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ARTICLE

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Scratching the surface: Subtractive rock markings from the Cockburn Ranges, eastern Kimberley, Western Australia

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ABSTRACT

This article deals with visual expression in the form of subtractive rock markings from the Cockburn Ranges, situated within the Balanggarra Native Title determination in the east Kimberley, Western Australia. We present examples of subtractive rock marking diversity, ranging from cupules and abraded grooves, recursive cultural practises in the form of battering and scratching of extant artworks, figurative and non-figurative images, potentially random scratches and battering of the rock surface and tally marks. These kinds of visual expressions in rock art research have a tendency to fall under the radar when researchers discuss the meaning and significance of Aboriginal Australian rock art. We argue that the broad diversity of subtractive rock markings is employed through time and space, stretching from the Pleistocene through to the more recent past. The article presents two avenues for interpreting this often-neglected corpus of Kimberley rock art: rock art as an intergenerational cultural knowledge transfer and its connection to maintenance rituals.

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Rock art; Kimberley; subtractive rock art; petroglyphs; Cockburn Ranges; maintenance rituals; intergenerational learning

Introduction

Subtractive rock art comes in many shapes and forms, ranging from detailed figurative artworks, including three-dimensional relief sculptures, to more elusive non-figurative rock markings (Clottes 2002; David and McNiven 2018; McDonald and Veth 2012). Accordingly, the methods used to create subtractive rock markings vary considerably, comprising, but not limited to, abrading, bashing, battering, carving, chipping, cutting, drilling, fluting, gashing, grinding, hammering, incising, pecking, pitting, polishing, pounding, puncturing, rubbing, scraping, scratching, and smoothing; the variations and combinations are almost endless. In rare cases, a single well-preserved rock art figure has been observed to have been created by up to four distinct subtractive techniques (Goldhahn 2016:33–55). Surprisingly, few advanced definitions describe and define such variable rock markings. Historically, archaeologists have often gathered such visual expressions under a single broad notion or class, such as engravings or petroglyphs (e.g. Bednarik et al. 2010). In some parts of the world, such as in northern Europe (e.g. Coles 2005; Kaul 1998; Lødøen and Mandt 2010; Mazel and Nash 2022; Skoglund 2016), all subtractive technologies have been

grouped under a single anachronistic deceptive notion—rock ‘carvings’ (Goldhahn 2021:xvii).

This article aims to raise awareness about the definitions of subtractive rock art. We base our arguments on analyses of subtractive rock markings from the north-eastern Kimberley in Western Australia (Figure 1), specifically the findings from a limited ten-day-survey of Aboriginal cultural sites in the Cockburn Ranges (Figure 2) conducted in 2021 and 2022 through collaboration between Balanggarra Aboriginal Corporation, the Centre for Rock Art Research + Management at the University of Western Australia, University of Melbourne, and Rock Art Australia (Harper 2021; Harper and Goldhahn 2022).

The Cockburn Ranges

The Cockburn Ranges are a distinctive geological feature in the southern corner of the Balanggarra Native Title determination, reaching elevations of 480 m asl (north) and 520 m asl (south). Comprising predominantly Cockburn Sandstones, with massive quartz sandstone interbedded with fine-grained sandstones, micaceous siltstones and shales (Dow and Gemuts 1996:28), their formation is mainly vertical, with shallow to moderate overhangs creating narrow shelters at

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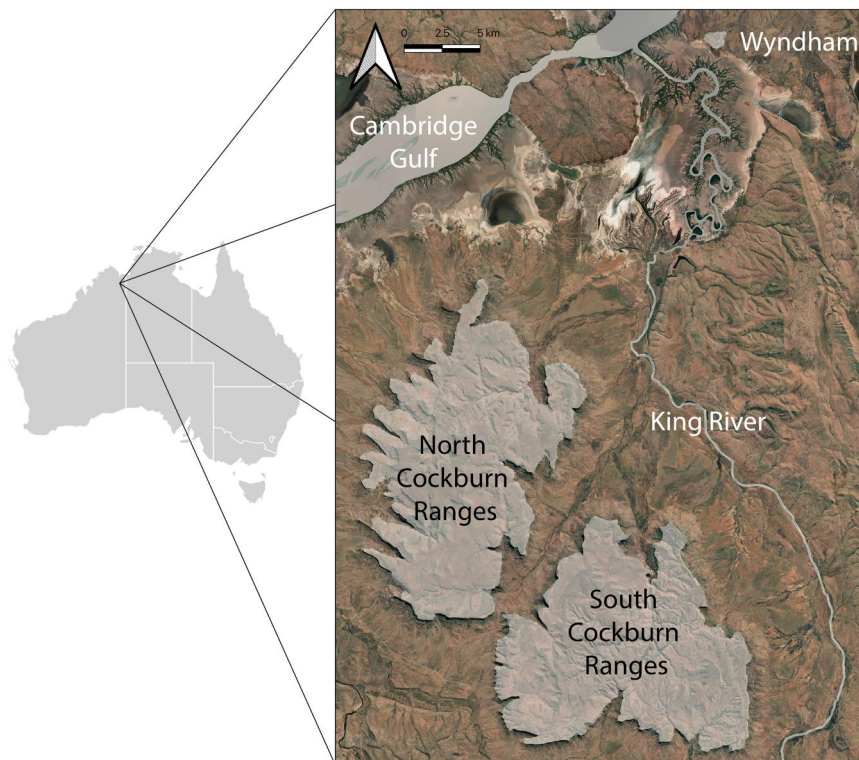


Figure 1. The Cockburn Ranges, and their location in Australia. Map by Goldhahn.



Figure 2. The southern (to the left) and northern (to the right) Cockburn Ranges. Photograph by Goldhahn.

various elevations from valley floors to elevated and layered mezzanines. Due to the high-elevation and often hard-to-reach shelters throughout the ranges, we utilised a combination of helicopter and foot surveys. Given the aims of our fieldwork to provide initial archaeological site identification, and our limited fieldwork time, we did not undertake exhaustive detailed documentation of each cultural site or rock art assemblage we encountered. We encircled the

high escarpment of the ranges in a Robinson 44 ('R44') helicopter (Figure 2), flew up valleys and gorges targeting prospective geological formations conducive to rock art, and marked out potential cultural sites with a handheld GPS (Figure 3).

Most of these sites were identified from the air. We then surveyed prospective sites and surrounding areas on foot, many times including challenging climbs. With this methodology, we marked out over

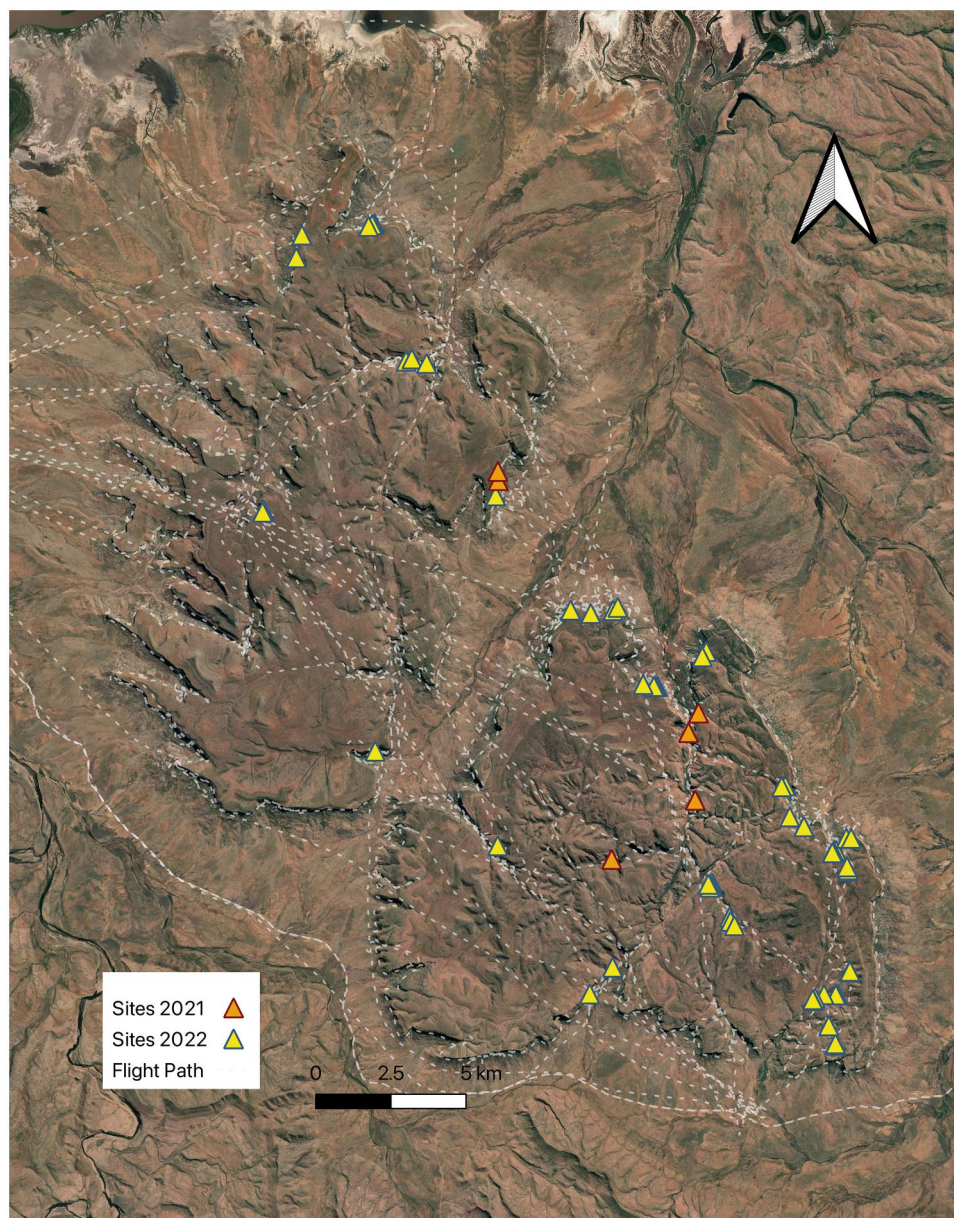


Figure 3. Map of all recorded sites during the 2021 and 2022 fieldwork; potential sites identified during aerial survey, and aerial survey track (dash-lines). Map by Harper.

100 potential rock art sites and conducted baseline documentation of 53 (Figure 3). We photographed each site, panel, and motif and described the number of figures, identified subject matter and rock art styles, and the presence of other cultural remains, such as stone artefacts, stone arrangements, grinding patches and implements, quarrying, etc. Site size varied from a spatial perspective and in terms of marking intensity with examples of art density from a single rock mark in a shelter to over 500 markings in extended galleries (Figure 4). The majority of known Kimberley rock art styles were identified and documented across the ranges (Harper 2021; Harper and Goldhahn 2022), including: late Pleistocene art traditions such as Irregular Infill Animal (Finch et al. 2021) and Gwion Gwion (Finch et al. 2020); and Holocene art traditions in the form of Static Polychrome, Painted Hand Figures, and variations

of the Wandjina Galeru-Ungud rock art traditions (e.g. Harper et al. 2020; Ross et al. 2016; Veth et al. 2017).

Generally, most rock art we documented was painted ('pictographs', $N=48$ sites), i.e. pigment-based additive rock art (Figure 5), and we recorded a single anthropomorphic figure made from beeswax (see Morwood et al. 2010; Ross et al. 2016; Welch 1995). Furthermore, 20 sites included subtractive rock art figures or markings (Figures 5–12), approximately 38% of the entire assemblage.

After returning from the field, we noticed something perplexing with our baseline recordings. Our documentation often lacked subtractive rock markings at sites with large, colourful, and visually impressive paintings. Many times, especially when visiting a place for the first time, vivid, colourful, and sometimes larger-than-life paintings tend to blind us with

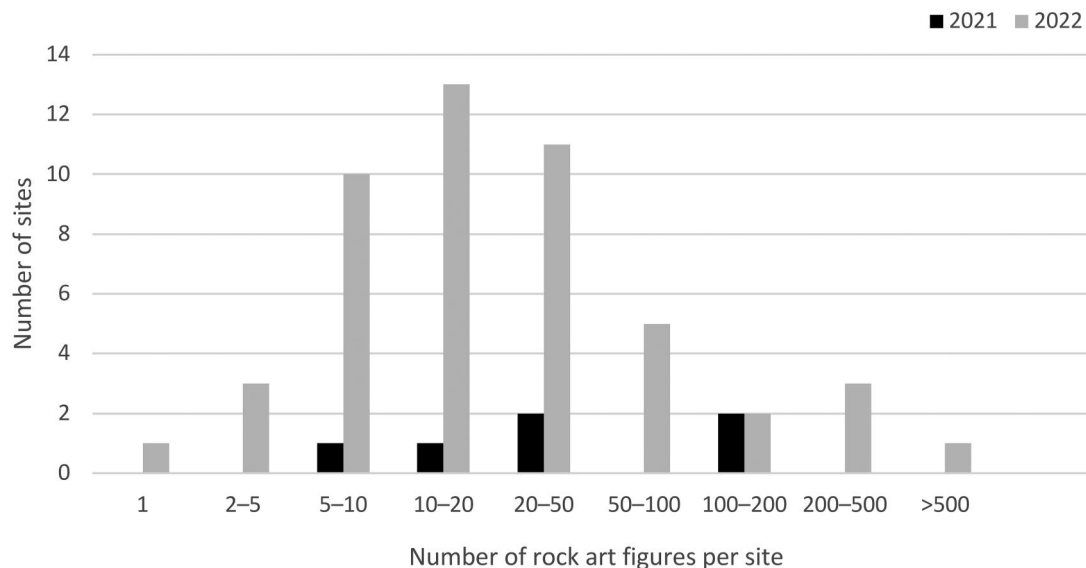


Figure 4. Range of number of documented rock art figures and markings per rock art site in the 2021 and 2022 survey of cultural sites in the Cockburn Ranges. Source: Balanggarra Aboriginal Corporation rock art database.

their presence, brilliance, and aesthetics (Figure 5 above). On the other hand, once we had noticed the often more elusive subtractive rock markings, we tended to find more, and frequently many more. After we spotted the first, these markings were impossible to neglect (Figure 5 below). We ended up with an overall impression that our baseline documentation was limited, partly due to restricted fieldwork time and partly because of this pigment bias combined with the effects of lighting and low visibility of some of these subtractive markings.

We wish to highlight that we are not the first to have noticed the neglect of subtractive figurative and non-figurative rock markings in Australia's Kimberley (Gunn et al. 2022; O'Connor et al. 2013), and most certainly elsewhere where painted art traditions dominate (e.g. Gunn 1983, 2000, 2007; Gunn and Whear 2007; McDonald 1998; Ross 2003; Taçon et al. 2003). Nevertheless, we left the Cockburn Ranges feeling that we sometimes had overlooked and often had not adequately recorded the frequent subtractive rock markings. The ensuing account is an initial attempt to address this neglect.

Earlier research into subtractive rock art in the Kimberley

Most researchers exploring Kimberley rock art have noticed the frequent subtractive figurative and non-figurative rock markings during their fieldwork (e.g. Gunn et al. 2019; Motta et al. 2020:141; Walsh 1994, 2000:215, 222–224; cf. Donaldson 2012a, 2012b, 2013), but relatively few have tried to make sense of them (but see Ouzman et al. 2002; Taçon et al. 1997; and below). Welch (2015:85, 125, 160, 164–166, 182, 241–242, 289–290), who connects different forms of non-

figurative subtractive rock markings to maintenance rituals (see Sutton and Walshe 2021:Chap. 2), is an exception. Across the Kimberley, research focus has been on the more visually dominating and aesthetic painted art, which is apt to assemble into typological groupings, often defined as clear-cut styles within this subfield of archaeological research (Goldhahn et al. 2022; Harper et al. 2020). A key focus has been on the late Pleistocene-aged figurative Gwion Gwion paintings (e.g. Finch et al. 2020; McNiven 2011; Walsh 1994, 2000; Welch 2015) and the late Holocene-aged Wandjina Galeru-Ungud rock art traditions (e.g. Akerman 2016; Crawford 1968), leaving many defined (Gunn et al. 2019) and yet-to-be-defined rock art styles and practices under-researched.

A critical exception is a recently published article by Gunn et al. (2022:9–15) on Pundawar Manbur (DRY013) rock shelter in the Drysdale River area, also situated within Balanggarra Native Title determination to the northwest of the Cockburn Ranges, where the analyses highlight the frequency of battering of already created and present pictographs (see also Motta et al. 2020). The battering occurred all over the rock surface that had been used for creating paintings at Pundawar Manbur, but Gunn et al. (2022:9) argue that certain rock art styles and figures have been targeted for such practices:

‘... 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).



Figure 5. Examples of subtractive rock markings from the Cockburn Ranges that take the form of scratched lines that are hard to detect due to the presence of more visual pictographs. The scratching has been enhanced approximately 200% on the photograph below for clarity (site PEN037). Photographs by Harper, photographic merging and tentative documentation of the scratching on the ceiling by Goldhahn.

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’.

By applying an intriguing analysis of the superimposition of the rock markings in the Pundawar Manbur shelter, Gunn et al. (2022:9) show that most battering of pre-existing artworks seems to be executed ‘during a single phase in the sequence of art superpositions’. Using Donaldson’s (2007) terminology, Ngunuru Gwion and Yowna Gwion anthropomorphic figures were targeted (also Walsh 2000:232). In addition to specific figures being marked, specific areas of those figures have been battered, such as ‘the extremities and joints of the figures (head, hands,

groyne, knees/thighs, and ankles/feet)’ (Gunn et al. 2022:13; see also Walsh 2000:215).

The analyses undertaken by Gunn et al. (2022) aimed to evaluate the Kimberley sequence of artworks through detailed site documentation, while interpretations of the purpose or function of the battering and other subtractive rock markings were not reviewed. It is evident from the detailed study of the Pundawar Manbur shelter that non-figurative rock markings in the Kimberley, including battering and other forms of subtractive markings, are of considerable age (Gunn and Whear 2007), even belonging to the Pleistocene.

Through their fieldwork in Bunuba and Gooniyandi Country, situated around the township of Fitzroy Crossing, O’Connor and her colleagues



Figure 6. Examples of probable early subtractive artworks in the Kimberley, 6a), to the left, abraded grooves and strokes (PEN032); 6b), top right, cupules (PEN037); 6c), bottom right, arranged abraded strokes (PEN032). Photographs, 6a and 6c by Goldhahn, 6b by Harper.

(2013) conducted another seminal study of subtractive Kimberley rock art. Unconventionally, they identified and analysed more recent artworks that were either created by black dry pigment or fine scratching. Both techniques were used for recursive rock markings in enhancing, redrawing, and outlining existing paintings (for a theoretical discussion, see Kelly 2021; McDonald 2013; Morphy 2012; Motta et al. 2020). The dry black pigments were documented as scored lines and meanders, amorphous shapes, and anthropomorphic beings, sometimes depicting non-Aboriginal people, identified through their European clothing and gestures (O'Connor et al. 2013:244–248; cf. Paterson and Wilson 2009 who interpret such attributes as depicting Aboriginal people).

The 'scratch-work art' comprises small fine incisions into the surface of the soft limestone bedrock, usually by penetrating the surface with a hard, sharp object: 'The incision is shallow, by removing the dark grey weathered surface ... the artists have managed to create contrast without depth' (O'Connor et al. 2013:548). The authors suggest that introduced materials, such as iron knives, screwdrivers, and barbed wire, might have been used to create the scratch-work art (O'Connor et al. 2013:548; cf. Mulvaney 2018).

Guided by their Aboriginal co-researchers' cultural understanding and knowledge of local art practices and their analyses of the superposition of artworks, O'Connor et al. (2013:550) argued that 'some, if not all' of the scratch-work art 'may relate to the Contact period'. In this part of the Kimberley, the Contact Period was characterised by harsh, often remorseless, confrontations and violence between representatives of colonial powers and Aboriginal people, sometimes referred to as 'the wild times', 'the shooting days' or 'the killing times' (e.g. Auty 2023; Elder 2003; McGrath 1987; Owen 2016; Woorunmurra and Pedersen 2016). Billy Oscar, one of the Senior Traditional Owners in the research team, suggested that local senior Bunuba lawmen created some of the dry pigment and scratch-work art while they 'were engaged in cattle droving and were unable to access their traditional ochre sources' (O'Connor et al. 2013:551; see Challis and Sinclair-Thomson 2022 for a comparative case). O'Connor et al. suggest that such artworks were a form of 'marking resistance'. They concluded that 'these graphic systems have been overlooked due to the visual dominance of Wanjina-style graphics or mistaken for graffiti', and they predicted 'that comprehensive survey will uncover many more dry black pigment and scratch-work motifs' in the



Figure 7. Vertical lines often described as tally marks from the Cockburn Ranges (PEN049), 7a), top left, painted; 7b), top right, drawn with dry pigment; and 7c), below, scratched. Photographs by Harper.

Kimberley (O'Connor 2013:553). Our initial fieldwork in the Cockburn Ranges in the eastern Kimberley verifies the conjecture made by O'Connor et al. for the southern Kimberley.

The diversity of subtractive rock markings in the Cockburn Ranges

We focus on presenting a preliminary overview of the diversity of subtractive rock markings from our 2021 and 2022 surveys (Harper 2021; Harper and Goldhahn 2022). The assemblage of subtractive markings is in many shapes and forms, ranging from detailed figurative artworks to non-figurative markings that can be challenging to interpret (cf. Halverson 1987; Walsh 2000:215; Watson 2008). Abraded grooves/strokes (Figure 6a) and cupules on vertical rock surfaces (Figure 6b) were recorded across multiple sites. These forms of marking have been argued to belong to the oldest rock art traditions across northern Australia (Taçon et al. 2003;

Taçon et al. 2020; Veth et al. 2017; Walsh 2000; Welch 2015) and may date from the Pleistocene (Bednarik 2008a; Taçon et al. 1997:945) or the Holocene (Wright et al. 2014:92), including post-contact times. Abraded strokes are sometimes found in vertical clusters, as illustrated in Figure 6c, and are occasionally described as 'tally marks' by Aboriginal custodians and Western researchers (Taçon et al. 2003; Welch 2015).

Interestingly, in the Cockburn Ranges, tally marks have been created with both additive and subtractive techniques, including abraded (Figure 6c), painted (Figure 7a), drawn with dry pigment (7b), and faintly incised scratches using a pointed stone implement (7c). As O'Connor et al. (2013:548) suggested, some of the latter scratching might have been created with introduced metal objects (7c). It is unclear from our assemblage if the different technologies have chronological significance or, as suggested by studies of more recent Aboriginal visual culture (see Morphy 1991; Taylor



Figure 8. Examples of subtractive rock markings from Cockburn Ranges showing different stages of deterioration, from 'newly' created to more faded ones, some are totally obliterated and no longer stand out visually against the rock wall. Note the difference between non-figurative and figurative markings, demonstrated here through depictions of probable bird tracks (PEN063). Photograph by Harper.



Figure 9. Examples of figurative subtracted artworks from Cockburn Ranges, 9a), top left, engraved wallaby (PEN006); 9b), top right, scratched anthropomorphic figures (PEN037); 9c), bottom left, scratched bird track (PEN063); and 9d), bottom right, scratched four-legged animal, probably cattle or water buffalo, length c. 26 cm (PEN037). Photographs by Harper.

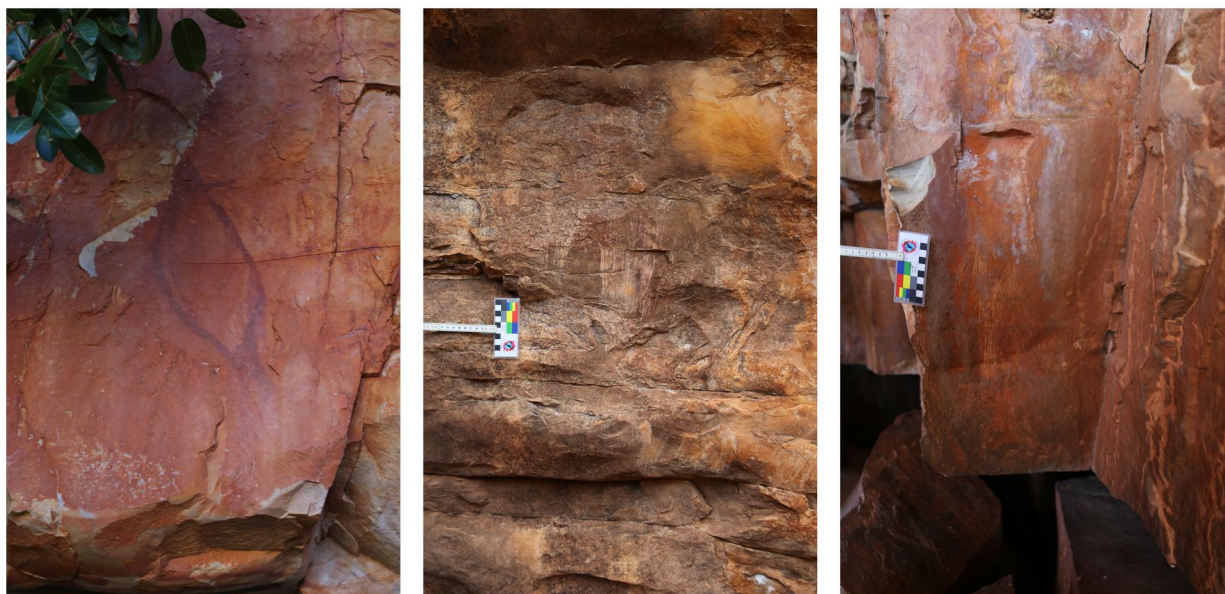


Figure 10. Example of diffuse subtractive markings from the Cockburn Ranges, 10a), left, pecking (PEN006); 10b), middle, incision (PEN027); and 10c), right, scratching (PEN044). Photographs by Harper.

1996), if the chosen technology might be of secondary importance for the meaning and significance of such rock markings (e.g. Layton 1992; O'Connor et al. 2022).

Similar markings, but with a more pronounced V-shaped profile, have been created by sharpening the edges of stones, bones, wood and, more recently, introduced metal objects and tools (Figure 8). Such markings are not always easy to detect, with natural weathering and deterioration of rock surfaces resulting in scratchwork adopting the colour of the surrounding unaltered rock walls. This is especially true if later pictographs also superimpose the markings. However, we find a wide array of such scratch-marks across the Cockburn Ranges, ranging from a single linear mark to combined complex strokes suggestive of animal tracks and figurative markings (Figure 8). If the different colours of such markings are taken as an indicator of time, as suggested by Mulvaney (2015) and others (e.g. McCarty et al. 1988; Maynard 1979), we seem to deal with a cultural practice with some significant time depth.

Subtractive figurative artworks that were recorded in 2021 and 2022 include an engraved macropod (Figure 9a), subtly diminutive, scratched infill anthropomorphic figures depicted seated with bent knees (9b), and bird tracks (9c; see also Figure 8). We also documented a few scratched yam figures. Based on the degree of the colour of the subtracted area, some of these markings, such as the macropod (9a), appear to have a considerable age, while other scratched markings seem to depict recently introduced quadrupeds, possibly cattle or water buffalo (9d). Some of the dry pigment markings have been produced by scratching stones/pigments against the rock wall (cf. O'Connor et al. 2013:544–548),

sometimes leaving both faintly subtractive patterns as well as additive figurative and non-figurative markings depending on the hardness of the chosen stone or pigment and the rock panel.

Among the more diffuse subtractive markings, we find many kinds of expressions (Figure 10; see also Figure 12), including, but not limited to: pecking on panels with pictographs, possibly created using a hammerstone (Figure 10a); and many apparent collections of scratching and/or incisions (Figure 10b). Some of these markings might once have been figurative, but deteriorating processes have resulted in their current indecipherable form (Figure 10c).

Variability was also observed around the visibility and placement of these kinds of subtractive markings. While some motifs, such as the prominent macropod engraving discussed above (Figure 9a), are visible throughout the site, there is an array of more discrete examples, such as those only visible when entering enclosed spaces. There is inferred intentionality in these varying markings, where the former falls into more traditionally understood accessible figurative art, logistically and conceptually executed with skill and finesse, while the latter is discrete, cautious, and suggestive of casual or developing execution and not aimed at a broad audience.

A manifold of recursive practices has been identified in relation to existing artworks (e.g. Kelly 2021; McDonald 2013; Morphy 2012; Motta et al. 2020; O'Connor et al. 2022). For example, some pictographs have been impacted or targeted by flaking rock edges associated with stone tool production, resulting in 'disfiguring' parts of existing images. From the direct removal of flakes, or 'edge battering', on specific artworks, with plenty of alternative rock surfaces available to create stone flakes without interfering with the



Figure 11. Examples of recursive practices from Cockburn Ranges, 11a), top left, flaked off area of a hand stencil (PEN016); 11b), middle left, outlined anthropomorphic figure (PEN052); 11c), bottom left, scratched hand stencil (PEN039); and 11d), right, scratched anthropomorphic figure (PEN016, not to scale). 11a-11c, photographs by Harper; 11d, photograph by Goldhahn.

artworks, we understand this as an intentional act and recurrent cultural practice (Figure 11a). More often, specific figures have been targeted in a way that might imply different temporalities and/or creative episodes (Figure 11b). A frequently documented practice observed was that selected parts of pre-existing figures had been scratched or incised (Figure 11c; cf. Gunn et al. 2022). In some instances, these recursive practices are concentrated over the chest of painted anthropomorphic figures (Figure 11d), which might mimic cicatrices, or Aboriginal body (art) practices known through historical and anthropological sources (e.g. Kaberry 1939; Lommel 1997; Petri 2011; Vinnicombe 1997:17). This practice of incising the

chests of painted figures has been noted in the southern parts of the Kimberley where senior Traditional Owners have identified it as mimicking cicatrices (O'Connor et al. 2022). Similar markings are close to impossible to follow and document when these extend under painted surfaces of the panels, rock walls, and ceilings. The same applies to faint scratching on existing artworks (Figures 5, 11, and 12).

Discussion

The given examples of subtractive practices recorded during our 2021 and 2022 fieldwork can be divided into four main categories:



Figure 12. An emerging anthropomorphic being created by a few lines of light scratching of the surface, superimposed over older/more faded anthropomorphic and zoomorphic pictographs. The linework has been enhanced c. 200% on the interpretation and photograph to the right for clarity. Below on the same panel, we also see some non-figurative scratching and pecking on the rock surface (PEN039). Photograph by Harper, photographic merging and outlined scratching by Goldhahn.

- i. Abraded: including lines, strokes, oval and circular grooves, cupules, and so-called ‘tally marks’;
- ii. Figurative: including pecked, scratched and carved/cut figures;
- iii. Non-figurative: including carving, cutting, flaking, pecking and scratching; and
- iv. Recursive: including scratching of images, redrawing their shapes and forms, outlining the figures, and/or targeting certain parts of, usually, pictographs with cutting, carving, pecking, and scratching.

Indeed, the combinations from these four categories are almost endless.

Some compositions appear to be single-event creations. In some instances, we can perceive the fluent hand of the artists in creating these subtractive markings, identifying where the stone or metal tools have been drawn across the rock surface (Figure 5), bumping on small inconsistencies in the rock surface, while the chosen subject matter has been outlined in a single movement (Figure 12; see also Figure 7). Some of these motifs and figures might be conceived as ‘incomplete’ from an outsider’s point of view (Figure 12). Still, the recurrent occurrences of such faint ‘unfinished’ figurative and non-figurative rock markings suggest that they served their intended purposes.

Given the diversity of subtractive rock expressions from the Cockburn Ranges presented here, we do not think it is a useful path to try to present a single comprehensive interpretation or

epistemological framework. Instead, we suggest that the presented material can be understood by different yet compatible perspectives built on a combination of emic and etic analytical insights and perspectives (Taçon and Chippindale 1998). In the following, we highlight two distinct but related perspectives: art as education and its connections to maintenance rituals.

Rock art as educational media

Our first explanatory framework for understanding some of these subtractive markings regards rock art as a form of educational media in Aboriginal communities (Goldhahn et al. 2020). In this context, the importance of children is central, but they are generally excluded in archaeological research (Lillehammer 1989, 2015; see also Baxter 2005; Langley and Litster 2018; Nowell 2021; Sofaer 2000) and, in particular, rock art research (but see Bednarik 2008b; van Gelder 2015a, 2015b; Goldhahn et al. 2020; May and Goldhahn 2020).

In her classic study from 1973, *Walbiri Iconography*, Nancy Munn describes how Aboriginal children from a very early age were introduced to graphic representations and manifestations of the Dreaming. Children were educated about important cultural stories and Beings through body paintings, chants and songs, sand drawings and material culture, and through being situated and travelling in the created world daily. Permanent and more temporary artworks, as we outsiders label such creations, constituted an intergenerational educational media (Munn 1973:58–149). In northern Australia,

rock art was sometimes created to entertain and educate young children (e.g. Mulvaney 1996). For instance, the famous Aboriginal artist Bardayal 'Lofty' Nadjamerrek described how he often asked his grandfather to tell him a story when he was a child and how, after that, his grandfather started to chant, paint, and sing (Garde 2004; Munro 2010). One reason for such educational artworks was that these accentuated the veracity of the Dreaming (Berndt 1983:30).

Artworks also functioned, and still function, as an educational tool when Aboriginal people want to educate outsiders. In the words of Ronald M Berndt (1983:29): 'I was learning about the country and its religious associations as manifested through myth, ritual and song. On their own initiative, the men who were explaining such matters to me undertook the task of representing what they were telling me in another dimension – by painting on bark'. In these and similar cases, artworks act as 'gateways' to unfold the created world and an Aboriginal understanding of the Dreaming for the audience (May 2023; Morphy 1991; Munn 1973; Taylor 1996).

While we have presented a broad array of subtractive markings from across the Cockburn Ranges, both temporally and in their form and technique, many of these may fall within this educational function. To be clear, these engravings were created with an audience in mind. We regularly found traces of people's presence in most shelters where we documented rock art. Through the rock art, we also found clear evidence of children participating in creating these artworks, most obviously through many stencils and prints of hands and feet that, judging from their size (see Gunn 2006), must have

belonged to children under ten years old (Figure 13). We have even documented the feet and hands of infants (Harper and Goldhahn 2022:96–97). We conclude, therefore, that both the additive and subtractive artworks in the Cockburn Ranges could have played a function in the intergenerational transfer of cultural knowledge for Aboriginal people utilising these areas and places.

Such inferences can also be suggested based on the form, execution, placement, and low visual impact of some subtractive markings. Many of these drawings and scratchings, speaking broadly, are found in parts of the shelter with low visibility and access. Some of these could be explained as part of a learning process of mimicking existing artworks, whether by young apprentices or children experimenting with visual culture (cf. Rivero 2016). This is particularly convincing where in prominent shelters rich with large, complex, and stylistically defined figures, most of them visually dominating pictographs, there are small hidden enclaves with discrete scratching with developing form, not visible to large audiences. Such artworks are often not executed with the same thorough linework, not finished with the same firm aesthetic control as other nearby rock art figures. We predict that if we start to record these visual expressions more thoroughly, such markings will be found in all defined stylistic groupings of artworks in the Kimberley, from different time periods, ranging from Irregular Infill Animals of the Pleistocene to many recent artworks of the Wandjina Galeru-Ungud rock art traditions.

Internationally, there has been some recognition that, of the many rock art practices we label as non-figurative, many often remain out of focus in our



Figure 13. Examples of handprints that, based on their size, must have belonged to young children (PEN016). Photograph by Harper.

analyses. Examples of this may be seen in marks that appear to have specific functions related to different materials, e.g. sharpening of wooden or stone artefacts, with the resulting marks not having the same intentionality as another battering (e.g. marking specific body parts of human and animal figures). In addition to their variability of function, intent and audience, these marks also speak to a broad swathe of time. Knowing that people have lived and practised culture in the Kimberley for at least 50,000 years (Veth et al. 2019), that Pleistocene-aged art styles are painted across the Cockburn Ranges, and that battering and other subtractive marking systems in the Kimberley are of both considerable ‘antiquity’ (Gunn et al. 2022), and more recent (O’Connor et al. 2022), we are dealing with a long period of creation that might be difficult, but important, to untangle. In doing so, we will find a manifold of rock expressions and practices that we must perceive and contemplate. Moreover, some of these markings can be expounded in the light of documented Aboriginal cultural practices (e.g. Capell 1939; Kaberry 1938).

Caring for Country

Across the Kimberley, there are various documented cultural practices of engaging with rock art to take care of Country. Most well-documented, and mainly from the western Kimberley, is the repainting of Wandjina to keep Country alive (Blundell and Woolagoodja 2005; Crawford 1968, 1973; Mangolamara et al. 2019; Woolagoodja 2020). Importantly, maintenance rituals associated with rock art come in many forms. The most common practices included—and still include—renewing and retouching rock paintings when they start to fade and lose their brilliance (Blundell and Woolagoodja 2005; Crawford 1968; Kaberry 1935, 1939; Woolagoodja 2020). Such actions were often conducted to create rain, increase women’s fertility, and procure plants and animals (Akerman 2016; Elkin 1930:262; Kaberry 1936:398, 1939:206). That said, there are several other documented practices known, including blowing water over the paintings (Lommel 1997:53–54), beating the rock art figures with sticks (Capell 1939:391), and rubbing, cutting, and scratching the images with stones (Capell 1939:390–391; Kaberry 1938; Crawford 1968, 1973; Mangolamara et al. 2019:124), most often via sharp quartz crystals. Most, if not all, of such practices were associated with calling out, chanting, and singing powerful words and songs that the particular Ancestral Being had inaugurated.

Importantly, working with the Unambal, Lommel (1997) noted practices aiming to counteract the

downpour of rain. The responsible Wandjina could then be ‘sung’ and ‘threatened with sharp pieces of wood, to the recitation of the chants used in killing’ or through being painted by the ‘medicine man’ without the ‘usual care’ but with ‘many and garish colours on it and if need be throw stones at the picture, singing the most powerful magic chants that he knows’ (Lommel 1997:54).

Not all rock art was treated in the above-mentioned ways. Some Wandjina and other Beings manifesting themselves in the form of rock art should be avoided, and touching these could bring harm or result in dangerous events (Lommel 1997:53–54; Petri 2011:74–75). At other times, rain-making rituals related to other forms of material culture were undertaken in the shelters with rock art; such as rituals utilising baler shells (Crawford 1968:24–25, 37; Petri 2011:74–75).

In this context, documented subtractive practices concerning regenerative maintenance rituals are particularly interesting. In his profound self-titled book from 2020, Yornadaiyn Woolagoodja describes how ‘scratching’ a Wandjina with a sharp quartz crystal, known as *jaddngang*, was part of the maintenance rituals in the western Kimberley: ‘Old people did this with quartz crystals over and over to wake him up so that the Wandjina can work with the people to freshen the Country and make rain for things to grow’ (Woolagoodja 2020:170). In another context, he underlined that ‘... they been doing this since the Wandjina put himself in country’ (Mangolamara et al. 2019:124). Similar practices were mentioned in research by Welch (2015) and Gunn et al. (2022) in relation to rock art from the Drysdale River area.

This is in line with Arthur Capell (1939:390) noticing that: ‘Amongst the Gwi:ni ... increase is secured by rubbing’, Gwi:ni being a northern Kimberley cultural group of Belaa language speakers, situated within the Balanggarra Native Title determination (Chalarimeri 2001).

Subtractive maintenance rituals are also documented from the eastern Kimberley, closer to the Cockburn Ranges. Phyllis Kaberry (1938:277) described how special places in the south-east Kimberley embodied the power of Ancestral Beings and how these places were used for maintenance rituals: ‘As they [The First People] passed through country they left stones, each associated with some animal, fish, bird, and which when rubbed or treated in a ritual fashion at the beginning of the hot weather, bring about an increase in their respective species’. In the Forrest River area, just north of Cockburn Ranges, the senior male custodians were responsible for retouching red rock paintings in taking care of Country (Kaberry 1935:431). The rubbing of stones was also recorded as a part of maintenance

ceremonies with both male and female custodians (Kaberry 1935:432). The primary Creator Being in the east Kimberley, is *Wolaro*, who left similar instructions for producing rain for procreating various plants and animals by the ‘rubbing of stones’ (Capell 1939:390–391). Capell (1939:391) pointed out that for the Ungarinyin (Narinyin), the term for increase, literally ‘we increase the species’, is *yauwir njadrna*, which also translates to ‘we rub them’.

Some of the ‘rubbed’ rock art figures from our case study could be interpreted with the same perspective, especially the rubbed chest of the human Being in Figure 11. This is also seen in the oval red figure with a white outline (Figure 5, to the right in the photograph), which Traditional Owner Clinton Johnstone read as a manifestation of Galeru-Ungud, or *Wolaro*, with links with the Rainbow Serpent. This figure shows apparent scratching over the ‘image’, possibly ‘to wake him up’. Further community-led research with Johnstone and other custodians of Cockburn Ranges will undoubtedly deepen our understanding of the relationship between such scratching and maintenance rituals.

One reason subtractive markings, such as those discussed here, have been overlooked in relation to rock art may be, in the words of O’Connor et al. (2022:157), that lighter ‘scratchwork’ and incisions are ‘lacking the visual command and apparent stylistic unity of Wandjina art’. They underline that the discussed ‘paintings’ have an agency of their own. Here, they refer to the late David Banggal Mowaljarlai (1992:8), a senior traditional lawman of the Ngarinyin people in west Kimberley, who once explained the significance of Wandjina Beings to outsiders in the following way:

‘Someone told me recently that ‘rock art is dead’. If ‘Art’ was dead, that would not matter to we Aborigines. We have never thought of our rock-paintings as ‘Art’. To us they are IMAGES. IMAGES with ENERGIES that keep us ALIVE EVERY PERSON, EVERYTHING WE STAND ON, ARE MADE FROM, EAT AND LIVE ON. ... Those IMAGES were put down for us by our Creator, Wandjina, so that we would know how to STAY ALIVE, make everything grow and CONTINUE what he gave to us in the first place. We should dance those images back into the earth in corroborees. That would make us learn the story, to put new life into those IMAGES. The message we read in our rock paintings is like a bible written all over our country. In those images we read HOW THE CREATOR MADE NATURE FOR US and how he put us in charge TO LOOK AFTER IT ON HIS BEHALF’.

Building on the profound knowledge of Aboriginal Elders from many parts of the Kimberley, O’Connor et al. (2022) view the scratching, cutting and lighter incisions of already present markings, or in the

creation of new rock markings, as a part of the ‘performative action’ in ‘remembering, recounting, and revitalising the narratives of creative Beings’ (O’Connor et al. 2022:166). These ways of engagement leave a visible marker, visible to outsiders later, that other performative actions do not (e.g. singing, dancing, invocation of powerful Ancestral words, etc.). The marking up of large human figures and other painted ‘artworks’ across the Cockburn Ranges (cf. Figures 5–12) is suggestive of this performative quality of memorialisation and keeping Country alive, as eloquently expressed by Mowaljarlai (see also Blundell and Woolagoodja 2005; Chalarimeri 2001; Mangolamara et al. 2019; Mowaljarlai and Malnic 1993; Ngarjno et al. 2000; Woolagoodja 2020). Based on our 2021–2022 fieldwork in the Cockburn Ranges, we conclude that such subtractive rock practices are ever-present and associated with most, if not all, art styles.

Conclusion

Given the abundance of rock art traditions and depth of occupation in this region, the diversity of subtractive markings in the Cockburn Ranges is unsurprising. However, the under-researched nature of such common markings represents neglected cultural practices that provide insight into two key frameworks: rock art as education and as intergenerational media; and how subtractive rock art has played a role in caring for the next generation and Country through maintenance ceremonies. This paper presents a preliminary overview to expose this diversity. It highlights the need to build finer-grained chronologies and identify patterns of subtractive marking within broader stylistic and cultural phases in the region.

Importantly, these cultural practices engage a contrasting set of images: from figurative creations that display aesthetic skill and recognisable motifs to abstract markings that raise more complicated questions around function, purpose, and deep-time recursive interactions with materiality—leaning on the mnemonic powers of re-engaging with rock art and place. There is evidence that such cultural practices are of considerable age (Gunn et al. 2022; Gunn and Whear 2007), and that they continued to be practised in more recent times (O’Connor 2013). In focusing on activities associated with rock art that are not necessarily ‘finished’ or considered evocative and accomplished ‘artworks’, we will not only broaden our understanding of Kimberley rock art, but we will also be able to document another variable that demonstrates long-term engagement with this media.

There has been a slow train of progress amongst researchers that rock art comprises many phenomena that often are not considered or appreciated as ‘art’ and therefore are neglected when academics

report on, analyse and interpret this media. Scratched and otherwise subtracted rock alterations in the form of both figurative and non-figurative rock markings are highly variable across style, technology, age, and subject matter and require detailed analysis, as provided to more visually obvious marking systems. Admittedly, in this paper, we have just begun scratching the surface ...

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