red, yellow+red	X-ray, polychrome and bichrome fish
IIIb	4	10	p	white+red, pink, white+red+grey	Bichrome anthropomorphs; Pink fragments; Polychrome horse
AD 1845					
IIIa	6	26	p	white, white+red, red, cream, cream+red	Bichrome macropods, bird, fish, turtle; Solid white or cream anthropomorph, birds, macropods, hand stencils
II	2	13	p	red, red+white, black	Red-striped macropod, fragments of pigment art
I	1	9	p	yellow	Solid yellow anthropomorphs; Yellow linear anthropomorph; Fragments of pigment art

Source: Authors' data.

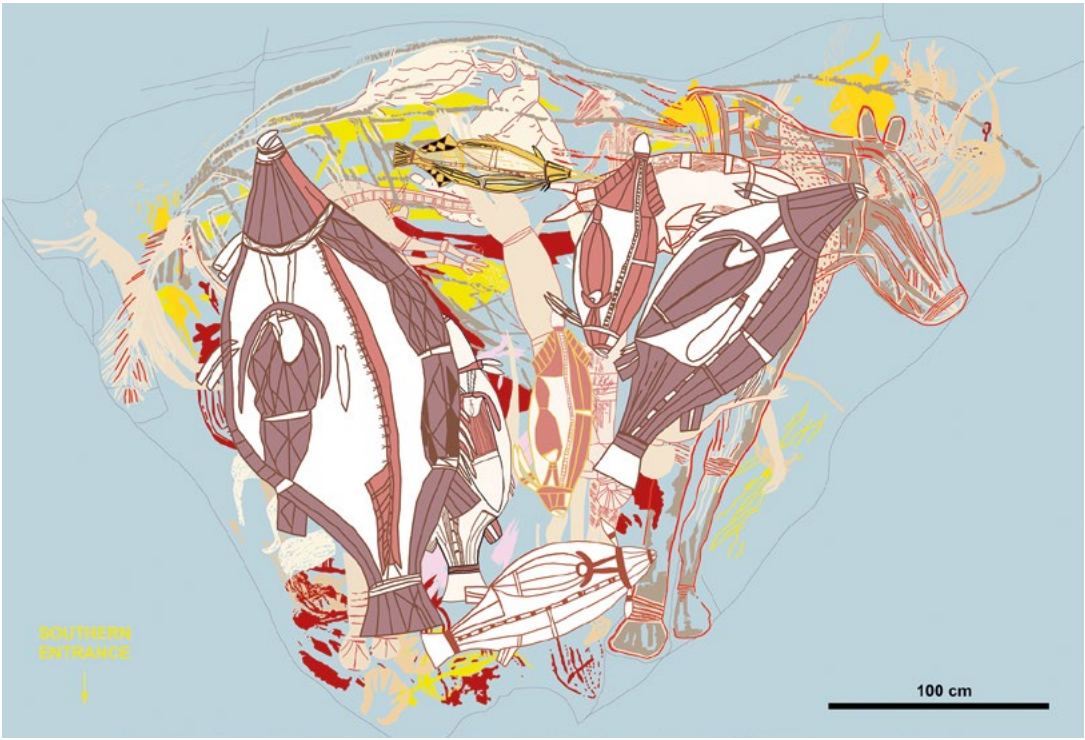


Figure 12.15 Photo-tracing of Panel D.

Source: Photo-tracing by Robert Gunn.



Figure 12.16 Horse image D-48, likely to represent a horse of the Leichhardt expedition in 1845 (see Chapter 9).

Source: Photo-tracing by Robert Gunn.

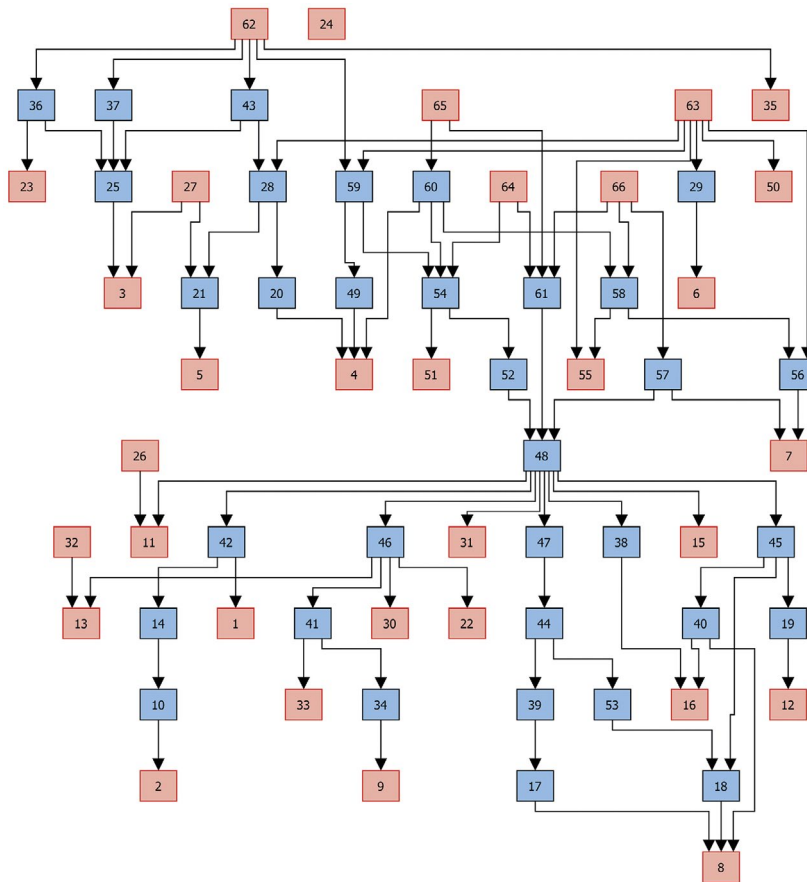


Figure 12.17 Harris Matrix of the Panel D superimpositions.

Red boxes = images at beginning or end of a superimposition sequence; blue boxes = images within a superimposition sequence.

Source: Illustration by Robert Gunn.

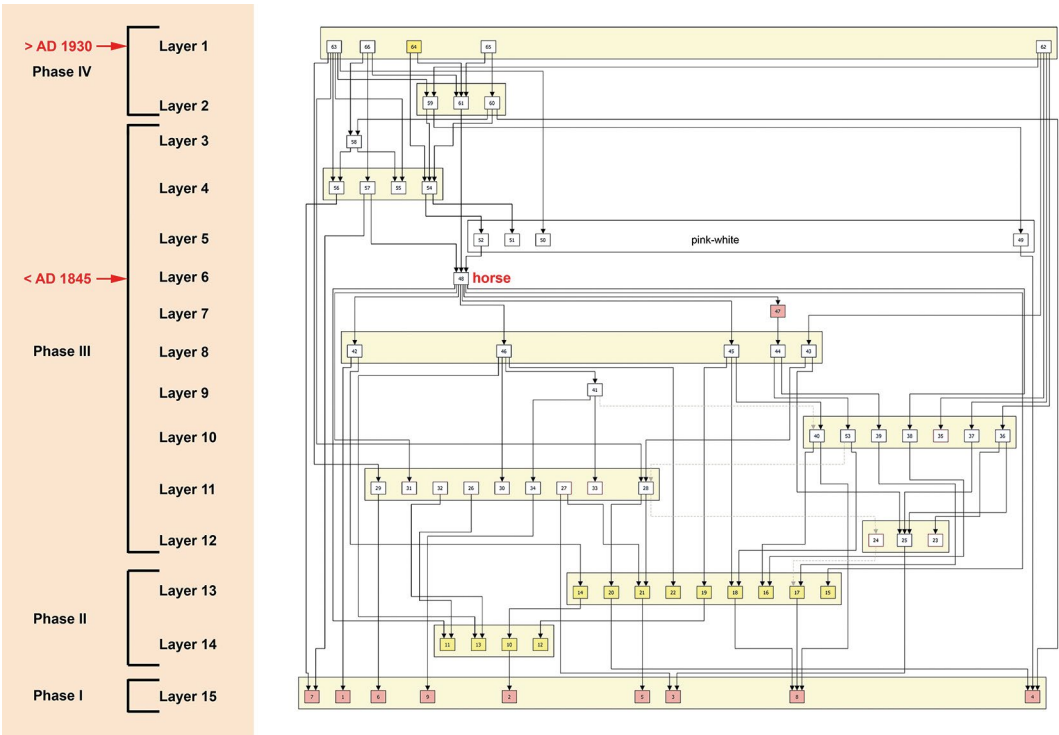


Figure 12.18 Interpretation and phasing of the Panel D Harris Matrix.

Source: Illustration by Robert Gunn.

The greater number of images in the upper layers of Panel D, however, cannot be seen as representing a period of flowering artistic activity. The reason for this is that the large size of, and density of pigment on, the polychrome fish mean that large areas that were probably decorated during earlier phases cannot now be seen. Hence, motif counts for these earlier phases are unlikely to be representative of the actual numbers of artworks produced.

From what is observable, and consistent with the other panels already described, there appears to have been little overall change in the range of motifs portrayed over time in Panel D (Table 12.9). In common with Panel H, however, Panel D shows a clear trend for the replacement of red and yellow pigments with white-based paintings around or shortly before 1845 AD (Table 12.10).

Table 12.9 Panel D motifs by art phase.

Panel D phase	Motif Type									Total # of images
	Fish	Anthropomorph	Macropod	Non-figurative design	Turtle	Hand	Other	Horse	Fragment	
IV	8									8
IIIb		3						1	6	10
1845 AD										
IIIa	1	2	6	3	2	2	10			26
II		2		1			2		8	13
I			1	1					7	9
Total	9	7	7	5	2	2	12	1	21	66

Source: Authors' data.

Table 12.10 Panel D colours by art phase.

Panel D phase	Colour									Total # of images
	Yellow+black	Polychrome	Cream+red	White+red	White	Pink	Cream	Yellow	Red	
IV	1	5		2						8
IIIb		1		3	2	4				10
1845 AD										
IIIa			3	6	13		3		1	26
II								13		13
I									9	9
Total	1	6	3	11	15	4	3	13	10	66

'Polychrome' refers to the use of three or more colours in a single image.

Source: Authors' data.

Discussion

Patterns of superimposition can be compared across the three panels by cross-correlating common artistic traits within individual phases. Given that some layers within some phases have been radiocarbon dated, we can assign absolute ages to those phases. The phases can thus be grouped into three chronological periods: 1) older than 1430 cal AD; 2) within the period 1430–1640 cal AD; and 3) 1640 cal AD – 1953 AD (Table 12.11). As painting appears to have ceased at Nawarla Gabarnmang around 1930 AD (Gunn et al. 2012; see also Chapter 9, this volume), the most recent period can be contained within a 290-year period, from 1640 cal AD to 1930 AD. No age for the underlying and oldest art on these panels is known, and hence the starting date and depth for the earliest time period is unknown (but see Chapter 11).

Table 12.11 Cross-correlation of panel phases and time periods.

Time period	Panel F1	Panel H	Panel D
1640–1930 cal AD	Vla & Vlb	VI	IV
		Va & Vb	IIIa & IIIb
1430–1640 cal AD	V		
	IV		
		IV	
	III	III	
Pre-1430 cal AD	II		II
	I	II	I
		I	

Source: Authors' data.

Therefore, the three chronological Periods for Panels D, F1 and H are:

1. Recent: 1640 cal AD – 1930 AD, with a sub-group from Panel D assigned to the time frame 1845–1930 AD by the horse depiction.
2. Second: 1430–1640 cal AD.
3. First: Older than 1430 cal AD.

Comparison of the art over these three Periods (Tables 12.12–12.13; Figures 12.19–12.23) indicates that:

- Polychrome paintings, including those incorporating an X-ray convention more commonly found in northerly parts of Arnhem Land (e.g. Figure 12.24), occur only in the Recent Period. All probably date to a time after 1845 AD and so are less than 170 years old.
- Anthropomorphs and macropods, painted in white with delicate red infill, became prominent during the Recent Period, most probably after around 1640 cal AD.
- The proportion of anthropomorphs and macropods increased in the Recent Period (after 1640 cal AD) relative to earlier Periods.
- The range of motifs increased during the Second Period and continued into the Recent Period.
- Fish and non-figurative designs became more prominent during the Second and Recent Periods.
- Most white motifs occur during the Second and Recent Periods, with a marked increase in white-based paintings (white, white-and-red bichromes and polychromes) during the Recent Period (72 per cent of images, compared with 29 per cent in the Second Period and 7 per cent in the First).
- The use of red and red-based (red-and-white bichromes) motifs declines notably after the beginning of the Recent Period (c. 1640 cal BP).

Table 12.12 Motifs by cross-correlated time periods (total # of images = 324).

Time period	Motif													Total # of images
	Flying-fox	Echidna	Turtle	Fish	Artefact	Anthropomorph	Non-figurative design	Macropod	Snake	Bird	Other	Fragment	Possum	
1640–1930 cal AD	3	1	3	14	6	26	19	14	3	2	23	9		123
1430–1640 cal AD		1	1	15	9	8	15	6	2		22	3	2	84
Pre-1430 cal AD						7	9	6	1	2	47	45		117

Source: Authors' data.

Table 12.13 Colours of images by cross-correlated time periods (total # of images = 324).

Time period	Colour													Total # of images
	Orange+white	Cream+red	Cream	Pink	Polychrome	White+red	White	Red	Yellow	Black	Yellow+red	Orange	Red+white	
1640–1930 cal BP	1	3	3	6	9	26	54	8	7	5	1			123
1430–1640 cal BP						1	23	42		4		8	6	84
Pre-1430 cal BP							8	58	46		1		4	117

Source: Authors' data.



Figure 12.19 Anthropomorphs produced after 1430 cal AD. Beeswax pellets and beeswax figures shown in black.

Source: Photo-tracing by Robert Gunn.

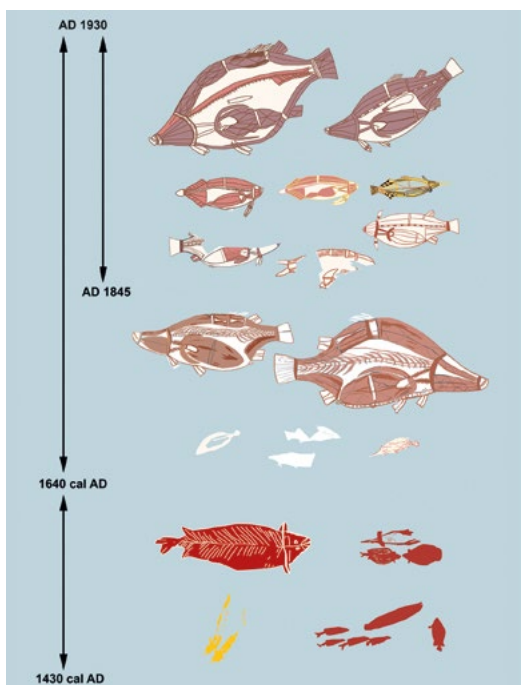


Figure 12.20 Fish images depicted after 1430 cal AD.

Source: Photo-tracing by Robert Gunn.

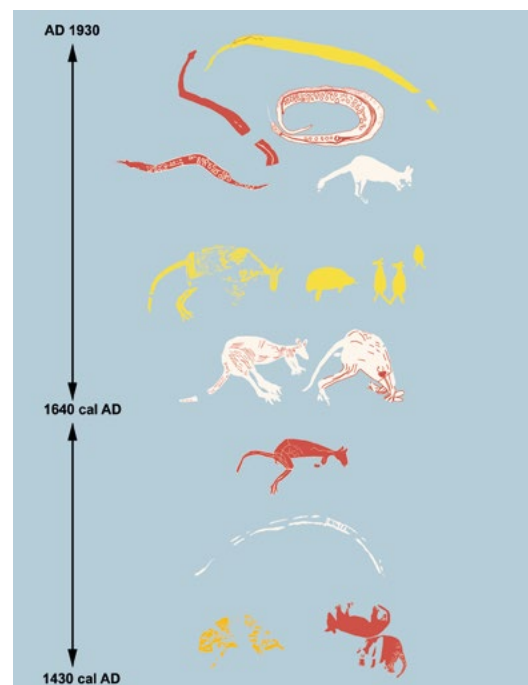


Figure 12.21 Other faunal images depicted after 1430 cal AD.

Source: Photo-tracing by Robert Gunn.

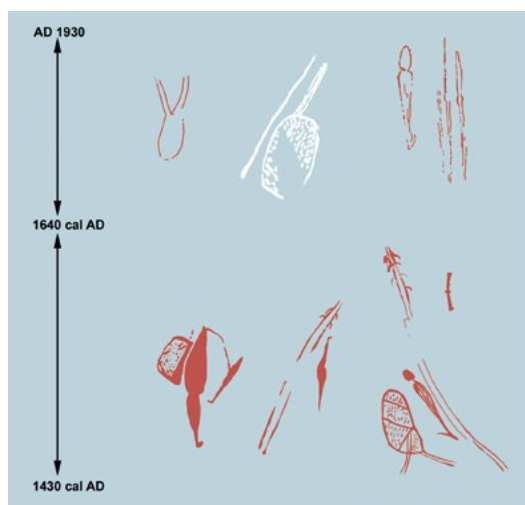


Figure 12.22 Implements depicted after 1430 cal AD.

Source: Photo-tracing by Robert Gunn.

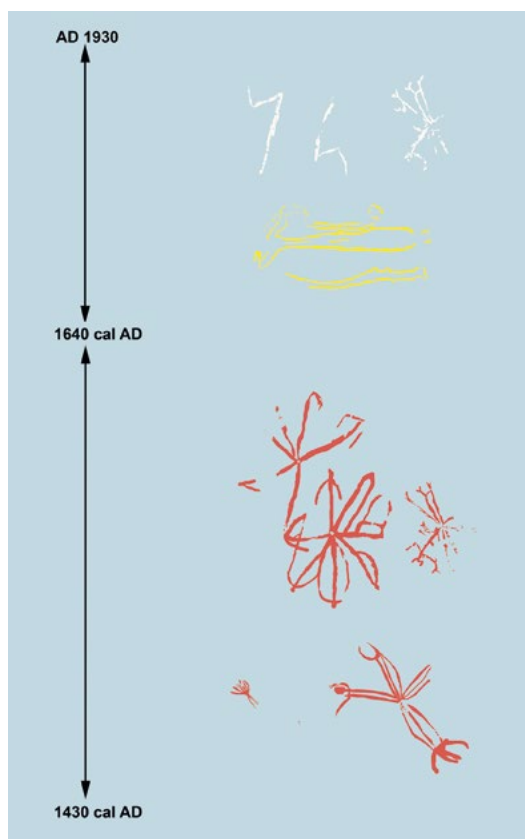


Figure 12.23 Non-figurative designs depicted after 1430 cal AD.

Source: Photo-tracing by Robert Gunn.

The art of Panels D, F1 and H have a number of changes in the use of colours and motifs over the period from pre-1430 cal AD times to 1930 AD. These changes appear to have been gradual, rather than occurring together as a single 'package' over a short period of time; the changes do not represent an abrupt and dramatic transformation of the overall repertoire. These results show:

- The specific impetuses behind the Recent Period art – cultural beliefs, understandings and codes relating to particular artistic practices – were also restricted to this period of time, the past 350–400 years.
- The time frame represented by the Recent Period is comparable with Chaloupka's (1993:191) 'Contact period', which he proposed began around 300 years ago, a period of cultural activity coincident first with the arrival of Macassans and then Europeans, Chinese and other outsiders.
- New 'traditional' styles such as polychrome X-ray fish and 'Jawoyn Lady' motifs (Figures 12.24 and 12.25; see also Chapters 11 and 13) developed during the Recent Period. These new styles contrasted with the stylistic conventions of the previous art periods when paintings were restricted to monochromes and bichromes and no female figures had achieved the high numbers, prominent positioning and wide distribution of the 'Jawoyn Lady' that became common in Jawoyn Country during the Recent Period (Gunn 1992:180). Chaloupka also pointed out, as we have also found, that 'stylistic conventions and painting techniques of the previous styles continued to be used' (Chaloupka 1993:191).

Overall, these results support Taçon's (1989b:318) finding: 'The most recent period of rock painting in Western Arnhem Land was one of great diversity and elaboration. It differs from earlier periods in terms of subject matter, form, use of colour and symbolic content'. His suggestion that most X-ray art was produced over the past 1500 to 300 years (Taçon 1989b:318, 330) may have unduly stretched

out the chronology of this art form. We have found it only during the last 300 years and it is possible that X-ray art is younger in the southern half of the Arnhem Land plateau, which includes Nawarla Gabarnmang, than in the north.



Figure 12.24 Polychrome X-ray fish (barramundi) from Panel E1. Scale 10 cm.

Source: Photo-illustration by Robert Gunn.

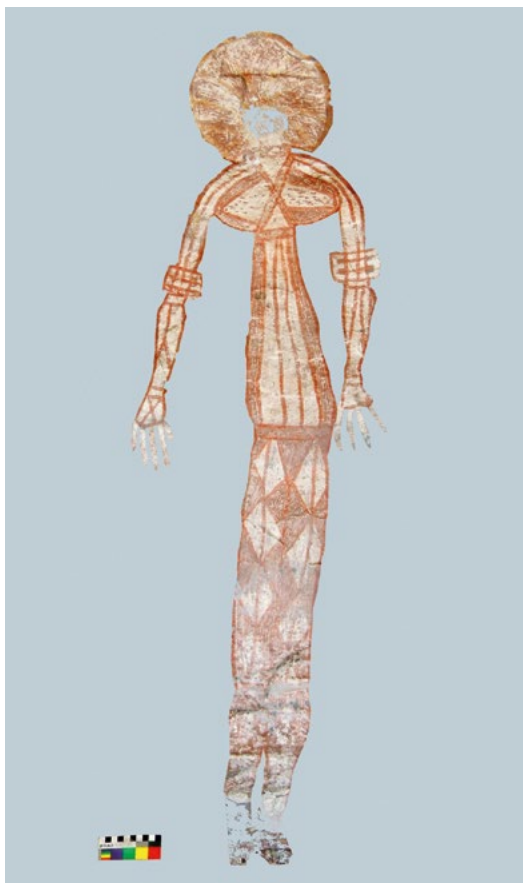


Figure 12.25 Bichrome 'Jawoyn Lady' from the nearby site A081-11. Scale 10 cm.

Source: Photo-illustration by Robert Gunn.

A further implication of our results is that Taçon's concept of 'rainbowness', symbolised by bright combinations of colour through hatching, cross-hatching and solid bands of pigment (Taçon 1989b:326, 1991:197), may also be a recent phenomenon. This, in turn, implies his proposed 'shift in religious orientation' (Taçon 1989b:330) was also relatively recent.

Alternatively, these results from Nawarla Gabarnmang may relate to local circumstances in southern parts of Arnhem Land only. They may indicate recent and in some ways restricted contacts with people from the north and their polychrome X-ray fish art.

Conclusion

Analyses of these three large art panels at Nawarla Gabarnmang have provided a chronological sequence for its recent rock art: an initial change in the recent art within the time period 1430–1640 cal AD, during which time white pigment became more popular and the range of motifs increased; followed by a further transition from 1640 cal AD to 1930 AD, when red pigment became relatively seldom used and white monochrome and white-based bichrome and polychrome paintings became much more common. Since white pigment is known to survive less well, the increase in white art may be thought to result from differential preservation. The ceiling surfaces, however, are very well protected from the elements and from animal activity, so we see the primary cause for the changes in colours used, and in artistic styles, as cultural. Whether the decrease in the use of red pigment and increase in white pigment at Nawarla Gabarnmang signals changing *access* to pigment types, or pigment sources, and/or whether they indicate a change in the *choice* of colour use relate to their symbolic associations remains unknown. No sources of either red or white pigment are known anywhere within tens of kilometres of Nawarla Gabarnmang.

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