

Superpositions and superimpositions in rock art studies: Reading the rock face at Pundawar Manbur, Kimberley, northwest Australia

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ABSTRACT

Patterns of *superposition* in rock art are often used to systematically construct style sequences. However, once on the rock, images can affect subsequent engagements with the art, the rock surface, the site, and its surrounding landscape, and this recursiveness can be studied through the *superimpositions* (significantly overlaid markings) on a rock face. This is an opportunity for archaeologists to investigate the culture of engagement not just at the moment of the art's initial creation, but subsequently also. In this paper we show how a long sequence of art styles that together span c. 17,000 years or more was not haphazardly arranged at the key site of Pundawar Manbur, in the Kimberley region of northwest Australia, but rather was constituted of many meaningful overlaps whose particularities reveal much about the culture of art and site engagement over time.

1. Introduction

Since the early years of rock art studies, 'superpositions'—where at least part of an image lies over another to form a relative chronological sequence—have formed a key tool for archaeologists in their work to use rock art to understand societies of the past. The pioneer of rock art studies, Abbé Henri Breuil, used an analysis of superpositions as the basis for his stylistic chronology of the rock art of Upper Palaeolithic Europe (Breuil, 1952). For Breuil, the layers of rock art in the European caves were like the stratigraphies of archaeological excavations. Working back through the layers he used the superpositions to record stylistic changes in the art through time. He linked these sequenced styles to major technological changes in the excavated sequences so as to divide Upper Palaeolithic art into a series of epochs. Whilst this sequence has been tweaked successively by each new generation of researchers, and our knowledge of the time sequence has greatly improved, many aspects

of Breuil's core framework survive until today. For those working in Australia, where the authors of this paper are based, superpositioning studies in rock art has most commonly followed the tradition of Breuil and been used to create regional stylistic sequences (e.g. Chaloupka, 1993; Dibden, 2019; Gunn, 1983; Gunn et al., 2019; McCarthy, 1960, 1974; Morwood, 1979, 1980; Rosenfeld et al., 1981; Trezise, 1971; Welch, 1993; Walsh, 2000; Wright, 1968). In the rock shelters of many parts of northern Australia, as in the European caves, superposition sequences have been recorded that are thought to span tens of millennia (Chippindale and Taçon, 1993).

Yet, sequencing is not the only use for analyses of superpositions. In the European Caves, André Leroi-Gourhan realised that superpositions held information beyond simply shedding light on chronology. He found repeated patterns in both positioning and superpositioning of subjects and he argued that these reflected the fundamental structure of Upper Palaeolithic societal beliefs. Certain cognitive constructs, according to

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Leroi-Gourhan, controlled the selection of images for placement in certain types of cave positions and the choice of which subject could overlie which (Leroi-Gourhan, 1968). This understanding did not deny the value of superpositions for understanding chronology, but it added a new dimension in which overlays also provide information on the structuring of meaning within rock art. In this understanding, each generation engaged with the art of previous generations and continued evolving the rock art panels in much more meaning-filled ways than the deposition of layers of artefacts in an excavated assemblage, where the uppermost superpositioning layer would usually hide from view what lies deeper under the ground. The difference with rock art is that artists could see the images on which they were making overlays, and these older images affected if not conditioned their choices. Leroi-Gourhan realised that archaeologists could use these patterned choices to understand the functioning of the belief systems of ancient Europe.

Working on the San ('Bushman') rock art of South Africa, David Lewis-Williams made a similar discovery (Lewis-Williams, 1974). Through meticulous quantitative research, he realised that earlier southern African assumptions were incorrect: overpainting was not a form of defacement of earlier art; it was not most commonly done over faded art; and it was not typically the result of limited rock surface availability. He focused on images that were substantially (rather than partially) overlain ('superimpositioning') and found that there were certain rules of syntax that 'favoured certain combinations and avoided others' (Lewis-Williams, 1974: 101). In the decades that followed, he went on to explain these rules through detailed study of San rituals, beliefs and cosmologies (e.g. Lewis-Williams, 1981, 2019).

In Australia there has been less work in the vein of Leroi-Gourhan and Lewis-Williams that explores the use of superimpositioning in the unpacking and explaining of the syntax underlying the art, but there has been a strong focus on the meaningful nature of some superimpositioning when it takes the form of repainting and retouching (e.g. Blundell and Woolagoodja, 2012; McDonald and Veth, 2013; Morphy, 2012; Motta, 2019; Mowaljarlai et al., 1988). These studies emphasise long-term processes of Aboriginal cultural renewal and maintenance of rock art. In other words, they focus not just on the moment of initial creation of an image or set of images, but even more so on how it continued to be culturally engaged afterwards (e.g. Kelly et al., 2021). These Australian studies have tended to emphasise additive processes in which older images are refreshed through overpainting. In other parts of the world, forms of recursive re-use can also be subtractive.

In a number of parts of southern Africa, the selective rubbing and smearing of rock art images has been recorded. In western and eastern South Africa, large patches ('palettes') of ochre pigment have been included amongst many of the most complex painted panels of San rock art. Unlike the images around them, these pigment patches have been repeatedly touched and rubbed after they were made. It has been argued that they were 'potent things', and by touching them users of the art could activate and use the power of the art (Hampson et al., 2002: 24; Yates and Manhire, 1991). In northern South Africa, painted human-shaped figures standing in a particularly significant pointing posture, termed the 'Waterberg posture', have been selectively rubbed, probably as part of ritual usage to draw upon their special potency (Laue, 2000). A similar phenomenon is recorded in the rock engravings of central South Africa. Specific engraved images, usually those depicting the most potent animals, have been selectively rubbed and scratched (Dowson, 2009; Ouzman, 2001).

These subtractive engagements with San art are all thought to have been done by the artists or their descendants, but the power of rock art has also been recursively used in Africa by farmer societies of more recent times. There are many cases of this, but notable published examples come from Zambia, where Chewa speakers throw rocks at a particular panel of 'hunter-gatherer' art as part of their rainmaking ceremony (Phillipson, 1976); Tanzania, where Waasi ritual specialists splash beer over rock paintings as a part of their rainmaking ceremonies (Bwasiri, 2011); and South Africa, where rock art pigments are scraped off by some traditional

doctors to make medicines (Duval et al., 2018: 97).

In the Kimberley region of northwestern Australia where we work (Fig. 1), the rock art sequence is longer and more complex than in most parts of Africa. The paintings of this region have been studied since the 1840s (Bradshaw, 1892; Grey, 1841). A number of sequences have been proposed, but none has presented systematic evidence of the patterns of superposition on which the sequence is based, nor has any clearly described in detail the purported artistic conventions that form the various so-called 'style phases' (Donaldson, 2012; Rainsbury, 2009; Veth et al., 2018; Walsh, 2000; Welch, 1993; but see Travis and Ross, 2016). Here a rock art 'style' refers to images depicted with a particular set of design conventions, and a 'style phase' to the relative and/or absolute chronological period(s) when that set of design conventions was used to make rock art (Gunn et al., 2019).

This paper focuses on the superpositioning and superimpositioning (for definitions, see below) at the extensively and intensively decorated site of Pundawar Manbur. This site contains most of the major styles recognised by the published Kimberley sequences. We seek to show how a meticulous study of superimpositions can allow us to move beyond stylistic chronology and to speak about matters of syntax and function. At a specific rock art site, we show how superimpositions provide us with signals of engagement that inform us about how older paintings continued to be drawn-upon, both literally and figuratively, and utilised by subsequent generations.

We follow Lewis-Williams (1974), Kaiser and Keyser (2008) and specifically Delannoy et al. (2018: 834–835) in differentiating between 'superposition' and 'superimposition':

'Superposition' simply indicates that one thing lies on another, such as in the geological principle of the superposition of strata. 'Superimposition' is more, incorporating the idea that the overlying object reworks what was there beforehand; the preexisting item affects what happens next, modifying the original in the process (such as in the hydrological notion that a new drainage pattern superimposes an earlier pattern). This notion of the influence of an object onto what comes later, of the affective nature of preexisting things, is fundamental to the ... study of a site and its rock art (because a major aim is to determine what happened through time ...).

For clarity: all forms of overlap are superpositions; superimpositions are a subset that involve the total or near-total overlap of marks or images that 'map on' the earlier form. Differentiating between superposition and superimposition in this way allows for a consideration of not only when an image was made, but also how, once on a rock surface, pre-existing images continued to be engaged and activated through time.

2. The Kimberley rock art sequence

The Kimberley's rock art is best known for two of its most visually prominent art styles, Wanjina (also 'Wandjina') and Gwion (previously 'Bradshaw'; also Kujon and Kiro Kiro) (Fig. 2). However, the region also contains a number of other recognised art styles (e.g. Crawford, 1968; 1972: 304–306) (Table 1). After identifying an initial three-part sequence in 1990 (Monochrome, Bichrome, and Polychrome art), Welch (1990, 1992) developed a linear temporal sequence with seven more or less distinctive art styles purported to represent mutually exclusive periods. From earliest to most recent, these sequential rock art styles are: Archaic, Tasselled Figures, Bent Knee Figures, Figures with Straight Parts and Missing Pigment, Parallel Line Figures, Wanjina, and Contact. This system was revised with minor changes the following year (Welch, 1993).

Working at the same time as Welch, Walsh published a complex schema in 1994, which recognised three 'Epochs', six 'Periods', 30 'Groups' and 15 'Sub-groups' (Walsh, 1994: 18). Walsh's Epochs essentially isolated the Gwion art from what came before and after it. The Periods (two from each Epoch) are broad categories differentiated

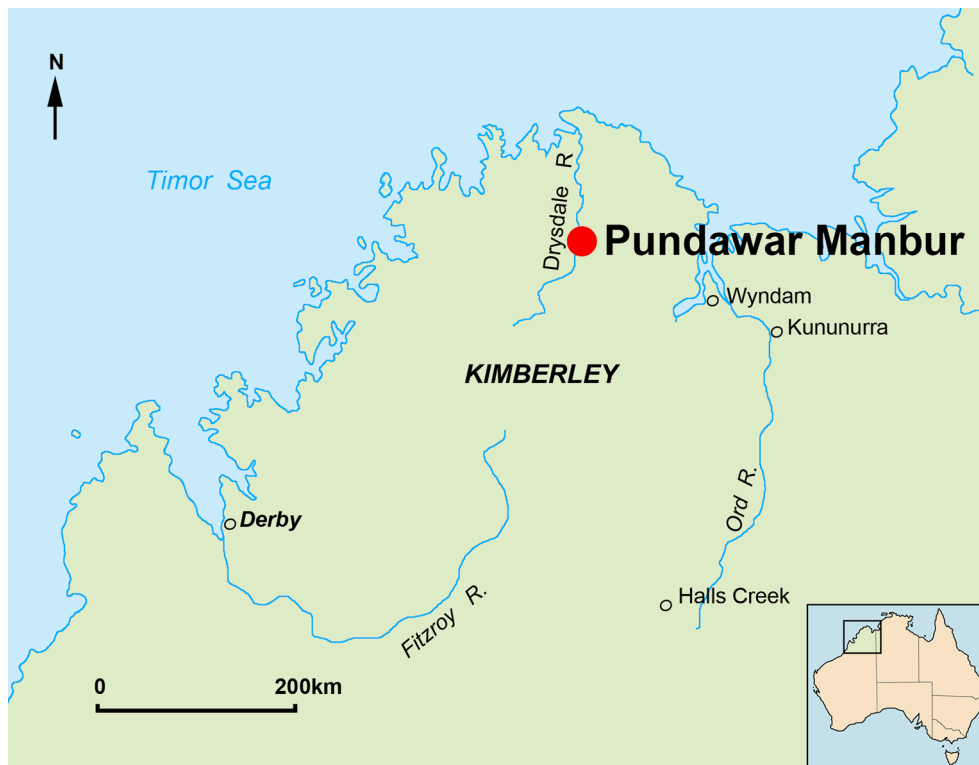


Fig. 1. Location of Pundawar Manbur (figure by Robert Gunn).

on the basis of style; and the Groups and Sub-groups further refine the Periods by shared finer-detailed attributes, all of which Walsh implied are chronologically sequential, although he also noted that there may be some exceptions, as some Groups appear to be contemporaneous (e.g. Sash Gwion and Elegant Action Gwion), while others may overlap (e.g. Walsh, 1994: 34). The most recent attempt at understanding the Kimberley's style sequence largely follows a slightly refined version of Walsh's sequence (Walsh, 2000) and proposes six 'rock art styles'. From oldest to youngest, these are: Pecked cupule, Irregular Infill Animal, Gwion, Static Polychrome, Painted Hand, and Wanjina (Veth et al., 2018) (Table 1).

Most of these major schemas propose that the named style categories essentially progress chronologically from one to the next. While this has led to some serious questioning of the viability of the sequences (Ross et al., 2016; Travers, 2015; Veth et al., 2018), there has been only one small published study systematically showing through superposition data that some of the identified styles do appear to progress chronologically (Travis and Ross, 2016). Unlike the other sequences, Donaldson (2012) has recently provided local Kwini names for the more distinctive art motifs, and it is these terms that we follow in this paper. A recently documented style, the Kimberley Stout figures, has yet to be assigned a secure position in the overall sequence, although initial observations of a limited number of superpositions suggest they are positioned between the Dynamic Gwion and Wanjina phases, and possibly contemporaneous with the Dalal Gwion (Gunn et al., 2019). Additionally, O'Connor et al. (2013) has also proposed a most recent, 20th Century style, which they refer to as 'Contact' art and that relates to black dry pigment and fine scratch-work images and markings.

Welch (2004) and Rainsbury (2009: 131) found problems with Walsh's definition of the 'style' of the Irregular Infill Animal period (Walsh, 2000: 114), as many of the large animals attributed to that style are not depicted with the distinguishing irregular-dashed infill. However, this critique is not entirely justified as Walsh chose the label to describe the most distinctive, characteristic infill form for this style phase, while recognising the existence of other infill forms (Walsh, 1994:

35–36; 2000: 126, 340–344). In a recent publication, Motta et al. (2021: 7) also illustrated animals in a range of different conventions that are purportedly from the Irregular Infill Animal period, although the full range of styles that she and Walsh included in the category has yet to be identified and described.

Rainsbury (2009: 133) further found examples of reverse superpositioning of some of the different Gwion sub-style figures, and suggested that some of the sub-styles may have been contemporaneous. Also, of the 148 sites Rainsbury (2009: 133) recorded (83 in proximity of, and including, the site of Pundawar Manbur presented here), only one contained examples of the so-called Clawed/Painted Hand period and, while hand stencils occur throughout the sequence, he had difficulties assigning individual stencils to any particular art period.

Last but not least, 14 paintings in the so-called Irregular Infill Animal style (Finch et al., 2021), and 21 in a range of Gwion styles (Finch et al., 2020), have recently received radiocarbon ages. Organic matter in mud-wasp nests under or over individual paintings were dated, indicating that the Irregular Infill Animal paintings date to sometime after 17,200 cal BP but before 13,100 cal BP (median values), and that the Ngunuru ('Tassel') Gwion and Yowna ('Sash') Gwion proliferated between 11,500 and 12,700 cal BP but possibly originated closer to 16,620 cal BP (median values).

3. Pundawar Manbur

The study site is within the traditional lands of the Unghangho family of the Kwini people, and within the Balangarra Native Title lands. It is part of a site complex that consists of a large rock shelter known as Pundawar Manbur, a smaller adjacent one to the northeast, and, in front of the rock shelters, a broad flat area with archaeological potential. The name of the larger shelter, Pundawar Manbur, was provided by the Traditional Owners: 'Pundawar' is the province in which the site lies, and 'manbur' refers to the large macropod image that visually dominates the main rock shelter. The site is located near the crest of a low valley wall, some 200 m from an ephemeral creek (Fig. 3). The creek is one of



Fig. 2. Examples of major recognised Kimberley rock art styles, from purported youngest (A) to oldest (J). A: Wanjina from Borolaga 1 site, 127 cm long from top of head to end of furthest hand. B: Painted Hand period motif (central figure in orange pigment), c. 60 cm tall. C: Dalal Gwion from the Borolaga site complex, 42 cm tall. D: Dynamic Gwion from DRY518 site; the left figure is 20 cm diagonally from head to toe. E: Kimberley Stout figure from Borolaga 1 site, 47 cm tall. F: Yowna Gwion from Pundawar Manbur; the central figure is 57 cm tall. G: Ngunuru Gwion from DRY547 site, c. 30 cm tall. H: Grass prints from Panel A5, Pundawar Manbur; each grass print is c. 35 cm long. I: Irregular Infill Animal motif, c. 70 cm long. J: Pecked cupules; the section of wall shown on this photo is c. 1 m high (photos by Leigh Douglas, Robert Gunn, Pauline Heaney and Bruno David, courtesy of the Balanggarra Aboriginal Corporation).

two tributaries that join the permanent Drysdale River 3 km to the east. Pundawar Manbur lies near the mouth of a narrow 3 km-long valley that contains 31 other rock art sites with over 1600 motifs, and two stone arrangements dispersed along its length. Most of these art sites are small

shelters with less than 20 images. The site lies in an area of open woodland on the extensive Kimberley Plateau, a region with a tropical climate of pronounced annual dry and wet season cycles. The creek adjacent to Pundawar Manbur has a number of small waterholes that

Table 1

Published sequences for Kimberley rock art: nomenclature and characteristics.

Sequence	Period terms				Summary characteristics
	Welch 1993	Walsh 2000	Donaldson 2012	Veth et al. 2018	
Earliest	ARCHAIC	ARCHAIC		PECKED CUPULE	Pecked cupules and abraded grooves
		IRREGULAR INFILL	IRREGULAR	IRREGULAR	Hand and boomerang stencils, hand prints, large outline fauna, flora, and anthropomorphs mostly with stippled irregular infill
	TASSELLED FIGURE	BRADSHAW GROUP	NGUNURU	INFILL ANIMAL	Graceful, finely painted, slim-bodied anthropomorphic figures with tassel ornamentations, elongated headdresses and sometimes holding boomerangs or dillybags. Small animals are sometimes associated
		Tasselled-Bradshaw	GWION	GWION	
	BENT KNEE FIGURE	Sash- Bradshaw	YOWNA GWION		Elongated anthropomorphs with very tall headdresses, sash-like aprons, boomerangs, and with knees flexed (dancing?)
	KIMBERLEY DYNAMIC STRAIGHT PART FIGURE	Elegant Action Figures	DYNAMIC GWION		Anthropomorphs with little body ornamentation and mostly depicted in active poses (e.g. running) or sitting in groups
		CLOTHES PEG FIGURE	DALAL GWION	STATIC POLYCHROME	Anthropomorphs in static frontal pose, arms outstretched and with cylindrical headdresses. Often bichrome (although the more fugitive colour(s) may be lost). Associated with barbed spears, hooked spear-throwers and boomerangs
	Painted Hands	CLAWED HAND	PAINTED HANDS	PAINTED HAND	Broad-brush outline paintings with segmented or grid infill. Includes a wide range of anthropomorphs, therianthropes, flora and fauna. Many of the depictions have claw-like hands
	WANJINA	WANJINA	WANJINA	WANJINA	Monochrome and polychrome Wanjina (heads, heads + body, or headdress alone)
Most recent	CONTACT		CONTACT		Anthropomorphs, zoomorphs, and items reflecting non-Aboriginal origins

retain water for some time after the creeks cease to run during the dry season. Pundawar Manbur and the other rock art sites along the Drysdale River are made of hard and durable quartzitic-sandstone of the Wharton Formation (Donaldson, 2007).

The Pundawar Manbur hillslope is typical of Kimberley quartzitic landscapes. A combination of fracturing, mechanical decompression and overhang erosion has resulted in the mass tilting and collapse of large blocks along the entire slope (Genuite et al., 2021). The blocks on and near the present surface were deposited after the slope had already largely attained its current configuration (Fig. 4). The talus that fronts Pundawar Manbur originally had a long, overhanging ceiling above a succession of rocky surfaces descending stepwise towards the valley floor. Today, the remnant overhang is only visible at Pundawar Manbur itself; elsewhere it has collapsed, resulting in a dense spread of massive, tilted blocks on the ground.

The Pundawar Manbur rock shelter that we see today has itself undergone a sequence of local rock falls. The oldest event was the collapse of the overhang's extension ('1' in Fig. 5). Then, a thick layer of rock fell from the ceiling ('2'); those blocks are superposed on the previously collapsed blocks ('1'). A small section from the upper part of the back wall ('3') then became loose and fell: those fallen blocks became lodged between the base of the wall and the ceiling blocks that had previously fallen. The presence in this gap of the smaller blocks from the upper part of the back wall ('3') means that there previously existed a void below a shallow localised overhang near the base of the wall ('A' on Fig. 5). This low overhang is located beneath the main decorated panel. Finally, an old overhang on the southwestern edge collapsed ('4'); its fallen blocks are supported by Blocks '2' and '3'.

The blocks from overhang collapses '1' to '4' rest on the same bedrock surface covered by a thin layer of sediment composed of pebbles and greyish sand. In the interstices between the collapsed blocks and the bottom of the shelter's back wall, however, soft sediments are thicker (tens of centimetres thick), and probably signal the presence of occupational deposits pre-dating the collapse of the shelter's overhanging ceiling '2', '3' and '4'.

Pundawar Manbur has one of the densest rock art repertoires known from the Drysdale River region of the northern Kimberley. The 31 other rock art shelters along the tributary that houses Pundawar Manbur range in size from small alcoves to large walls, with the number of motifs per shelter ranging from 1 to c. 200, but with no clear relationship between

shelter size and motif numbers.

Over a 5-day period between 2 and 23 June 2018, we recorded the art with the daily participation of representatives of the Kwini Traditional Owners. The site is 17 m-long, 7 m-deep between back wall and edge of the overhang, and up to 5 m-high from floor to ceiling. The ceiling is horizontal, and the back wall near-vertical (Fig. 2), both being decorated with art. The back wall forms a large, continuous art panel (Panel A: 13 × 2 m in area) that extends across most of the length and height of the shelter (Fig. 6A). Panel A has 422 motifs and 874 instances of superpositioning, some of which constitute superimpositioning. For the purposes of this paper, the term 'panel' is used as an analytical unit of art-bearing rock undivided by fractures, plane changes or other natural segregations. Of the 422 motifs on Panel A, 51 are remnant areas of pigment whose motif shapes are too damaged to determine and classify to style, and 32 have modifications of pre-existing motifs (some motifs being modified more than once; see below). The panel also contains a number of pigmented areas that are so amorphous in shape and low pigment density that their extents, which often underlie other motifs, could not be defined and consequently could not be recorded as individual motifs; these were disregarded for this paper. The nine other art panels in the shelter are all much smaller, having between two and 49 motifs, and few superpositions. The fallen rock slab-covered floor provides no indication of extensive occupation deposit; whether stratified deposits underlie the floor slabs is unknown (but see above).

4. Methods

For heuristic purposes, the large, densely decorated Panel A was subdivided into five overlapping sub-panels (A1–A5; Fig. 6B), each of which was analysed separately and then amalgamated into a single chronostratigraphic schema, the first systematic presentation of a site's rock art superpositions for the Kimberley region (details below). Where possible, each motif was numbered, described, sketched and measured in the field. The recording was then refined using a single broad photograph of each panel as a base for digital photo-tracing, with comprehensive close-up photographs and their DStretch enhancements used to further examine each instance of superposition (Gunn et al., 2010). A Harris Matrix was then produced for each sub-panel, showing all connections between motifs ('unverified', being the term used in the Harris Matrix program before the matrix has been rationalised to reduce



Fig. 3. Pundawar Manbur. Top: Viewed from the southeast. Bottom: Viewed from the side (photos by Robert Gunn, courtesy of the Balanggarra Aboriginal Corporation).

redundant pathways) (Fig. 7 Top). The Harris Matrix was then verified (all redundant associations deleted) and unassigned motifs (not in superposition) were allocated to layers on the basis of shared art traits. A subsequent step in the analysis of superpositions chronologically further constrained the art layers of the sub-panels, relating them to the other sub-panel sequences again on the basis of shared common artistic attributes (Fig. 7 Bottom; Gunn and Lowish, 2017; Harris and Gunn, 2018). The layers of each sub-panel were then amalgamated to form a single chronological sequence ('Sequence Layers') covering the full Panel A (Tables 2, 3). The Sequence Layers were numbered with '1' at the top and '49' at the bottom.

5. Results

Panel A contains 49 distinct art Sequence Layers (Table 1), although only two extend across all sub-panels (Sequence Layer 12: battering; and the earliest layer, Sequence Layer 49: hand stencils). This suggests that

during particular artistic events, the production of rock art usually focused on very specific parts of the site only, rather than the entire site. The greater number of art events occurred in the northern half of the panel, and thus of the site. Four types of anthropic marks of particular interest are further investigated here: hand stencils, large fauna, Gwion figures, and battering.

5.1. Hand stencils

Panel A has 114 hand stencils distributed across its length. Of these, 47 are of left hands, 25 right hands, and 42 of indeterminate left or right (Table 4). While the majority are in shades of red, white and yellow stencilled hands also occur, both as discrete layers in the sequence (Sequence Layers 36 and 31 respectively).

Stratigraphically, the lowermost layer of hand stencils (Sequence Layer 49) occurs across all sub-panels and forms the earliest layer of art at the site. Together with Sequence Layer 48, also consisting only of red

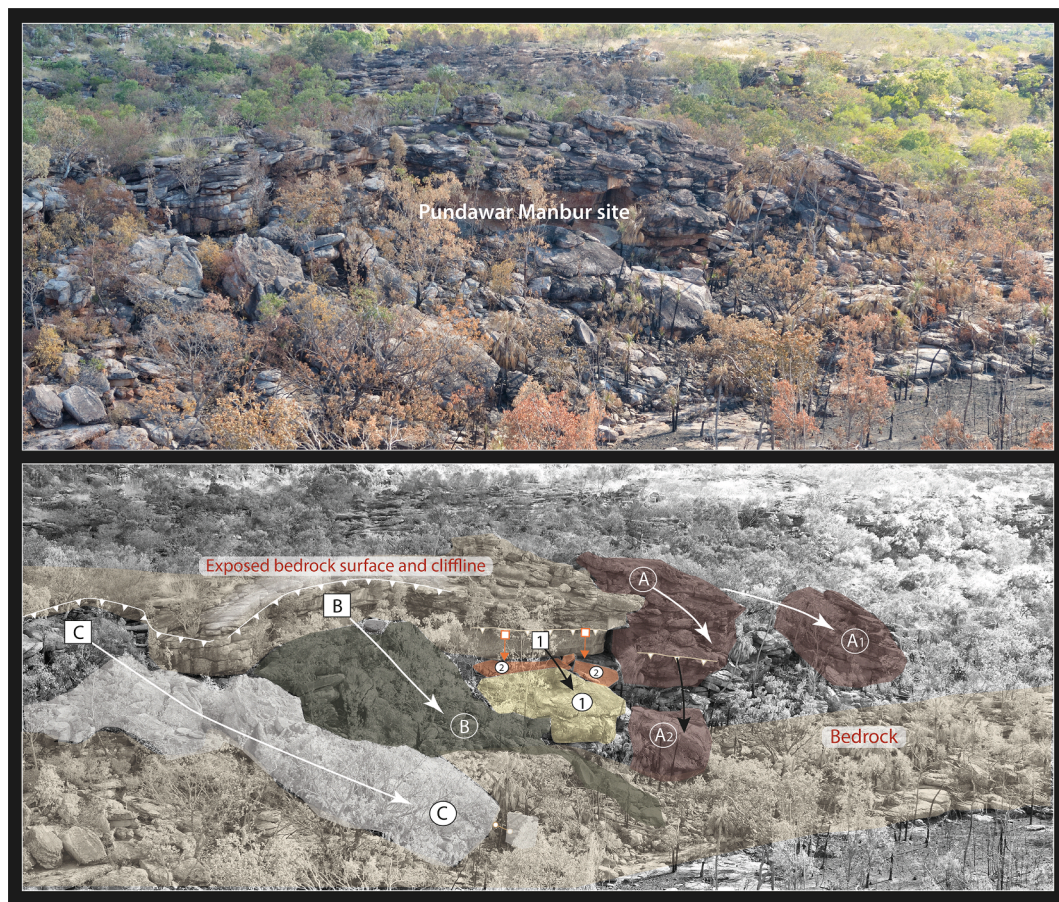


Fig. 4. Pundawar Manbur's rugged landscape. The slope in front and to the side of the site has witnessed massive overhang collapse, the scars of which are clearly visible on exposed cliff lines ('B', 'C'; the letters in square boxes indicate the originating cliff lines; those in round boxes the collapsed overhangs). To the right of the Pundawar Manbur rock shelter, Block A has tilted and slid down the slope, splitting in two in the process ('A' and 'A₁'). Block 'A₂' collapsed from the originally much larger overhang of Block 'A'. At Pundawar Manbur, two distinct sets of rock collapse are evident: that of the site's overhang, which was originally much larger ('1'); and that of smaller blocks ('2') that fell from the ceiling of the current overhang (photo by Robert Gunn, courtesy of the Balangarra Aboriginal Corporation, with graphics by Jean-Jacques Delannoy).

hand stencils, the two layers incorporate 62 hand stencils across the length and width of Panel A (Fig. 6C). This indicates that the shelter in its present form was initially decorated solely with hand stencils.

In the lowermost (earliest) layers, the number of stencilled left hands is more than double that of right hands, a pattern common elsewhere across Australia (Gunn, 2007). Forty-eight of the stencilled hands from these layers could be measured. They range in size from children to adult males (middle finger lengths: 5.0–10.0 cm, median 9.0 cm; Table 5) (Gunn, 2006). Allowing for the overlap of hand size classes, all ages appear to be represented, with adult hands being the most common, and infant hands (≤ 5 cm) uncommon. All the variant hand stencils, of hands in which the fingers have been truncated or arranged in a non-splayed manner (Walsh, 1979), are of teenager-size or older adults (male and/or female).

Two variant hand stencils feature shortened digits, both of which could have been produced by folding fingers or by amputation (see also Walsh, 1979). As with the full hand stencils, those with finger variants continued to be produced in later layers of the sequence.

Stencils of hands are not restricted to the earliest art layer at Pundawar Manbur, but continue into the earliest layer of the Gwion Period (Sequence Layer 31), when a cluster of 18 yellow hand stencils were produced on Panel A5. Across the top of this cluster, a row of adult male hand + forearm stencils of identical size (length of middle finger = 10 cm) appear to have been made by a single individual (Fig. 8A). Across the bottom of the cluster, there is a set of at least four children's hand stencils (length of middle finger = 5 cm). They, too, are all identical in

size and may thus have all been made by a single child of around five years old (Gunn, 2006). The cluster also incorporates an incomplete anthropomorph in the same yellow pigment, and appears to be contemporaneous with the hand stencils. The unfinished anthropomorph resembles an incomplete Gwion (type unknown). These yellow stencils and painting appear to be contemporaneous with a suite of five yellow Ngunuru Gwion and three other yellow hand stencils on Panel A2.

Only a single hand stencil was produced at the site after the Gwion figures were painted (Fig. 8B). It was stencilled during Sequence Layer 6, one of the most recent layers. This is consistent with Walsh's claim (2000: 214) that stencilled art was only produced during the earliest and most recent art periods, and not during the intervening periods.

Unlike many other Kimberley rock art sites, where hand stencils and hand prints are generally considered at least roughly contemporaneous in the Irregular Infill Animal period (Motta et al., 2021; Walsh, 2000: 117), there are no hand prints at Pundawar Manbur. Grass prints (Fig. 2H)—which in Arnhem Land, 800 km to the east and whose rock art has parallels with that of the Kimberley (Lewis, 1997), are considered to be contemporaneous with hand prints (Chaloupka, 1993: 93)—in the Kimberley are considered to be more recent than hand prints and to have possibly been produced up until the Gwion period (Walsh, 2000: 120). The grass prints at Pundawar Manbur occur in Sequence Layers 34 and 35, with hand stencils occurring in both earlier and more recent layers. Here, the grass print layers (Sequence Layers 34 and 35) also post-date the large fauna layers discussed below, occurring between the large

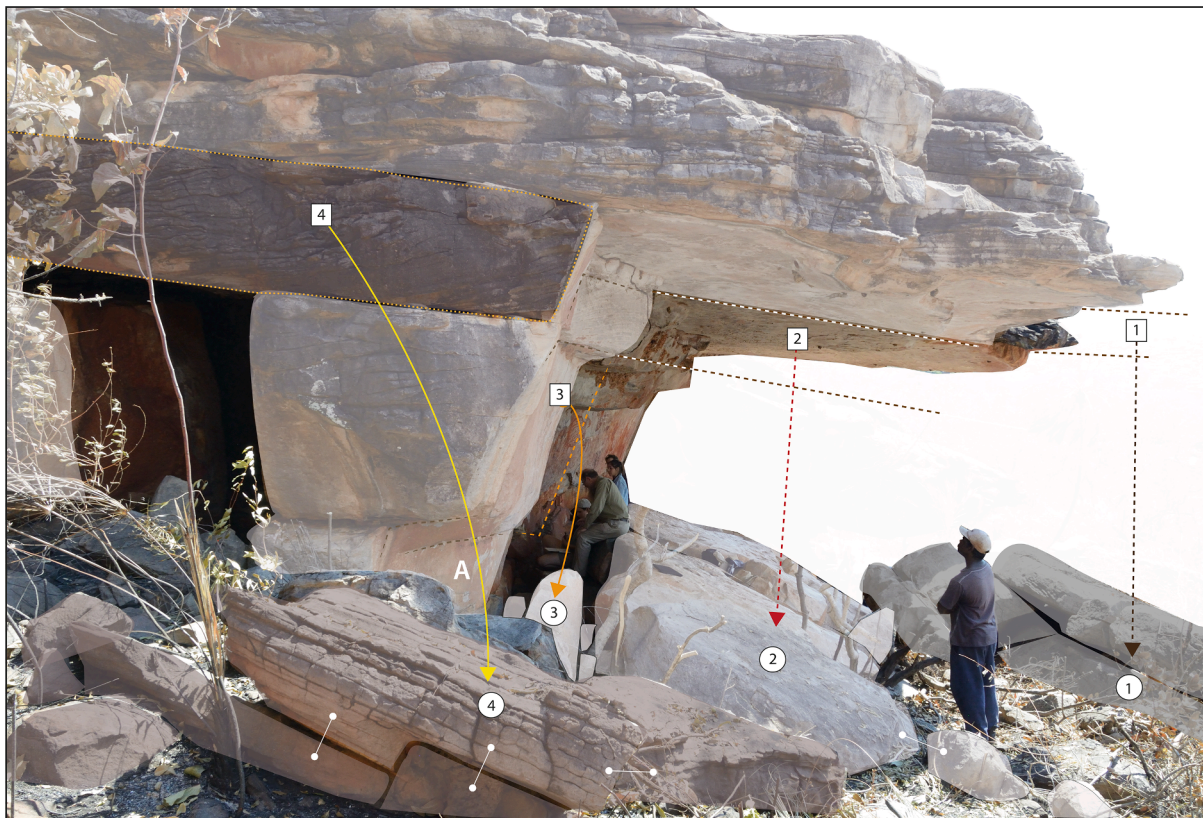


Fig. 5. Sequence of overhang collapses at Pundawar Manbur (photo by Leigh Douglas, courtesy of the Balanggarra Aboriginal Corporation, with graphics by Jean-Jacques Delannoy).

fauna and Gwion layers, but intermixed with layers of hand stencils.

5.2. Large fauna

Nine large images of fauna are present: three macropods (including the original *manbur* macropod motif), one unidentified quadruped, an unidentified fish, and four unidentified animal-like images (Fig. 8C). Those that could be reliably measured ranged from 96 to 226 cm in maximum length. All nine large zoomorphs occur in Sequence Layers 35–42, underlying the Gwion layers (Sequence Layers 23–28). Only one (from Sequence Layer 38), the smallest of these zoomorphs, has the characteristic irregular dash-infill that defines motifs from the Irregular Infill Animal Period (Walsh, 2000: 114). The large fauna here are in one of two colours: red or grey-mauve. Three of the red images have longitudinally striped infill with or without solid-infilled extremities. The other red image appears to have a solid-infilled silhouette form, but this image is very indistinct and may have been subject to water-wash. Three of the grey-mauve images have cross-grid patterns, one a latitudinally-barred infill, the other a mix of striped, cross-grid and solid infill. These variations suggest that irregular infill (as originally defined by Walsh) is but one of many conventions used to decorate large fauna images during the Irregular Infill Animal phase, albeit possibly the most common infill convention, a point originally illustrated but not clarified by Walsh (2000: 125–127).

5.3. Gwion

Thirty-nine Gwion figures were recorded: 22 Ngunuru Gwion, 11 Yowna Gwion, one Dalal Gwion, and five that could not be classified to type. While there is one example of a Yowna Gwion superposing a Ngunuru Gwion (Fig. 9A, 9B), there are two examples of Yowna and Ngunuru Gwion side-by-side, and in both cases the Yowna are the better

preserved and thus appear the more recent. There is thus a hint that here the Yowna Gwion may be more recent than the Ngunuru Gwion. Across Panels A3 and A4, however, there are groups of both Yowna Gwion and Ngunuru Gwion in the same pigment and in similar states of preservation, suggesting that at broad, archaeological time-scales these two types of Gwion are more probably contemporaneous (Fig. 9C, 9D). The paucity of superpositions does not allow us to be definitive about their relative chronology for the site as a whole, let alone for the region.

The Gwion figures at Pundawar Manbur occur in four main colours (mulberry, grey-mauve, red, yellow: Table 6). There is considerable variation within these broad colour classes: from light to dark, and with hues ranging from purple-red to yellow-brown. While yellow pigment was clearly used for hand stencils and some Gwion, most colour variations are a product of weathering rather than original pigment colours. Walsh (1994: 22) suggested that most of the Irregular Infill Animal paintings, which precede the Gwion figures, may also have been painted in a mulberry-coloured pigment that has since been affected by weathering (e.g. Walsh, 1994: 21–26, 143, 219, 283; 2000: 62; Welch, 2015: 217). Changes in pigment colour due to weathering factors is also recognised elsewhere in Australia (Cook et al., 1990; Rosenfeld, 1988).

A further complication with the interpretation of colours is the repainting of parts of figures, either during the original painting event or subsequently. Walsh (1994: 22–23, 158–162) mentioned, and illustrated, the presence of bichrome Ngunuru Gwion figures (red figure with white decoration), and also the existence of white Yowna Gwion figures elsewhere in the Kimberley region (see also Welch, 2015: 213, 216, 230). A Ngunuru Gwion on Panel A5 has a silhouette base in pale brown-red, linear interior decoration in a darker brown-red, and subsequent re-outlining with the addition of a small companion animal adjacent to the Ngunuru Gwion's hair/headress in a yet darker brown-red (Fig. 10A).

On Panel A4, a Yowna Gwion (Fig. 10B) that is now missing its head

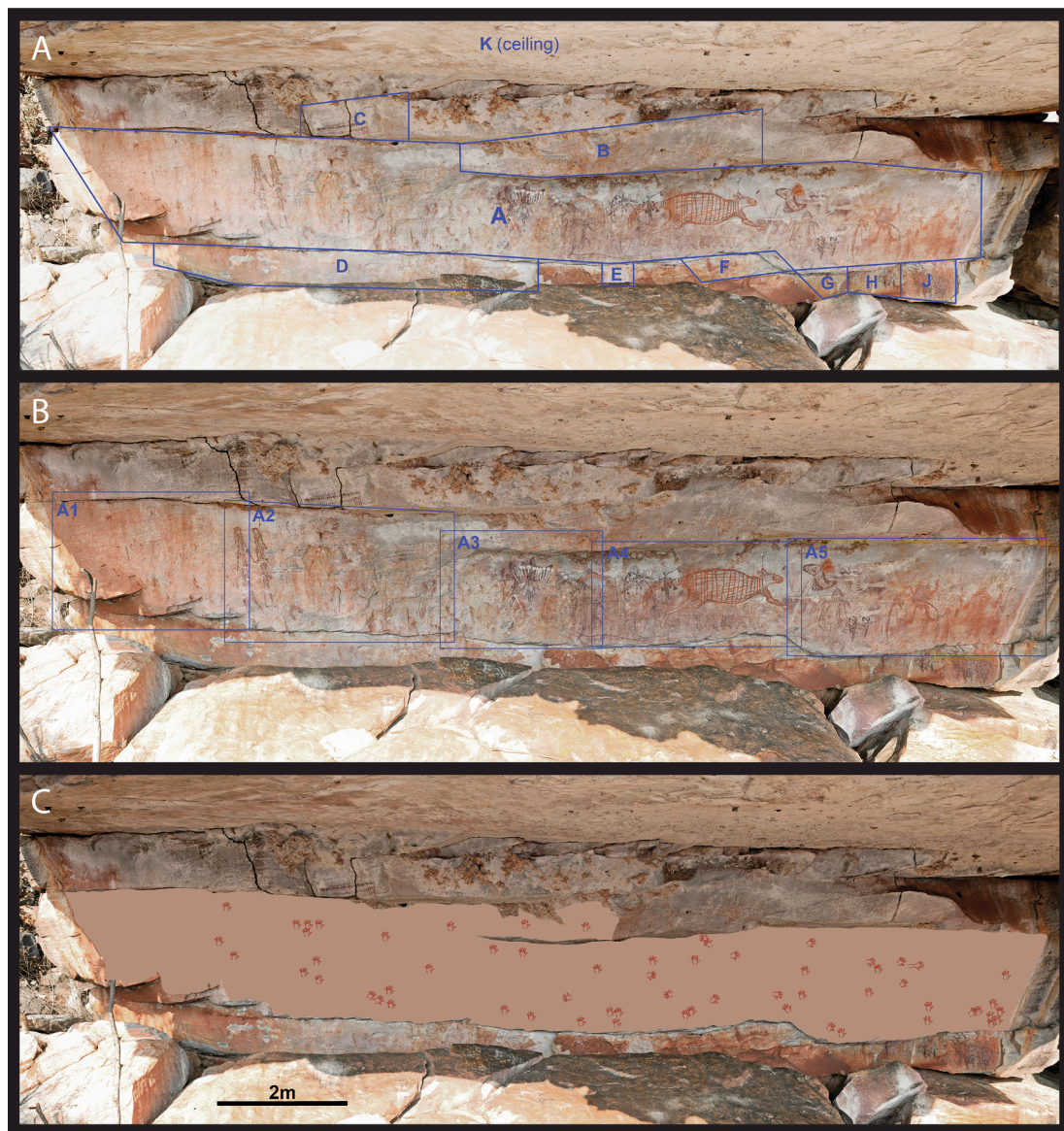


Fig. 6. Pundawar Manbur's panels. A: Panels A–K. B: Panel A's sub-panels (A1–A5). C: Distribution of the earliest rock art on Panel A: red hand stencils, basal Sequence Layers 48 and 49 (photo and figures by Robert Gunn, courtesy of the Balanggarra Aboriginal Corporation).

and waist is likely to also have been a bichrome figure from which the missing areas have since deteriorated; the presence of such 'incomplete' Gwion figures was also noted by Welch (2015: 244).

5.4. Battering

At Pundawar Manbur, there is much evidence that the painted rock surface was battered by people in the past. In many instances, the battering clearly targets particular earlier motifs, and hence constitutes some of the clearest examples of superimpositioning at the site. Battering is distinct from 'edge flaking' (or quarrying), where protruding, corniced rock edges (on bedrock and boulders) have been hit to produce stone artefacts. Instead, the battering consists principally of the pounding of select parts of pre-existing images, although areas of pecking and gashing also occur within the battered areas. Battering has at least three different forms:

1. Pounded marks consist of bruised or crushed rock wall surface areas produced with a rounded hammerstone.

2. Pecked marks are distinct and piercing impact pits produced with a sharp-pointed hammerstone (or metal implement).
3. Gash marks are similar to pecked marks but made with angular impact such that the pits have tail-like marks up to 10 mm long following the direction of the blow.

Walsh (2000: 215, 222–224) noted the widespread occurrence of battering over Gwion figures to create 'pecked concavities' across the Kimberley, which he sometimes used interchangeably with the terms pounding or pecking. He termed the marks 'defacements' of the earlier, painted images. Welch (2015: 227) considered the marks as 'hammering', and Motta et al. (2020: 141) as 'scratching'. We will return to this issue in the Discussion and conclusion below.

At Pundawar Manbur, battering is one of only two forms of anthropic markings to occur across all sub-panels, the other being hand stencils (Table 1). Within an archaeological time-scale, battering forms a single, contemporaneous art event or set of events across the full width of Panel A. In other words, all the battering occurs during a single phase in the sequence of art superpositions.

The motif types targeted for battering were mainly Ngunuru Gwion

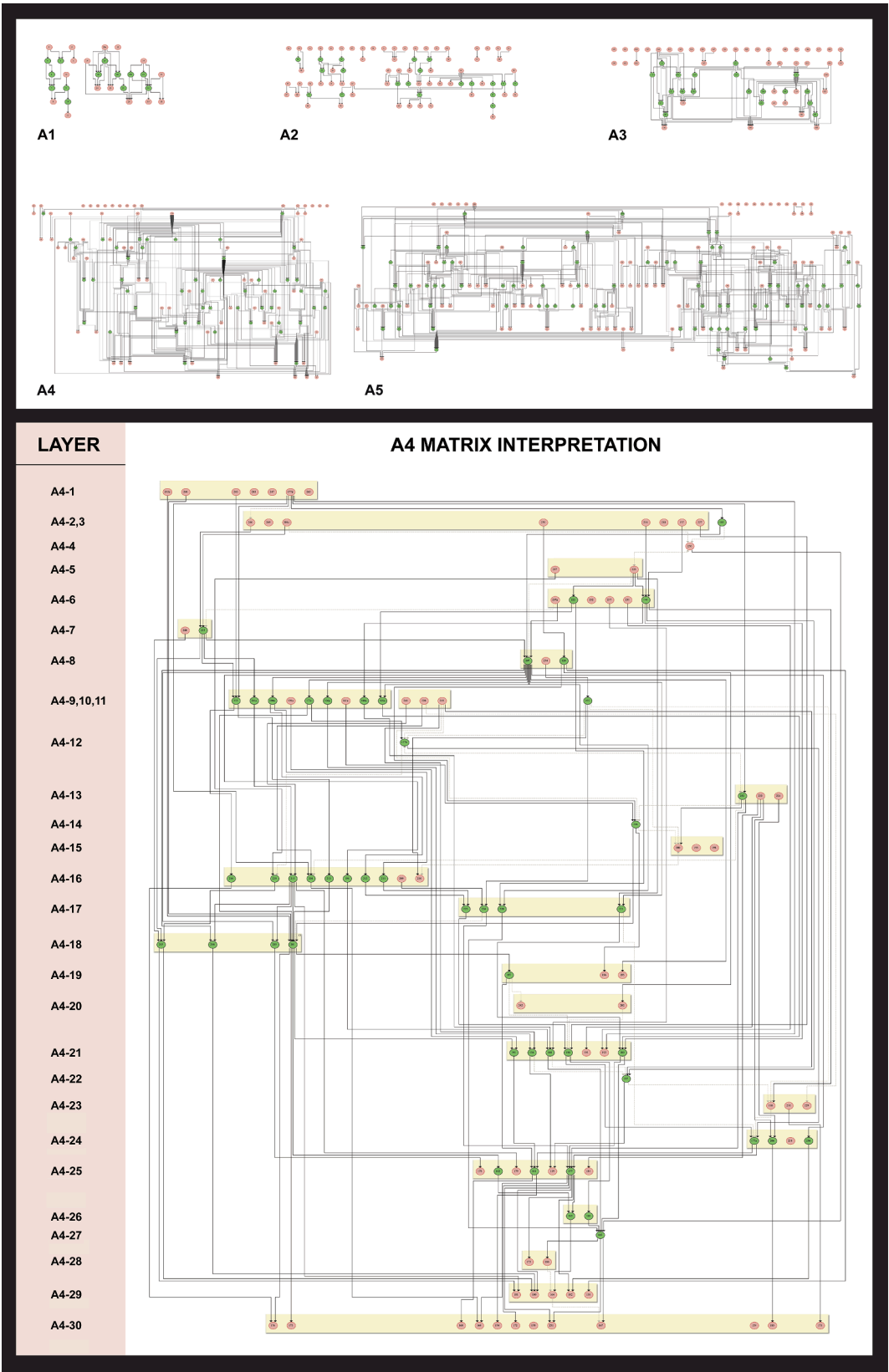


Fig. 7. Harris Matrices, Pundawar Manbur. Top: Unverified Harris Matrices for the five sub-panels of Panel A. Bottom: Verified Harris Matrix and interpreted art layers for Panel A4 (figures by Robert Gunn).

Table 2

Correlation of art layers across Pundawar Manbur's Panels A1–A5. Coloured cells indicate the motif colours of the respective layers, with blue for unpatinated scratchings, batterings and abrasions. The Sequence Layers are arranged with '1' being the uppermost layer and '49' the lowermost.

Sequence Layer	Characteristic	A1	A2	Panel A3	A4	A5	No. of Motifs
1	Yellow painting			A3-1			1
2	Scratchings	A1-1,2		A3-3			9
3	Drawings: red, black	A1-3,4		A3-2,4		A5-1	13
4	Orange paintings WANJINA				A4-1	A5-3	16
5	Red paintings			A3-5	A4-2	A5-2	12
6	Dark red painting/stencil				A4-3	A5-4,5	8
7	Drawing: dark red		A2-1		A4-4,5	A5-6	6
8	White painting + WANJINA			A3-6	A4-6	A5-7	10
9	Red painting		A2-2	A3-7			4
10	Yellow paint, draw				A4-7		2
11	Red painting: long lines			A3-8	A4-8	A5-8	4
12	Battering (incl. retouch)	A1-5	A2-3	A3-9	A4-9	A5-9	26
13	Abraded areas					A5-10	3
14	Scratching				A4-10		3
15	Red paintings				A4-11	A5-11	5
16	Red painting					A5-12	1
17	Drawing: dark red				A4-12		1
18	Drawing: orange				A4-13		3
19	Red paintings		A2-4,5		A4-14,15		9
20	Red paintings		A2-6		A4-16		16
21	Off-white paintings				A4-17		4
22	Red paintings: flying fox				A4-18		4
23	Red paintings				A4-19		3
24	Red paintings				A4-20		2
25	Red paintings					A5-13	6
26	Dark Red Dalal Gwion	A1-6					1
27	Dark Red Yowna GWION			A3-10	A4-21	A5-14	14
28	Dark Red Ngunuru GWION			A3-10			11
29	Red Ngunuru GWION	A1-7	A2-7		A4-22	A5-15,16	23
30	Yellow Ngunuru GWION	A1-8	A2-8				6
31	Yellow hand stencils		A2-8			A5-17	22
32	Red hand stencil					A5-18	1
33	Red painting					A5-19,20	2
34	Red grass prints		A2-9			A5-21	12
35	Dark Red grass prints					A5-22,23	25
36	White stencils/ paintings			A3-11	A4-23	A5-24,25	12
37	Red paintings: crosshatch	A1-9	A2-10			A5-26	11
38	Red paintings: large fauna	A1-11	A2-11				3
39	Dark red paintings: large fauna				A4-24, 25	A5-27	15
40	Dark Red hand stencils				A4-26		2
41	Dark Red boomerang stencils	A1-10		A3-12	A4-27		6
43	Dark Red hand stencils	A1-12	A2-12	A3-13	A4-28		19
44	Red paintings			A3-14			2
42	Dark Red Large fauna			A3-15			4
45	Red (hand + arm) stencils					A5-28	2
46	Red paintings					A5-29	25
47	Red Large fauna	A1-13				A5-31	3
48	Red hand stencils		A2-13		A4-29	A5-30	18
49	Red hand stencils	A1-14	A2-14	A3-16	A4-30	A5-32	44

Table 3

Pundawar Manbur's Panel A sequence, derived by amalgamating the sub-panel layer sequences. Coloured cells indicate the motif colours of respective layers, with blue for unpatinated scratchings, batterings and abrasions. Firm lines delineate style boundaries; dashed lines delineate possible additional style boundaries. The Sequence Layers are arranged with '1' being the uppermost layer and '49' the lowermost.

Sequence Layer	Layer characteristic	ART PERIOD	No. of Motifs
1	Yellow painting	Contact AD <1850 WANJINA Early Wanjina <5000 cal BP	85 (19%)
2	Scratchings		
3	Drawings: red, black		
4	Orange paintings WANJINA		
5	Red paintings		
6	Dark red painting/stencil		
7	Drawing: dark red		
8	White painting + early WANJINA		
9	Red painting: complex design		
10	Yellow paint, draw		
11	Red painting: long lines		
12	Battering (including retouch)	?	32 (7%)
13	Abraded areas		
14	Scratching		
15	Red paintings	?	48 (11%)
16	Red paintings		
17	Drawing: dark red		
18	Drawing: orange		
19	Red paintings		
20	Red paintings		
21	Off-white paintings		
22	Red paintings (including flying fox)		
23	Red paintings		
24	Red painting		
25	Red paintings	<12,700 cal BP GWION c. 11,500–16,620 cal BP	83 (18%)
26	Dark Red Dalal Gwion		
27	Dark Red Yowna GWION		
28	Dark Red Ngunuru GWION		
29	Red Ngunuru GWION		
30	Yellow Ngunuru GWION		
31	Yellow hand stencils		
32	Red hand stencil	IRREGULAR INFILL ANIMAL <13,100 cal BP c. 17,300 cal BP	144 (32%)
33	Red painting		
34	Red grass prints		
35	Dark Red grass prints		
36	White stencils/ paintings		
37	Red paintings: crosshatch		
38	Red paintings: large fauna		
39	Red paintings: large fauna		
40	Dark Red hand stencils		
41	Dark Red boomerang stencils		
42	Dark Red hand stencils		
43	Red paintings		
44	Dark Red Large fauna		
45	Red Large fauna		
46	Red (hand + arm) stencils		
47	Red paintings		
48	Red hand stencils	Early HAND STENCILS	62 (14%)
49	Red hand stencils		

Table 4
Pundawar Manbur Panel A hand stencils by motif type and colour. * Hands where the thumb, little finger, or sufficient digits of the stencil are no longer apparent.

Pigment Colour	Left hand	Right hand	Indeterminate hand*	TOTAL
Red	24	12	25	61
Dark Red	10	6	4	20
Mulberry	2		2	3
Yellow	10	6	5	21
White	1	1	7	9
Total	47	25	42	114

Table 5
Pundawar Manbur Panel A, type and size of hand stencil from the earliest art Sequence Layers 48 and 49.

Hand stencil type	Total #	Middle finger length range (cm)	Not measured
Left hand	24	5.0–10.0	29
Right hand	9	7.0–9.0	12
Indeterminate left/right hand	24	5.0–10.0	7
Remnant hand stencil pigment area	2	n/a	2

and Yowna Gwion figures (both in ‘mulberry’ and a paler, brown–red pigment; Fig. 11A, 11B), but four of the large animal figures were also battered to a greater or lesser degree. In addition, a number of other areas of battering, of varying sizes and densities, that do not target earlier paintings also occur on otherwise blank portions of Panel A.

When targeting Gwion figures, battering took place in discrete areas focusing on the extremities and joints of the figures (head, hands, groin, knees/thighs, and ankles/feet) (Fig. 12A, 12B). It is not restricted to just the larger or more prominent Gwion figures, nor to the clearer mulberry-coloured figures. On a small painted panel (Panel D) below Panel A, there is a row of six small Yowna Gwion, all of which have been repeatedly pounded such that several of the figures are all but erased (Fig. 14A). While here the single Dalal Gwion figure was not battered, Walsh illustrated a prominent panel elsewhere in the Kimberley where a suite of 22 Dalal Gwion paintings were similarly selectively battered (Walsh, 2000: 232).

It is not just Gwion figures that were singled out for battering at Pundawar Manbur. There are also four images of fauna that were similarly targeted: the large, central *manbur* macropod motif; a smaller, unidentified quadruped immediately below the *manbur* figure; a string of roosting flying foxes (also below the *manbur* figure, all on Panel A4); and an unidentified splayed animal (‘possum/glider’ figure on Panel A5) (Figs. 13B, 14). Elsewhere in the Kimberley, Walsh illustrated two examples of battered fauna from the Irregular Infill Animal Period and

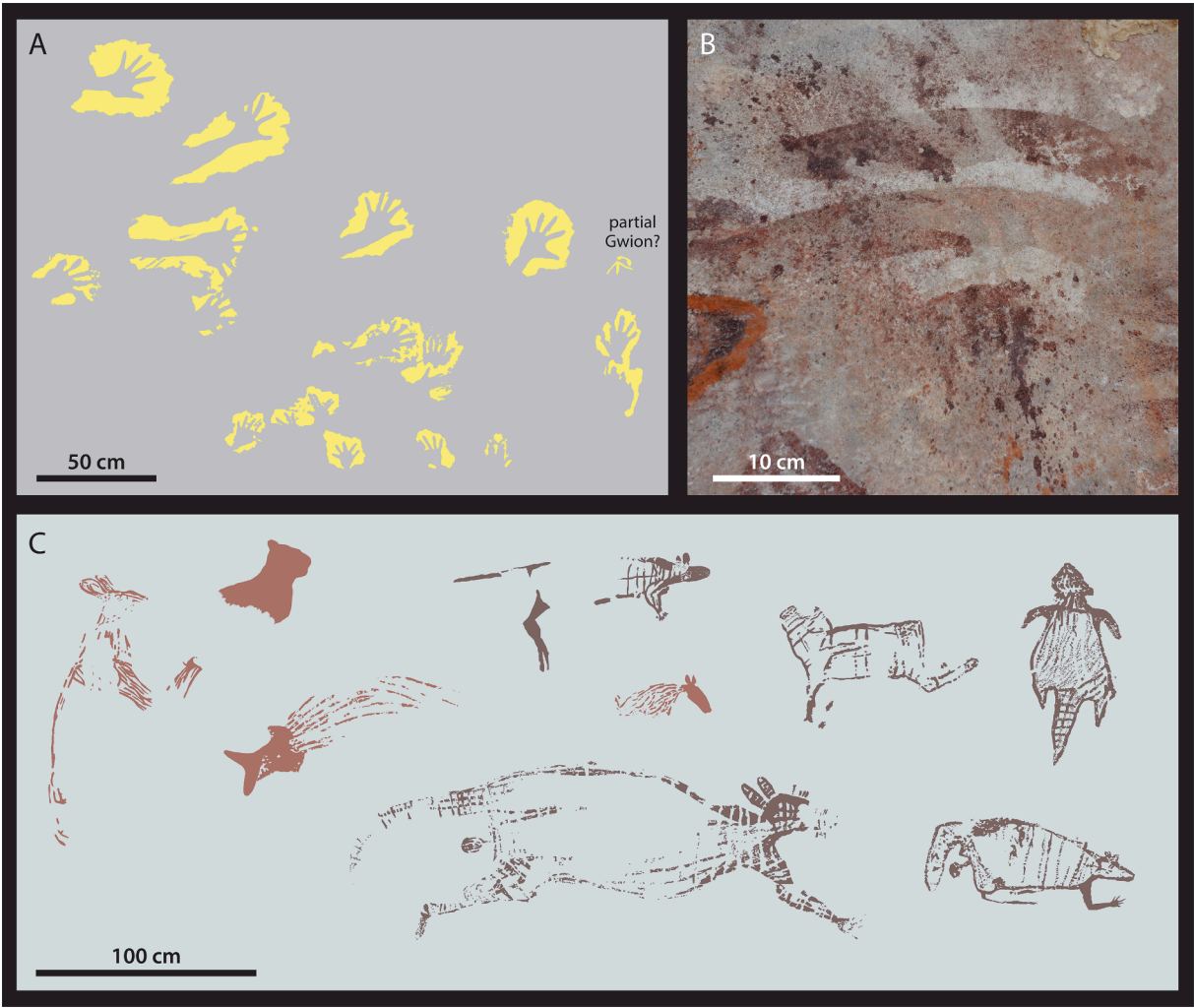


Fig. 8. Pundawar Manbur. A: Set of contemporaneous adult and child yellow hand stencils, Panel A5. B: Hand stencil from Sequence Layer 6. C: Red and grey-mauve zoomorphs from the early Sequence Layers of the Irregular Infill Animal Period (Sequence Layers 44 and 45), Panel A (figures by Robert Gunn, courtesy of the Balanggarra Aboriginal Corporation).

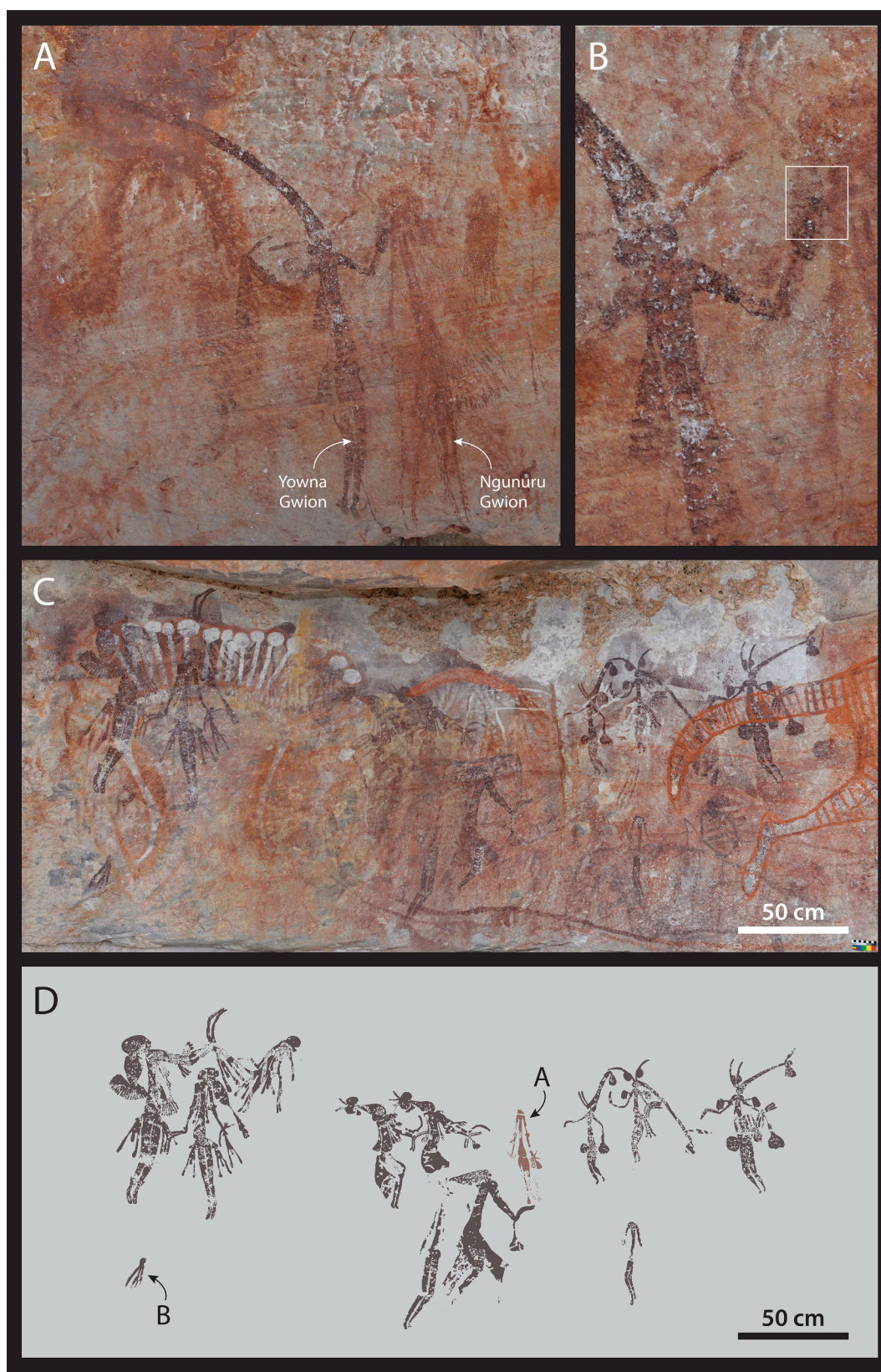


Fig. 9. A, B: Mulberry-coloured Yowna Gwion (77 cm long, diagonally from the tip of the headdress to the end of the furthest foot) overlying a red Ngunuru Gwion on Panel A5. C, D: Composition of mulberry-coloured Ngunuru Gwion and Yowna Gwion figures (including the small stick-figure 'B') across Pundawar Manbur Panels A3 and A4. Ngunuru Gwion figure 'A' is in a grey-mauve and, on the basis of poorer preservation, appears earlier but remains centrally positioned in the later composition (photos and figure by Robert Gunn, courtesy of the Balangarra Aboriginal Corporation).

Table 6

Number of Gwion paintings by colour, Pundawar Manbur.

Gwion type	Mulberry	Grey-mauve	Red	Yellow	TOTAL
Ngunuru Gwion	3	10	4	4	21
Ngunuru Gwion (part)				1	1
Yowna Gwion	11				11
Dalal Gwion		1			1
Dalal Gwion (probable)	1				1
Unallocated Gwion		2	2		4

noted that such battering tends to be concentrated on the head and chest of the animals (Walsh, 2000: 125–126). It is worth noting that the small ‘companion’ animal at the shoulder of one of the Ngunuru Gwion at Pundawar Manbur was not battered, nor has targeted battering been reported on such ‘companion’ animals elsewhere in the Kimberley.

Of the four battered animals at Pundawar Manbur, three are from Sequence Layer 39 prior to the Gwion layers (Sequence Layers 26–31), while the fourth animal, actually a row of roosting flying foxes, was painted during Sequence Layer 18, following the Gwion layers (Table 2). The large *manbur* macropod at the centre of the site has the greatest concentration of battering, produced on the tip of its tail, its extended front paw, and all of its hind leg and central body cavity (Figs. 12C, 14). This battering was done after the production of the image and its initial repainting (both during Sequence Layer 39), but prior to its latest repainting (in a bright orange-red) in Sequence Layer 4 in the Wanjina macropod style that superimposes the battering (Fig. 12C). The quadruped below the *manbur* figure has battering focused on its head, ears and, to a lesser extent, body cavity. The other unidentified animal (resembling a possum/glider) has only light battering across its body and limbs (Fig. 13B). The row of flying foxes consists of 10 suspended animals, but only the torso of one of the central animals has been heavily battered. The adjacent flying foxes are only lightly battered, with that at the far right of the composition untouched. A further flying fox in a more linear and freer ‘calligraphic’ style with a brighter red pigment was later added to this row (Sequence Layer 5) (Fig. 13E), during the Wanjina period (Sequence Layers 4–8). The additional animal superimposes both the branch the other flying foxes hang from and two of the flying foxes to its immediate left. This more recent flying fox was not impacted by the battering.

Sparsely battered areas of varying sizes occur on the unpainted rock surface immediately around these zoomorphs, and less commonly elsewhere on Panel A. While some of these lightly battered areas superpose motifs (hand stencil, large macropod, snake) and pigment fragments from earlier Sequence Layers, none of these underlying images have been a focus of concentrated battering and the association appears unintentional. Nowhere except on the large fauna and Gwion paintings described above is the battering pronounced, and none of the hand stencils, which precede the large fauna, show evidence of having been targeted for battering.

The evidence of the Harris Matrix shows that at Pundawar Manbur, battering of the rock surface took place after the Yowna Gwion paintings had been done. While Walsh (2000: 232) illustrates that Dalal Gwion were similarly targeted for battering elsewhere in the Kimberley, whether battering was broadly contemporaneous (at an archaeological time scale) at all Kimberley art sites has yet to be established. The Harris Matrix of Panel A3 also shows that the battering at Pundawar Manbur occurred prior to the earliest Wanjina-style paintings, as displayed by the rayed-headaddress Wanjina directly overlying the battering on Ngunuru Gwion (Figs. 13C, 13D, 15). The rayed-headaddress Wanjina is itself superimposed by a range of later art.

6. Discussion and conclusion

The evidence from Pundawar Manbur shows a complex and

recursive use of superimpositioning that gives us glimpses into both the sequence and use of the art in the site. There are aspects in the layering identified by our Harris Matrices approach that both confirm and challenge existing chronologies. For example, as previously recognised, all hand stencils except for a single example in Sequence Layer 6 occur in the lower Sequence Layers 31–49. The greatest concentration (50 %) of hand stencils occurs in the lowest two layers of the art sequence, and underlie all other motifs. Thus, the first markings people made at the site was an extensive covering of hand stencils. The degree to which they were undertaken contemporaneously, or gradually added to over time prior to the first paintings (of animals), is unknown.

The next phase introduces freehand figurative art to the site. This is dominated by Irregular Infill Animals, but hand stencils also continued, indicating aspects of symbolic continuity. We have shown that the definition of what kinds of paintings constitute the Irregular Infill Animal style(s) requires reassessment and clarification. Animal paintings attributed to this phase used a number of different conventions. It is clear that, in this phase (or set of phases) of art, individual painters used considerable latitude in their stylistic conventions, much more so than in later periods. Whilst the syntax seems generally to avoid the depiction of the human form, the range and internal decoration within animal subjects is highly variable even within this single site. Looking more broadly across the region, the relative and absolute chronology of each convention needs to be defined and assessed. The degree to which irregular infill dashing defines the art of this period across the Kimberley also requires further investigation. A particularly interesting finding from our sequence work is that grass prints (Sequence Layers 34–35), previously thought (but never systematically investigated) to have been a very early art phase both in the Kimberley and across northern Australia, occur during the Irregular Infill Animal period at Pundawar Manbur.

After this phase the syntax changes completely, and whilst animal depictions and hand stencils continue, human-shaped figures take on massive visual dominance. This is the period of the Gwions. With the exception of an unusual recent example in Sequence Layer 6, this is the last time at this site that hand stencils are made, and there is a strong selectivity in their placement. The syntax is that hand stencils were never placed over human or animal forms (the reverse, however, is not the case). Three Gwion styles are present at Pundawar Manbur (Ngunuru Gwion, Yowna Gwion and Dalal Gwion) and the evidence from this site suggests that they were produced within a relatively short time of each other, as there are no other style layers between them. During this Gwion phase, one Yowna Gwion overlies a Ngunuru Gwion and, on the basis of pigment colour and preservation, one set of Ngunuru Gwion appears contemporaneous with a nearby set of Yowna Gwion. Also on the basis of pigment colour and preservation, the Dalal Gwion appear to have been painted at a similar time to the Yowna Gwion. An interesting possibility from these observed relationships is that these three Gwion types might not represent chronological change as has previously been assumed (Walsh, 1994, 2000), but instead might represent variation in artist identity or function.

Whilst the majority of art at Pundawar Manbur largely conforms to the major art styles and sequences previously described by other researchers, it also includes a broader range of motif types than has been previously recognised. In particular, the layers of smaller paintings between the Gwion (Sequence Layers 26–31) and scratching/abrading/battering (Sequence Layers 12–14) layers require further study to determine whether they should be included within the existing art periods or form one or more independent and previously unrecognised art styles and/or phases. These 10 intermediary layers consist mainly of small, 3-line non-figurative sets and small, structurally simple non-figurative designs, but also include the long line (‘branch’) with roosting flying foxes (Fig. 14).

The overlay sequence therefore contains a range of patterns within and between styles that are as informative about art engagement as they are about chronology, but one pattern in particular seems to offer

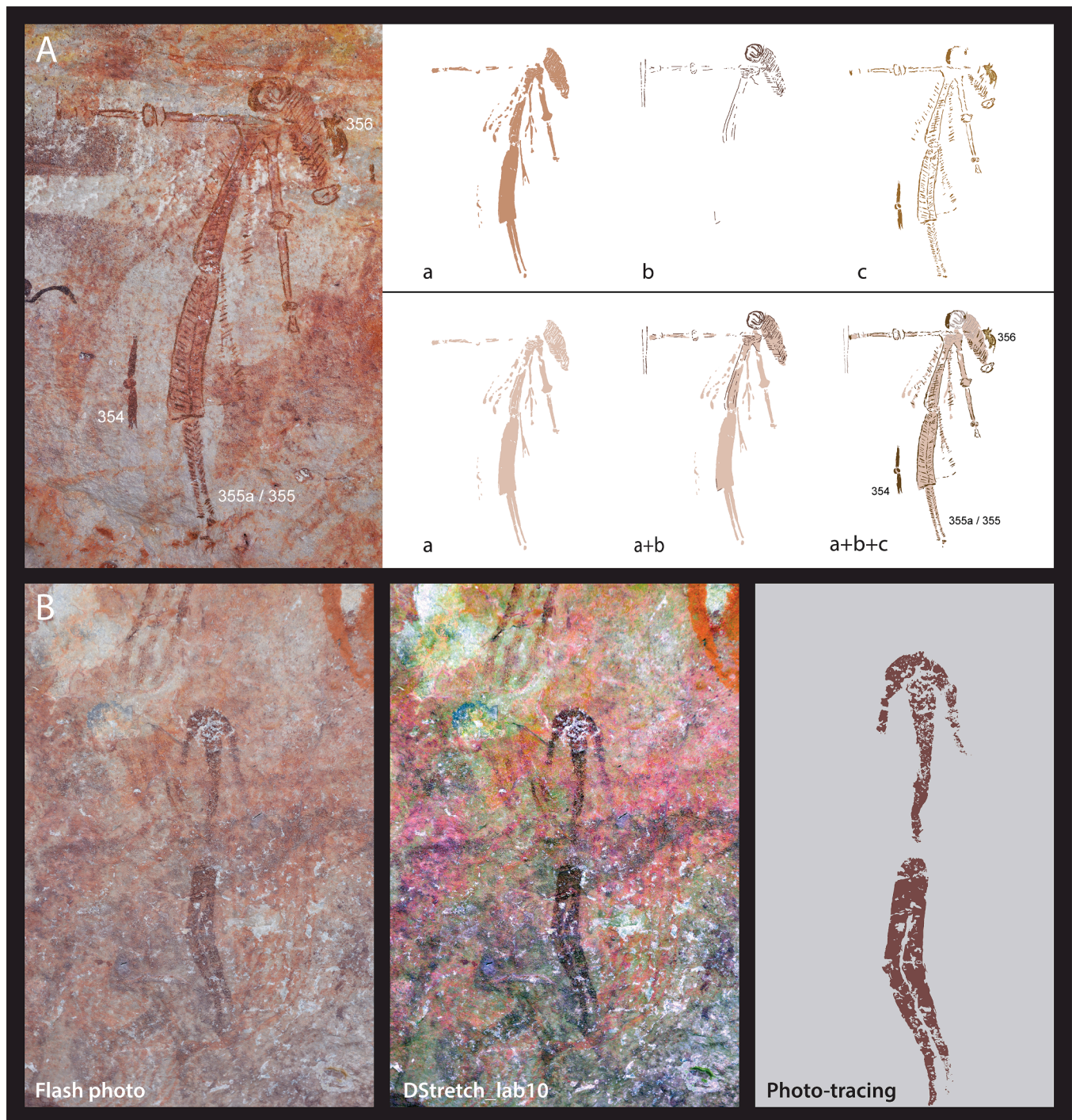


Fig. 10. Row A: The development of Ngunuru Gwion figure (Motif #355, 47 cm tall) together with the small infilled animal figure on its hair/headdress (Motif #356), Pundawar Manbur Panel A5. Many Gwion figures across the Kimberley have a small animal depicted on their hair/headdresses or shoulders. The individual stages of painting are shown in the upper panel, the composite growth of the image as the painting progressed in the lower panel. Row B: Remnant Yowna Gwion (Motif #191, 32 cm tall), probably initially a bichrome image on which the fugitive colour has been removed by weathering. Pundawar Manbur Panel A4 (photos and figures by Robert Gunn, courtesy of the Balanggarra Aboriginal Corporation).

information about the recursive use of older images by subsequent generations at Pundawar Manbur. Irregular Infill Animal and Gwion motifs were specifically targeted by what Australian rock art studies have traditionally called 'battering'. These images alone were battered, not any other type of painting such as the hand stencils, grass prints and so on. All the battering at Pundawar Manbur appears to have been undertaken during a single phase, and took place across the length and width of Panel A and on the smaller Panel D. Sparser battering also took

place on Panel A, sometimes in areas apparently unrelated to earlier art, and elsewhere on areas of the wall without any underlying art. In other sites nearby there are panels of Ngunuru Gwion, none of which have been battered, suggesting that battering was site-, as well as motif-, selective. While Walsh (2000: 214) saw battering as 'deliberate defacement' to the earlier art, Motta (2019) suggested it was a form of re-use to re-engage with the people of an earlier culture. What aspect of use/function, then, does the battering signal? We begin by examining the

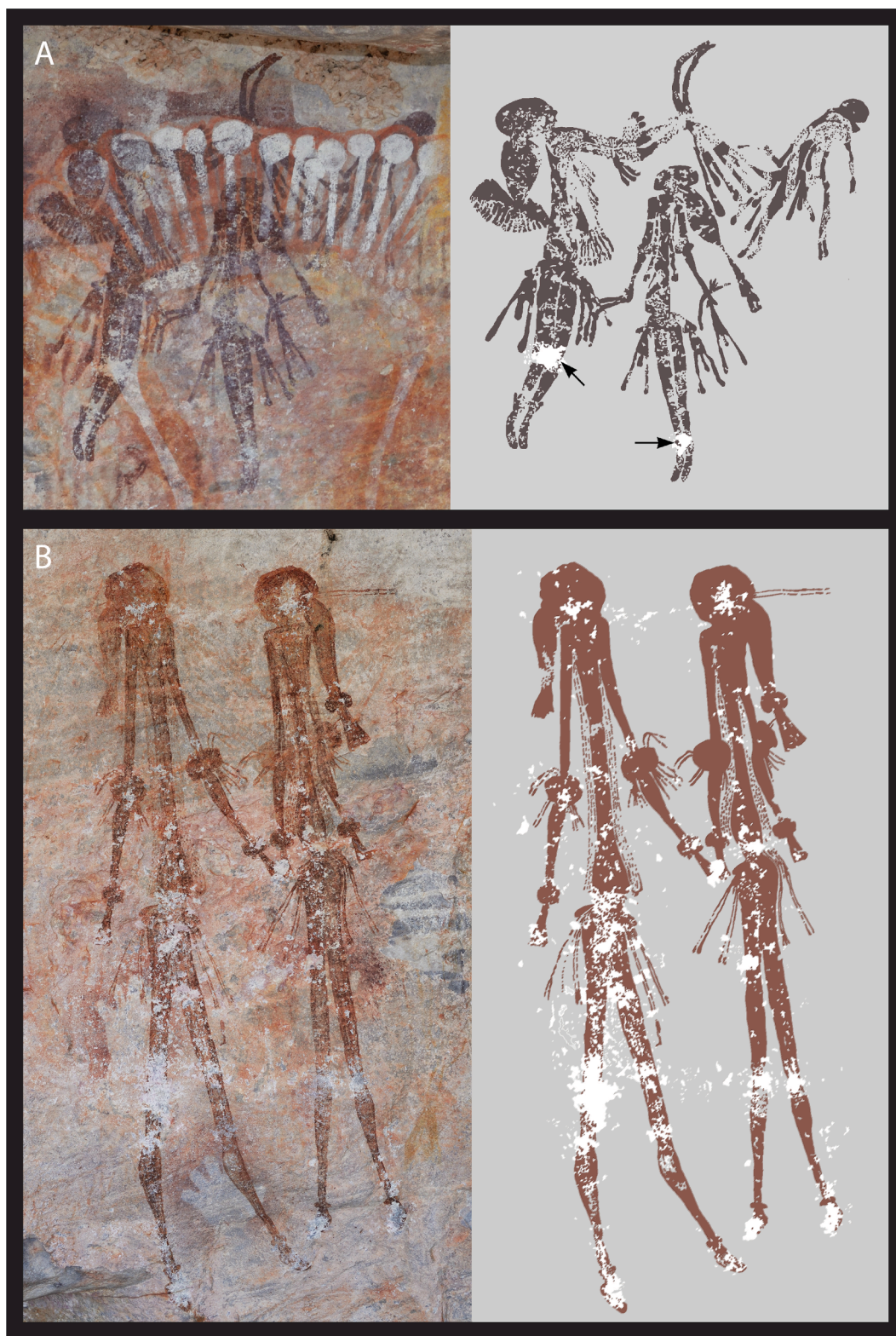


Fig. 11. A: Mulberry-coloured Ngunuru Gwion, one with battering on its knees, the other on its ankles. A smaller Gwion figure on the top-right does not have battering. The left hand-side Ngunuru Gwion painting is 66 cm tall. Pundawar Manbur Panel A3. B: Brown-red Ngunuru Gwion figures with battering selectively targeting the head, hands, groin, knees/thighs, and feet (Panel A2). The left-hand side Ngunuru Gwion painting is 132 cm tall (photos and figures by Robert Gunn, courtesy of the Balangarra Aboriginal Corporation).

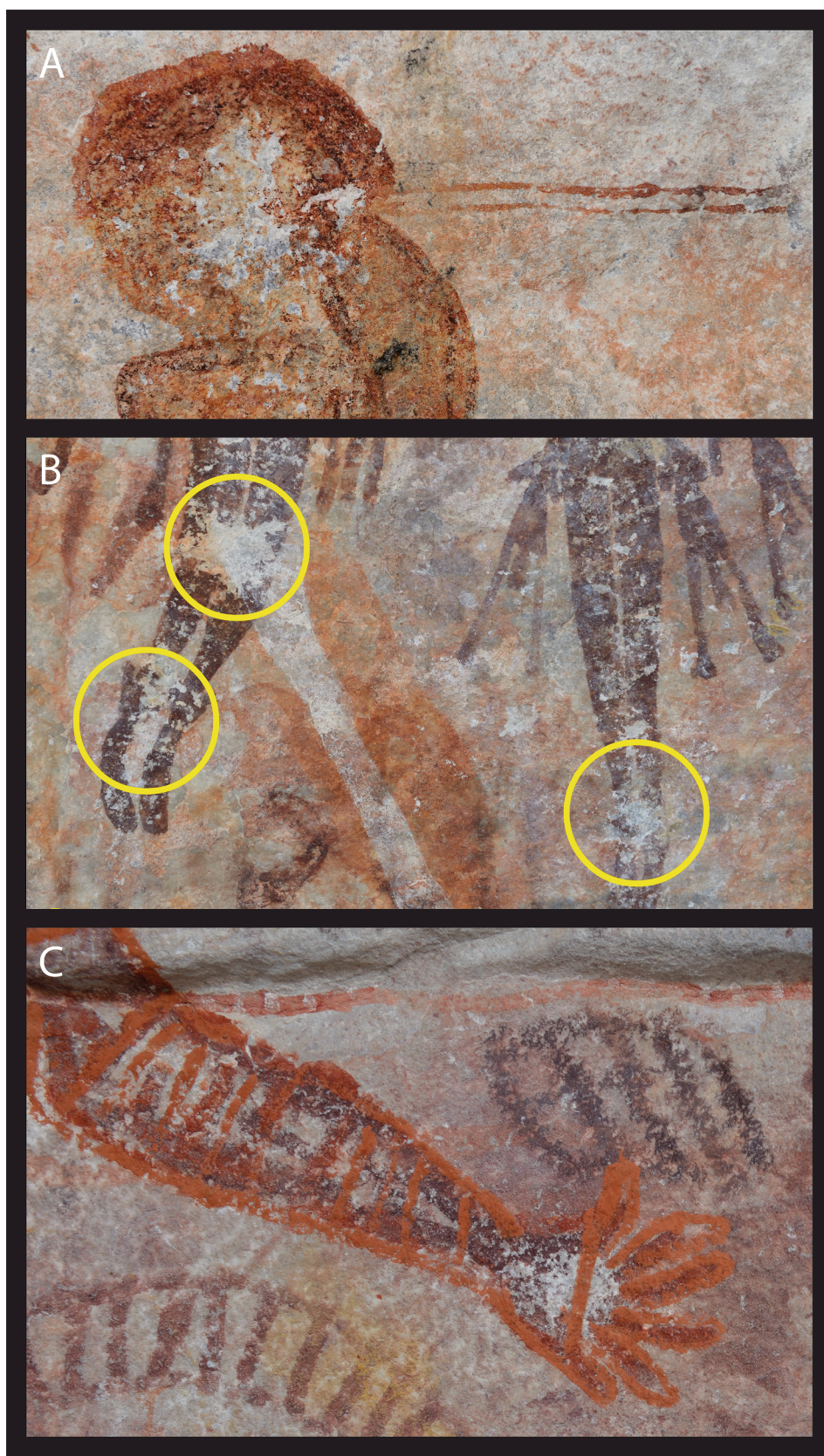


Fig. 12. Targeted battering of Gwion and zoomorph body parts, Pundawar Manbur. A: Details of Fig. 11B, highlighting the targeted battering on a Ngunuru Gwion's head (for a sense of scale, see Fig. 11B). B: Details of Fig. 11A, highlighting the targeted battering on Ngunuru Gwion ankles and knees (for a sense of scale, see Fig. 11A). C: Details of Fig. 14, highlighting the targeted battering on the *manbur* macropod paw later overlain by the orange pigment. The battered paw area is c. 5 cm in diameter (photos by Robert Gunn, courtesy of the Balangarra Aboriginal Corporation).

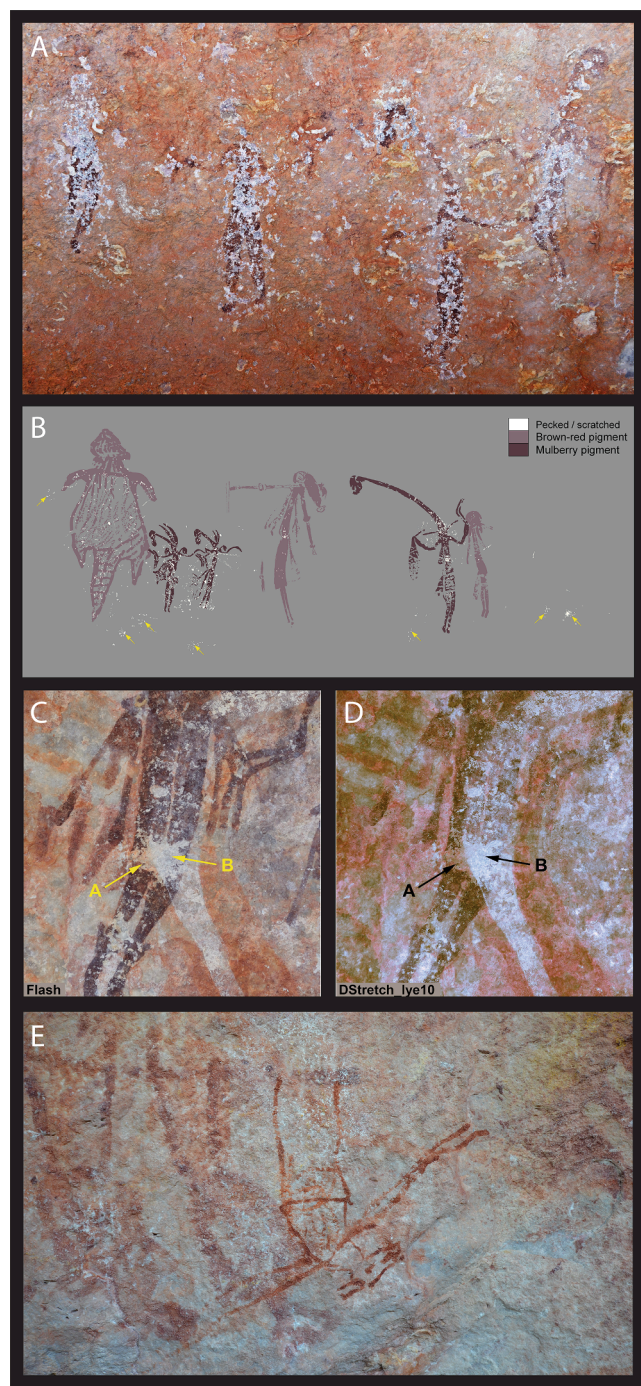


Fig. 13. A: Four of the six heavily battered Yowna Gwion figures on Panel D, Pundawar Manbur. The tallest figure is 25 cm tall. B: Battering (here shown in white) on mulberry-coloured Yowna Gwion figures, red Ngunuru Gwion figures, and a large animal painting of indeterminate taxon, with small areas of battering nearby (arrowed), Panel A5. The central Ngunuru Gwion figure is 74 cm tall, the large animal at left 79 cm long. C, D: Detail of Fig. 11A, showing red (A) and white (B) pigment of the early rayed-headaddress Wanjina superposed over the battered Ngunuru Gwion (for a sense of scale, see Fig. 11A). E: The later addition (17 cm long) to the earlier row of flying foxes (photos by Leigh Douglas and Bruno David, courtesy of the Balanggarra Aboriginal Corporation, with figure by Robert Gunn).

meaning of battering in the region's ethnography.

There are few ethnographic records that document battering or other impactful engagement with rock art in the Kimberley, and most relate to Wanjina images. An anthropologist who has worked in the area for

decades, Kim Akerman (pers. comm. 2021), was told by senior Traditional Owners in the 1970s that they could castigate Wanjina images by hitting them with stones if the Wanjina were considered to have failed in ensuring the onset of rain, or if they were thought to have permitted damage to people or Country by extreme weather events. The Wanjina 'paintings' are the shades of Wanjina metamorphosed into the rock, and are part of the contemporary cosmology of Kimberley groups across much or all of the Kimberley (e.g. Akerman, 2016; Crawford, 1968; Mowaljarlai and Malnic, 1993). The Wanjina 'paintings', actually powerful living Dreaming Beings in local Aboriginal cosmologies, are often depicted as large polychrome images who dominate their respective rock shelters. They were regularly repainted to ensure the coming of the rain at the beginning of the wet season (the northern Australian monsoon), typically from October to April.

In 'Mythology in northern Kimberley, north-west Australia', the linguist Arthur Capell (1939) made a number of observations about how members of various Kimberley language groups whose Country lay in and around Pundawar Manbur interacted with Wanjina imagery. He noted that engagements with, and the reasoning behind, such interactions with the Wanjina 'paintings' varied, even within this regionally small and linguistically related region:

Amongst the Gwi:ni [Kwini] the different type of cave paintings (or rather cliff paintings) there found are not retouched for increase purposes; increase is secured by rubbing of stones. The headmen do repaint them but simply to preserve them, for Wolaro: when dying told his son *djundjum barāma*, "you carry on after me", and the commandment still holds good. Neither can the headmen originate new paintings. The Woljamidi [an adjacent language group] do repaint the species to secure increase, with the exception of the kangaroo, of which an informant said that the headman rubs with a tiny piece of stone a stone that looks like a kangaroo bending over. In the Drysdale, according to an informant from Maliri horde country, a little south-west of the Drysdale Mission [70 km NNE of Pundawar Manbur], the pictures in the caves are struck with sticks for increase. This applies only to the Cave of the Winds itself [location unspecified]. It is worth noting, however, that the Ungarinyin [a language group to the west] for "we increase the species" is *yauwir njadma*, lit. "we rub them," although they do not rub stones but touch up cave-paintings. (Capell, 1939: 390–391).

Akerman (pers. comm., 2021) thus notes that there is a need to consider whether the battering of Wanjina paintings during ethnographic times was a response to, or caused by, the introduction of the 'Kurungara' cult in the early 1900s. This secretive cult gave the power of performance, previously held by lone medicine men, to groups of members, under the direction of a senior figure, to direct magical acts against rival individuals or groups. Between the 1920s and 1950s, this rapidly developing cult profoundly affected all areas of the Kimberley (for details, see Petri, 1950; 1954: 178–187; Lommel, 1952: 13, 94–103; Worms, 1942).

A different explanation was given by Walsh (2000: 222–223) for the battering of Dalal Gwion at another site in the northern Kimberley. Among the bichrome and polychrome Dalal Gwion, most of the body was painted in red but the forearms had originally been painted in white. The white paint has since deteriorated away, so that the distal end of the upper arm (originally the elbow area), whose red paint has survived, now appears to represent the wrist or hand area. In the site discussed by Walsh, the battering was focused on the face, feet and ends of the upper arms (signalling where the wrist-and-hands would be once the white forearms had disappeared). This positioning of the battering at the end of the upper arm-cum-wrist-and-hand area signals that it had been done after the white forearm had disappeared, therefore after the Dalal Gwion period. Walsh (2000: 223) stated that 'approximately twenty years ago', i.e. around 1980, 'north Kimberley Aboriginal elders ... told me that when observing the "little red paintings" while hunting in the bush in the "old days" they would attempted [sic] to "bash them", as they were

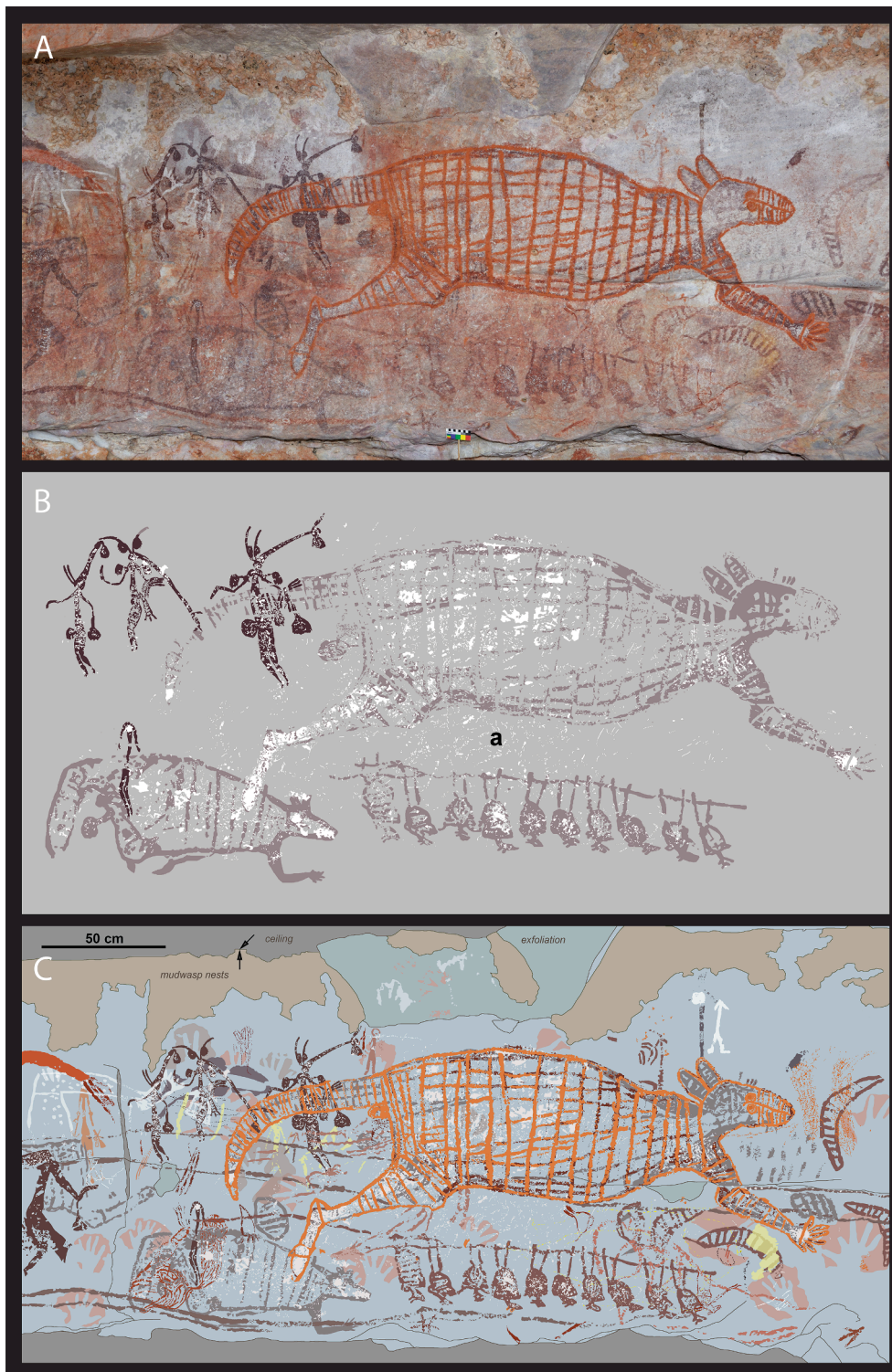


Fig. 14. The central *manbur* macropod and nearby motifs, Pundawar Manbur Panel A4. The large *manbur* macropod is 226 cm long, and the large Gwion immediately behind the *manbur* image is 57 cm. A: Photo. B: Digital tracing of Sequence Layers that precede the post-battering art layers, showing the battering (shown in white on this illustration) covering zoomorphs and Yowna Gwion figures, along with an area of off-art battering (a). C: Full digital tracing of art motifs and battering (all Sequence Layers) (photo and figures by Robert Gunn, courtesy of the Balangarra Aboriginal Corporation).

“bad” (he does not mention Aboriginal interpretations of the battering of animal paintings). Again, this cannot be reduced to an act of defacement, but of affective interaction with pre-existing images that are in reality salient beings who are alive and agential in the local Aboriginal landscape.

While the ethnographic observations of battering, rubbing and retouch from the early European contact period are more recent than the pre-Wanjina battering at Pundawar Manbur, it is important to note that by all archaeological, anthropological and genetic evidence, the

Aboriginal peoples who battered the art panels at Pundawar Manbur were the ancestors of the Aboriginal peoples of ethnographic times (1800s onwards). Put another way, today’s Kimberley Aboriginal populations are the descendants of those who battered the art panels of Pundawar Manbur (for continuity of archaeology, see also Veth et al., 2021). While thousands of years, and potentially up to c. 11,500 years (following the end of the Gwion period; Finch et al., 2020) have elapsed between these archaeological events and their cosmological explanations as documented by the ethnography, the clearest associations

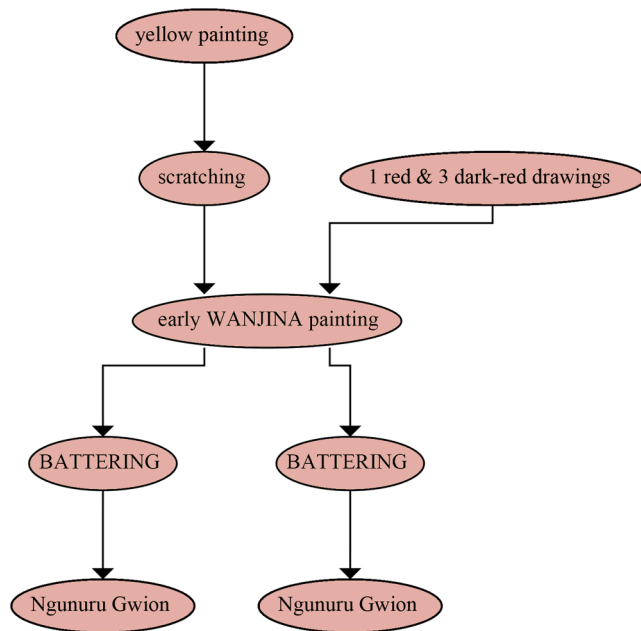


Fig. 15. Select detail of the Pundawar Manbur Panel A3 Harris Matrix, showing the motifs that overlie the battering of two earlier Ngunuru Gwion (figure by Robert Gunn).

between art, cosmology and performance we have are in these descendent testimonies and observations that closely match the archaeological evidence for earlier rock art battering. That the battering of individual Irregular Infill Animal and Gwion figures at Pundawar Manbur and other Kimberley sites was socially controlled and meaning-filled is clear in the repeated targeting of very specific parts of the animal and Gwion figures. Similar engagements undertaken to ensure the maintenance of specific species or natural events, particularly rainfall, was also a feature of many of the major rock art sites across northern and central Australia during the 19th and early 20th Centuries (e.g. Arndt, 1962a, 1962b; Crawford, 1968; Mountford, 1968; O'Connor et al., 2008).

This leads us to emphasise that the standard Australian rock art term 'battering' is not used with any negative connotation. All of the recorded ethnographic examples are of an affective engagement—one of use rather than abuse. Nevertheless, the term 'use' may over-emphasise function. In reality these engagements were moments of affecting, moments of re-creation, and/or moments of honouring actions intended to ensure life and vitality of the people and their landscapes. We read the battering as a *knocking* on the images of Pundawar Manbur in this way, of activation by appropriate descendants dutifully approaching and connecting with their powerful ancestral creative beings: as direct evidence of later painters understanding, acknowledging and drawing upon the power of the older images.

This leads us to a further question about the superimpositions (including the battering), as put to us by a reviewer: are they products of rituals? This depends on how 'ritual' is defined. If by 'ritual' we mean purposeful repetitive cultural behaviour intended to reach an outcome, then yes. If we mean 'religious ritual', in the sense of 'ritual' as per the above but with the added condition of involving that culture's religious or cosmological understandings, then, again, yes. But if we mean a kind of religious ritual that involves social ceremonies, dedicated ritual specialists unlike other clan/kin/community members, choreographed performances and the like, then no, at least not if Pundawar Manbur's superimpositions were a result of the kinds of activities known from local ethnography. Those activities were performances that we prefer to think of as *engagements* or actions that have an affective intent. Why not 'ritual' in the third sense above? That notion is founded on an intended division between the sacred and the profane, the special and the

everyday mundane. In contrast, affective engagements in the Kimberley rock art of the ethnographic period are founded on local cosmological principles of relationality. People, the numinous, the environment and the individual things ('material culture') of everyday life are not essentially separated but co-defined. They come to life through engagement, where the one makes and remakes the other. So in this sense of culturally encoded behaviour with an intended outcome, one could call it ritual. More importantly, however, it is the doing that is important, not just the painting or battering as a visual end-product.

The experience of Pundawar Manbur has taught us of the value of the meticulous identification and analysis of superimpositions at single rock art sites—as David et al. (in press) emphasise, *the details matter*. This work is time-consuming and laborious. Whilst the recording of the site took days, the subsequent analysis took nearly-three years. But, in the many painstaking details, sets of patterns emerged at Pundawar Manbur that could easily be overlooked, and often are. This will be true of many other sites, and in many countries. The analysis of superimpositions at Pundawar Manbur not only allowed us usefully to test, refine and expand the regional art sequence, but it also provided insight into the structural art syntax within phases and the intentional re-use or re-engagement of the earlier art by subsequent generations. This has led us to understand that the chronology and social history of the rock art cannot be reduced to the time of its creation, for it continues to actively affect how a site is engaged through time: pre-existing images help guide future perceptions and social actions, as illustrated at Pundawar Manbur especially through the example of battering.

Superimpositions can help us service our archaeological fixation with chronology, but they can also help us to move beyond this and to consider the social life of images: why they were created and how they were read by subsequent generations who, by engaging with the art, kept the images alive.

CRedit authorship contribution statement

Robert G. Gunn: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Visualization, Supervision, Project administration, Funding acquisition. **Bruno David:** Conceptualization, Methodology, Resources, Writing – original draft, Writing – review & editing, Visualization, Funding acquisition. **Jean-Jacques Delannoy:** Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing, Visualization. **Benjamin Smith:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing. **Augustine Unghangho:** Permissions. **Ian Waina:** Permissions. **Balanggarra Aboriginal Corporation:** Resources, Writing – review & editing. **Leigh Douglas:** Investigation, Writing – review & editing. **Cecilia Myers:** Funding acquisition, Resources, Writing – review & editing. **Pauline Heaney:** Writing – review & editing. **Sven Ouzman:** Funding acquisition, Resources, Writing – review & editing. **Peter Veth:** Funding acquisition, Writing – review & editing. **Sam Harper:** Resources, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Akerman, K., 2016. Wanjina: Notes on some iconic Ancestral Beings of the northern Kimberley. Hesperian Press, Victoria Park.
- Arndt, W., 1962a. The Nargokun-Narlinji cult. *Oceania* 32 (4), 298–320. <https://www.jstor.org/stable/40329382>.
- Arndt, W., 1962b. The interpretation of Delemere lightning painting and rock engravings. *Oceania* 32 (3), 163–177. <https://www.jstor.org/stable/40313152>.
- Blundell, V., Woolagoodja, D., 2012. Aboriginal culture and identity: The Wanjina paintings of northwest Australia. In: McDonald, J., Veth, P. (Eds.), *A Companion to Rock Art*. Wiley Blackwell, New York, pp. 472–487.
- Bradshaw, J., 1892. Notes on a recent trip to Prince Regent's River. *Royal Geographical Society of Australia (Victorian Branch) Transactions* 9, 90–103.
- Bwasiri, E.J., 2011. The implication of the management of Indigenous living heritage: The case study of the Mongomi wa Kolo rock paintings World Heritage Site, central Tanzania. *South African Archaeological Bulletin* 66, 60–66. <https://www.jstor.org/stable/41408533>.
- Chaloupka, G., 1993. *Journey in time: The world's longest continuing art tradition*. Reed, Chatswood.
- Chippindale, C., Taçon, P.S.C., 1993. Two old painted panels from Kakadu: Variation and sequence in Arnhem Land rock art. In: Steinbring, J., Watchman, A., Faulstich, P., Taçon, P.S.C. (Eds.), *Time and space: Dating and spatial considerations in rock art research (Papers of Symposia F and E, AURA Congress Cairns 1992)*. Occasional AURA Publication 8. Australian Rock Art Research Association, Melbourne, pp. 32–56.
- Cook, N., Davidson, I., Sutton, S., 1990. Why are so many ancient rock paintings red? *Australian Aboriginal Stud.* 1990 (1), 30–32. <https://doi.org/10.3316/informit.154954344998067>.
- Crawford, I.M., 1968. The art of the Wandjina. Oxford University Press, Melbourne.
- Crawford, I.M., 1972. Function and change in Aboriginal rock art, Western Australia. *World Archaeology* 3 (3), 301–312. <https://doi.org/10.1080/00438243.1972.9979512>.
- David, B., Delannoy, J.-J., Birkett-Rees, J., in press. *Elements of landscape archaeology*. Cambridge University Press, Cambridge.
- Delannoy, J.-J., David, B., Gunn, R.G., Geneste, J.-M., Jaillet, S., 2018. Archaeomorphological mapping: Rock art and the architecture of place. In: David, B., McNiven, I.J. (Eds.), *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*. Oxford University Press, Oxford, pp. 833–856 <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190607357.001.0001/oxfordhb-9780190607357-e-46>.
- Dibben, J., 2019. *Drawing in the land: Rock art in the Upper Nepean, Sydney Basin, New South Wales*. *Terra Australis* 49. ANU Press, Canberra. <http://doi.org/10.22459/TA49.2018>.
- Donaldson, M., 2007. Overview of Kimberley rock art. In: Donaldson, M., Kenneally, K. (Eds.), *Rock Art of the Kimberley*. Kimberley Society, Perth, pp. 1–24.
- Donaldson, M., 2012. *Kimberley rock art, Volume 2: North Kimberley*. Wildrocks Publications, Mt Lawley.
- Dowson, T., 2009. Re-animating hunter-gatherer rock-art research. *Cambridge Archaeol. J.* 19 (3), 378–387. <https://doi.org/10.1017/S0959774309000560>.
- Duval, M., Hørrel, S., Bovet, L., Smith, B., 2018. Contributions of a heritage values-based approach to rock art management: Lessons from the Maloti-Drakensberg World Heritage Site, South Africa. *Conservation and Manage. Archaeological Sites* 20 (2), 89–111. <https://doi.org/10.1080/13505033.2018.1462649>.
- Finch, D., Gleadow, A., Hergt, J., Levchenko, V.A., Heaney, P., Veth, P., Harper, S., Ouzman, S., Myers, C., Green, H., 2020. 12,000-year-old Aboriginal rock art from the Kimberley region, Western Australia. *Sci. Adv.* 6 (6), eaay3922. <https://doi.org/10.1126/sciadv.aay3922>.
- Finch, D., Gleadow, A., Hergt, J., Heaney, P., Green, H., Myers, C., Veth, P., Harper, S., Ouzman, S., Levchenko, V.A., 2021. Ages for Australia's oldest rock paintings. *Nat. Hum. Behav.* 5, 310–318. <https://www.nature.com/articles/s41562-020-01041-0>.
- Genuite, K., Delannoy, J.-J., David, B., Unghango, A., Corporation, B.A., Cazes, G., Fulop, R., Fink, D., Codilean, A., Ouzman, S., Veth, P., Harper, S., Green, H., Finch, D., Urwin, C., 2021. Determining the origin and changing shape of landscape-scale rock formations with three-dimensional modelling: The Boroloka rock shelters, Kimberley region, Australia. *Geoarchaeology* 36 (4), 662–680. <https://doi.org/10.1002/gea.21863>.
- Grey, G., 1841. Journals of two expeditions of discovery in north-west and Western Australia, during the years 1837, 38, and 39 (Volume 1). T. and W. Boone, London. https://books.google.com.au/books?id=DUNCAAAcAAJ&pg=PA24&redir_esc=y#v=onepage&q&f=false.
- Gunn, R.G., 2006. Hand sizes in rock art: Interpreting the measurements of hand stencils and prints. *Rock Art Res.* 32 (1), 97–112.
- Gunn, R.G., 2007. The interpretation of handedness in Australian Aboriginal rock art. *Rock Art Res.* 24 (2), 199–208.
- Gunn, R.G., David, B., Douglas, L., Delannoy, J.-J., Harper, S., Heaney, P., Ouzman, S., Veth, P., 2019. 'Kimberley Stout figures': A new rock art style for Kimberley rock art, north-western Australia. *Australian Archaeology* 85 (2), 151–169. <https://doi.org/10.1080/03122417.2019.1681129>.
- Gunn, R.G., Lowish, S., 2017. The Morellian Method and its potential in rock art research. *Rock Art Res.* 34 (2), 193–205.
- Gunn, R.G., Ogleby, C.L., Lee, D., Whear, R.L., 2010. A method to visually rationalise superimposed pigment motifs. *Rock Art Res.* 27 (2), 131–136.
- Hampson, J., Challis, W., Blundell, G., De Rosner, C., 2002. The rock art of Bongani Mountain Lodge and its environs, Mpumalanga Province, South Africa: An introduction to problems of southern African rock-art regions. *The South African Archaeological Bull.* 57, 15–30. <https://doi.org/10.2307/3889103>.
- Harris, E.C., Gunn, R.G., 2018. The use of Harris Matrices in rock art research. In: David, B., McNiven, I.J. (Eds.), *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*. Oxford University Press, Oxford, pp. 911–926 <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190607357.001.0001/oxfordhb-9780190607357-e-18>.
- Kaiser, D., Keyser, J., 2008. Symbolic superimposition: Overlapping shield bearing warriors at Bear Gulch. *American Indian Rock Art* 34, 37–59.
- Laue, G., 2000. Taking a stance: Posture and meaning in the rock art of the Waterberg, Northern Province, South Africa. University of the Witwatersrand, Johannesburg. Unpublished Honours thesis.
- Leroi-Gourhan, A., 1968. *The art of prehistoric man in Western Europe*. Thames and Hudson, London.
- Lewis, D., 1997. Bradshaws: The view from Arnhem Land. *Aust. Archaeology* 44, 1–16. <https://doi.org/10.1080/03122417.1997.11681585>.
- Lewis-Williams, J.D., 1974. Superpositioning in a sample of rock-paintings from the Barkly East District. *South African Archaeological Bull.* 29, 93–103. <https://doi.org/10.2307/3888335>.
- Lewis-Williams, J.D., 1981. *Believing and seeing: Symbolic meanings in southern San rock paintings*. Academic Press, London.
- Lewis-Williams, J.D., 2019. *Image-makers: The social context of a hunter-gatherer ritual*. Cambridge University Press, Cambridge.
- Lommel, A., 1952. *Die Unambal: Ein stamm in nordwest Australien*. Museum für Volkerkunde, Hamburg. [1997. *The Unambal: A tribe in Northwest Australia*. Takarakka Publications, Kenmore].
- McDonald, J., Veth, P., 2013. The archaeology of memory: The recursive relationship of Martu rock art and place. *Anthropological Forum* 23 (4), 367–386. <https://doi.org/10.1080/00664677.2013.843444>.
- Morphy, H., 2012. Recursive and iterative processes in Australian rock art: An anthropological perspective. In: McDonald, J., Veth, P. (Eds.), *A Companion to Rock Art*. Wiley Blackwell, New York, pp. 625–643.
- Motta, A.P., 2019. From top down under: New insights into the social significance of superimpositions in rock art of northern Kimberley, Australia. *Cambridge Archaeol. J.* 29 (3), 479–495. <https://www.cambridge.org/core/journals/cambridge-archaeological-journal/article/abs/from-top-down-under-new-insights-into-the-social-significance-of-superimpositions-in-the-rock-art-of-northern-kimberley-australia/8A18CA3B8FEFD8A730588591A14EC1D3>.
- Motta, A.P., Porr, M., Veth, P., 2020. Recursivity in Kimberley rock art production, Western Australia. In: Horn, C., Wollentz, G., Di Maida, G., Haug, A. (Eds.), *Places of Memory: Spatialised Practices of Remembrance From Prehistory to Today*. Archaeopress, Oxford, pp. 137–149.
- Motta, A.P., Veth, P., Corporation, B.A., 2021. Relational ontologies and performance: Identifying humans and animals in the rock art from north-east Kimberley, Australia. *J. Anthropol. Archaeol.* 63, 101333. <https://www.sciencedirect.com/science/article/pii/S0278416521000660>.
- Mountford, C.P., 1968. Winbaraku and the myth of Jarapiri. *Rigby, Adelaide*.
- Mowalljarlai, D., Vinnicombe, P., Ward, G.K., Chippindale, C., 1988. Repainting of images on rock in Australia and the maintenance of Aboriginal culture. *Antiquity* 62, 690–696. <https://doi.org/10.1017/S0003598X00075086>.
- O'Connor, S., Barham, A., Woolagoodja, D., 2008. Painting and repainting in the west Kimberley. *Aust. Aboriginal Stud.* 2008 (1), 22–38. <https://doi.org/10.3316/informit.254464209496268>.
- O'Connor, S., Balme, J., Fyfe, J., Oscar, J., Oscar, M., Davis, J., Malo, H., Nuggett, R., Surprise, D., 2013. Marking resistance? Change and continuity in the recent rock art of the southern Kimberley, Australia. *Antiquity* 87 (336), 539–554. <https://doi.org/10.1017/S0003598X00049115>.
- Ouzman, S., 2001. Seeing is deceiving: Rock art and the non-visual. *World Archaeology* 33 (2), 237–256. <https://doi.org/10.1080/00438240120079271>.
- Petri, H., 1954. *The dying world in northwest Australia*. Hesperian Press, Carlisle.
- Petri, H., 1950. Kurangara—Neue magische kulte in Nordwest-Australien. *Zeitschrift für Ethnologie* 75, 43–51. [2011. *Kurangara—New magic cults in north-west Australia*. Pawsey, M. (translator), Akerman, K. (Ed.), unpublished English manuscript, courtesy of Kim Akerman].
- Phillipson, D.W., 1976. *The prehistory of eastern Zambia*. British Institute in Eastern Africa, Nairobi.
- Rainsbury, M.P., 2009. *River and coast: Regionality in north Kimberley rock art*. Durham University. Unpublished PhD thesis.
- Rosenfeld, A., 1988. *Rock art conservation in Australia*. Australian Government Publishing Service, Canberra.
- Rosenfeld, A., Horton, D., Winter, J., 1981. Early man in northern Queensland: Art and archaeology in the Laura area. *Terra Australis* 6. Australian National University, Canberra.

- Ross, J., Westerway, K., Travers, M., Morwood, M.J., Hayward, J., 2016. Into the past: A step towards a robust Kimberley rock art chronology. *PLoS ONE* 11 (8), e0161726. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0161726>.
- Travers, M., 2015. Change and continuity: Exploring stylistic transitions in the anthropomorphic figures of the northwest Kimberley rock art assemblage and the varying contexts of rock art production. University of New England, Armidale. Unpublished PhD thesis.
- Travers, M., Ross, J., 2016. Continuity and change in the anthropomorphic figures of Australia's northwest Kimberley. *Aust. Archaeol.* 82 (2), 148–167. <https://doi.org/10.1080/03122417.2016.1210757>.
- Veth, P., Myers, C., Heaney, P., Ouzman, S., 2018. Plants before farming: The deep history of plant-use and representation in the rock art of Australia's Kimberley region. *Quat. Int.* 489, 26–45. <https://www.sciencedirect.com/science/article/pii/S1040618216301392>.
- Veth, P., Harper, S., Ditchfield, K., Ouzman, S., Corporation, B.A., 2021. The case for continuity of human occupation and rock art production in the Kimberley, Australia. In: McGrath, A., Russell, L. (Eds.), *The Routledge Companion to Global Indigenous History*. Routledge, London, pp. 195–220.
- Walsh, G.L., 1979. Mutilated hands or signal stencils? A consideration of irregular hand stencils from central Queensland. *Aust. Archaeol.* 9, 33–41. <https://doi.org/10.1080/03122417.1979.12093358>.
- Walsh, G.L., 1994. Bradshaws: Ancient rock paintings of north-west Australia. Bradshaw Foundation, Carouge-Geneva.
- Walsh, G.L., 2000. Bradshaw art of the Kimberley. Takarakka Nowan Ka Publications, Toowoong.
- Welch, D., 1990. The bichrome art period in the Kimberley, Australia. *Rock Art Res.* 7 (2), 110–124.
- Welch, D., 2004. Large animals and small humans in the rock art of northern Australia. *Rock Art Res.* 21, 47–56.
- Welch, D., 1992. Bradshaw to Wandjina: The evolution of anthropomorphic depictions in the Kimberley area of north-west Australia. Unpublished paper presented at the Second AURA Congress, Cairns.
- Welch, D., 1993. The early rock art of the Kimberley, Australia: Developing a chronology. In: Steinbring, J., Watchman, A., Faulstich, P., Taçon, P.S.C. (Eds.), *Time and space*. Occasional AURA Publication 8. Australian Rock Art Research Association, Melbourne, pp. 13–21.
- Worms, E.A., 1942. Die Gorañara-Feier im Australischen Kimberley. *Annali Lateranensi* 6, 207–235. [2015. The Gorañara-Ceremony in the Australian Kimberley. In: Pawsey, M. (translator), Akerman, K. (Ed.), *Cologne to the Kimberleys: Studies of Aboriginal life in northwest Australia by five German scholars in the first half of the 20th century*. Hesperian Press, Carlisle, pp. 89–113].
- Yates, R., Manhire, A., 1991. Shamanism and rock paintings: Aspects of the use of rock art in the south-western Cape, South Africa. *The South African Archaeological Bull.* 46, 3–11. <https://doi.org/10.2307/3889007>.