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Aboriginal monumental stone-working in Northern Australia during the Pleistocene

Abstract: Placements, arrangements, and constructions of large stones – most often termed ‘megalithic monuments’ – have long occupied the imagination of the global archaeological community. So-called ‘megalithic traditions’ have been studied extensively in Central to Northern Europe, and to a lesser extent in other parts of the world such as the Middle East, parts of Africa, Asia, and Oceania. Due to the nature of Australia’s relatively unique archaeological record, and assumptions about ‘hunter-gatherer’ landscapes, it has often been assumed that Australian Aboriginal populations did not (or could not) construct monumental places from stone. Drawing on transdisciplinary research conducted over the past decade, we show how large rock outcrops were carved out to create new forms of monumental architecture in Northern Australia. We track back through time these anthropically shifting shapes of monumental rock outcrops, with implications for how Indigenous communities organized and marked their worlds more than 11,000 years ago.

Keywords: *Aboriginal Australia, Arnhem Land, Australian archaeology, megaliths, monumentality, Pleistocene*

1. Megalithic monuments and the European Neolithic

Across much of the world people have placed, arranged, and built with large stones (literally, ‘megaliths’). Noticing distinctive and comparable phenomena of megalithic construction across much of the continent, European observers have long written about these shared traditions, trying to make sense of what they were all about (e.g., Camden 1610; Stukeley 1740), and how, and why, they could have spread over the long distances of their distribution (e.g., Riesenfeld 1950). In Europe, various terms (e.g., ‘dolmen’, ‘menhir’) have been used to

classify and understand anthropic uses of large stone over the years, and placements, arrangements, or constructions using large stone have been grouped as forms of ‘megalithic monument’ (e.g., see Joussaume *et al.* 2006). This term refers to large stones used in such a way as to embody ‘scale, permanence and visibility’ (Ballard & Wilson 2014: 79) and to serve memorial or place-marking purposes (Scarre 2011; Wilson & David 2002). Certainly, the megalithic monuments of Europe serve such purposes today. Megalithic monuments are locations where people can engage with and (re)imagine ‘prehistory’ (Holtorf 1998), ancestral and national pasts that speak to us of our own becoming, or of the past of

others that we interact with today. The language used to describe European megaliths has since been exported to describe superficially similar constructions worldwide (e.g., see Joussaume 1988). Archaeologists have identified and documented notable instances of large stone manipulation in disparate parts of the globe, including the Middle East (Fraser 2018), Cameroon (Asombang 2004), Japan (Mizoguchi 2013), Indonesia (Adams 2007) and Pacific island nations such as Vanuatu (Bedford 2019).

There is a long history of critical analysis in the archaeology of both European Neolithic megaliths and monumentality and their connections with megaliths and monuments elsewhere in the world. Key commentators have debated the utility of ‘megalithic monument’ as a category and have explored the often-arbitrary ways in which the term is used to group and classify forms of monumental architecture (Scarre 2004: 143; Tilley 1998). As early as the 1950s, observers such as Gordon Childe and Glyn Daniel noted that many disparate types of architecture were being described as ‘megalithic’ (see Scarre 2004: 143). These included sites where rock was extracted to create structure (such as rock-cut tombs) and large stone buildings made entirely of small blocks of stone, as well as conspicuously megalithic monuments such as dolmens (Darvill 2010; Scarre 2004: 143; Tilley 1998: 141). In recent decades, archaeologists have reconsidered the use of large stones in the context of the wider landscape (Midgley 2013; Parker Pearson 2012; Scarre 2002). Gillings & Pollard (2016: 553-556), for example, have highlighted the importance of ‘*selection, extraction, journeying and erection*’ of stones to the ‘*meanings embodied by the monumental configurations they ended up in*’. For the societies that built them, monuments embodied the interconnected cultural landscape: they were connected by visible and invisible trails to quarries, settlements, and socio-ritual events, usually of a religious nature.

Several scholars have explored the distinctive materialities of stone (Bradley 1998; Scarre 2004; Tilley 1996). Scarre (2004; see also Bradley 1998) discusses the implications of unmodified stones used in the megalithic monuments of Europe. In the Drenthe region of the Netherlands, naturally split glacial boulders were incorporated into Neolithic

dry-stonework tombs. The stones were incorporated into monuments in such a way that they contrasted (in terms of colour and texture) with the rest of the structure, and their smooth faces were oriented inwards (Scarre 2004: 146). The way they were built into monuments hints at the special ‘meaning’ and ‘potency’ of these glacial boulders (Scarre 2004: 146). For Scarre (2004: 144), analyses of megalithic traditions can reveal ‘*the attitudes of these societies to the materials that they were using*’, which may in turn elucidate their ‘attitudes or ideas about the world’. There is much to be learned from the ways in which stone structures and their materialities interplay with the landscapes in which they are situated (see also Allen & Gardiner 2002; McFadyen 2008: 313; Tilley 1996). Importantly, structures made from wood and earth were key parts of Neolithic ceremonial and funerary landscapes alongside the especially durable materiality of megalithic monuments (Hinz *et al.* 2019; Midgley 2013; Parker Pearson 2012). Hinz *et al.* (2019: 22) remind us that megalithic monuments have often been examined as though ‘detached’ from contemporaneous (and more ancient) archaeological features. Their significance in Europe’s Neolithic must be ‘*appreciated through their entanglement in the overall network of socio-cultural conditions of early agricultural societies*’ (Hinz *et al.* 2019: 21). Such observations bring to the fore the idea that monuments must be understood at many levels, commencing with fine-grained analysis of their construction, chronology, and points of articulation with the surrounding landscape, and that the category ‘megalith’ may itself be secondary to the social processes and technologies by and for which they were made.

2. Stones and monumentality in Oceania and Aboriginal Australia

Despite the increasingly nuanced archaeologies at play in current studies of European megalithic monuments, stone constructions in Oceania (New Guinea, Australia, and the Pacific islands) have suffered from comparison. As the prior discussion highlights, monumental stonework has been conceptually parcelled with the unique social and economic conditions of the European Neolithic. Implicitly or explicitly, it is assumed that stone structures could only be made by people who were ‘better organized’

(Malville *et al.* 1998) than more mobile or so-called 'egalitarian' societies, usually meaning 'small-scaled' societies not hobbled to agricultural plots, rural centres and/or centralized social powers. As Bedford (2019: 69) reflects: '*discussions of monumentality in... the Pacific and more specifically monumental architecture in stone, tends to be fixed in association with hierarchically organized chiefdoms, and that such activity would not have occurred if such social frameworks were not in place*'. These ideas were especially prevalent in the early 20th century, when European and colonial Australian antiquarians sought to explain Oceanic stone use in terms of cultural diffusion (Perry 1923; Riesenfeld 1950; Smith 1915; see discussion in Ballard & Wilson 2014: 82-84; Fraser 2018: 13-16; Russell & McNiven 1998). Riesenfeld (1950) collated a vast corpus of information on the 'dolmens' and 'menhirs' found in Pacific regions such as the islands of Vanuatu, and the smaller stone monuments of New Guinea. He suggested that a 'race' of 'stone-using immigrants' brought culture, crops, and cultivation to Oceania – but not Australia – before being replaced by 'aboriginal Papuans' in Melanesia (Riesenfeld 1950: 664-667). Systematic archaeological research coupled with changing social mores have since been unwinding such racist assumptions. Recent discoveries in New Guinea, for example, have demonstrated that agricultural practices in this part of Melanesia developed gradually and locally over the past *ca.* 9000 years (see e.g., Denham *et al.* 2003; Golson 1976; Shaw *et al.* 2020). Ethnographies, while not a window into the past (Spriggs 2008), do demonstrate that at least for the last 80 years, and in many cases longer, monumental stones were part of active place-making processes through which ancestral forces were engaged. This work is suggestive that megaliths were part of a network of sites enlivened through ritual, orality and more transient materials (Ballard 1994; Bonnemaïson 1996; Layard 1942; Rumsey & Weiner 2001).

Although Australian Aboriginal peoples and Torres Strait Islanders did not construct megalithic monuments as classically conceived, they have nonetheless been subjected to the 'remorseless logic of diffusionism' (Ballard & Wilson 2014: 83). As McNiven & Russell (2005: 165-173; Russell & McNiven 1998) have written, the hyper-diffusionist scholar William Perry (1923) erroneously suggested that there were

megalithic stone circles in Australia. Perry (1923) posited that these stone monuments were evidence that an 'advanced' 'heliolithic culture' had occupied Australia prior to the arrival of Aboriginal people. These ideas were popular but not universally accepted at the time, and by the mid-1900s the tide of scholarship was reversed as scholars re-emphasized that there was '*no evidence ... of megalithic remains on the Australian continent*' (Kenyon 1930: 71; McCarthy 1940: 184). Having been freed from association with megalithic monuments, '*Aboriginal Australians were made to represent the antithesis of megalithic culture, and the familiar nineteenth-century dichotomy of primitive (hunter-gatherer) Aborigines and advanced (agricultural) non-Aborigines was allowed to reassert itself.*' (McNiven & Russell 2005: 173)

This dichotomy re-established itself to the extent that Aboriginal people were also denied a monumental presence in the Australian landscape, in the sense that by not building large and lasting monuments, they failed to adequately mark their own presence as workers and builders of the land, a prerequisite for their recognition as worthwhile inheritors of that land. As Isabel McBryde (1963: 137) stated, Aboriginal people lacked 'monumental structures of any kind'.

At this stage, we must ask: what if Aboriginal monuments (stone or other) occur but bear little resemblance to those of Europe? Cosmologies and ontologies offer important insights into Aboriginal notions of monumentality. Aboriginal people assert that ancestor-beings formed the landscape in the cosmological past. The Aboriginal-English term 'Country' is often used to describe an interconnected and interactive landscape populated by the ancestors who endure through time. Country can speak and be spoken to; Aboriginal people care for a Country that nurtures in return (Bradley 2011: 45; Rose 2002). In the Aboriginal notion of Country there is no division between natural and cultural aspects of the landscape. Thus conceived, the landscape itself is a living monument to, and of, the ancestors (see Ballard & Wilson 2012 for discussion of this concept for Melanesia). From an archaeological perspective, it is worth noting that Aboriginal people fashioned their landscapes into durable and memorable places. In southeast Australia's Murray River plain, for

example, people from various Aboriginal language groups constructed large earthen burial mounds which served to commemorate the dead (Littleton & Allen 2020). Many of these large, built places have since been erased by generations of colonial pastoral activity across the region. The earthen monuments ‘dropped out of European consciousness’ and were ‘replaced by a trope of Aboriginal people with ... no substantial constructions’ (Littleton & Allen 2020: 9).

Although the constituent stones were seldom vast, Aboriginal people also extensively manipulated rocky landscapes (Black 1950; Kenyon 1930; McCarthy 1940). Forms of Aboriginal stone constructions include stone-walled fish traps (McNiven *et al.* 2012, 2015; Stockton 1982), circular house structures (Coutts *et al.* 1978; McNiven *et al.* 2017; Wallis *et al.* 2017), standing stones (Gunn *et al.* 2012b) and arrangements forming lines, circles, figurative motifs or cairns (Barker *et al.* 2016; David *et al.* 2004; Fitzpatrick *et al.* 2018; Norris *et al.* 2013; Law *et al.* 2017; McIntyre-Tamwoy *et al.* 2015). As the studies cited here attest, many Aboriginal stone arrangements had ceremonial and totemic associations. These durable structures reminded Aboriginal people of the actions of their ancestors and were tangible aspects of local cosmologies. Among the more spatially extensive of these stone constructions is the engineered Budj Bim Cultural Landscape of the Gunditjmarra in southeastern Australia. This landscape was recently inscribed on the UNESCO world heritage list (Smith *et al.* 2019). From at least 6600 years ago, the Gunditjmarra modified the stony basaltic (volcanic) landscapes around Lake Condah for aquaculture: to manage and harvest eel populations (Builth 2006; Coutts *et al.* 1978; McNiven *et al.* 2012, 2015, 2017). Fish trap construction involved excavation of basalt blocks and the construction of basalt walls to form channels. These modifications ‘radically altered local hydrological and sedimentation regimes’ (McNiven *et al.* 2015: 53). Archaeological analyses of Aboriginal built landscapes such as Budj Bim are already challenging Eurocentric notions of monumentality, and of ‘hunter-gatherer’ landscape use (which we note is a label rejected by many Indigenous peoples and by some archaeologists (David & Denham 2006; Smith

et al. 2019: 293). Here, we contribute to a growing body of work which investigates how Aboriginal peoples constructed and performed monumentality. We describe an instance of monumental stone working in northern Australia, where Aboriginal people created a living space by hollowing out and reshaping a vast rock shelter.

3. Nawarla Gabarnmang, a rock shelter on Jawoyn Country, Northern Australia

Nawarla Gabarnmang is a rock shelter located near the centre of the Arnhem Land plateau in northern Australia. The plateau is a ca. 32,000 km² sandstone bioregion from which emanates major waterways such as the Katherine, South Alligator, East Alligator and Mann Rivers (Figs. 1 and 2). It is home to a remarkable density of rock art and archaeological sites, few of which have ever been studied in detail (e.g., Chaloupka 1993; David *et al.* 2017b; Gunn *et al.* 2017: 303; Lewis 1988). The site of Nawarla Gabarnmang lies 400 m above sea level on the northern edge of an elevated quartzose sandstone outcrop. The rock shelter is situated in Jawoyn Country, covering much of the southern half of Arnhem Land. The Jawoyn Association – an organization which represents Jawoyn people – rediscovered the site in 2006 through a helicopter survey of remote rock art and archaeological sites (Gunn & Whear 2007). Soon after the rediscovery of the site, senior Elders Bardayal ‘Lofty’ Nadjamerrek and Jimmy Kalariya gave the name of the place as ‘Nawarla Gabarnmang’, which means ‘where the hole goes through the rock’ in the Jawoyn language. When interviewed by Robert Gunn in 2007 (Gunn *et al.* 2012a: 56), Bardayal Nadjamerrek recalled visiting and camping at the site as a young boy sometime in the 1930s. For Jawoyn people, places such as this are not just ‘archaeological sites’; they are places where their ancestors made paintings, held ceremonies, traded with nearby groups, and lived for many generations. At the invitation of the Jawoyn Association, archaeological fieldwork at the rock shelter was conducted by a multidisciplinary team of Australian and French researchers from 2010 to 2012.



Fig. 1 – Location of excavated archaeological sites in and near the study area.



Fig. 2 – Northern entrance of Nawarla Gabarnmang from the air. Note the numerous quartzite blocks on the scree in front of the shelter (Photo: B. David).

Nawarla Gabarnmang is an expansive and impressive rock shelter (Fig. 3). It measures ca. 32 m long by ca. 23 m wide and the ceiling (as it stands today) is 1.8-2.0 m in height. The immediately surrounding landscape can be divided into several geological and geomorphological zones. The main area discussed here – and referred to as Nawarla Gabarnmang – is the long overhanging east-west aligned rock shelter. At the northern margin of the rock shelter is a basin that lies some 20 m lower than Nawarla Gabarnmang’s ground floor (Fig. 2). To the south is a low-lying ‘courtyard’ area that separates the rock shelter from a vast rock outcrop, of which Nawarla Gabarnmang is a northern extension. Between the rock shelter and these two zones are piles of scree which slope downwards from Nawarla Gabarnmang to the basin and courtyard. These scree slopes comprise hundreds, and possibly thousands, of

tabular quartzite blocks of regular size, which we discuss later in this paper. The floor of the rock shelter comprises soft grey-black sediments that are protected from wind and rain by the horizontal ceiling and by the more than 50 quartzite pillars that hold it up. The ceiling and 36 of the pillars are covered in colourful rock art panels made up of hundreds of painted and stencilled motifs; the ceiling panels have been described in detail in Robert Gunn’s recent PhD thesis and subsequent book (Gunn 2016, 2018; see also Gunn *et al.* 2012a; David *et al.* 2017a; Delannoy *et al.* 2020). Much of the extant art on Nawarla Gabarnmang’s surfaces dates to within the past 450 years, though some motifs date to much older periods, including some that can be shown to be between 3000 and 14,000 years old (Gunn 2018: Table 11.2; Gunn *et al.* 2012a; David *et al.* 2017a).



Fig. 3 – The internal space of Nawarla Gabarnmang (Photo: J.-J. Delannoy).

Excavations were conducted in 2010-2012 in seven discrete zones within the rock shelter (see Delannoy *et al.* 2017: Table 10.1). Extensive Accelerator Mass Spectrometry (AMS) radiocarbon dating, and Bayesian modelling of the site's chronology, have revealed phases of site use dating to 52,160-34,610 cal BP, 36,290-4220 cal BP and 2210-0 cal BP, although the deepest and oldest levels have not yet been dated (David *et al.* 2019: 81). As such, Nawarla Gabarnmang is among the oldest and most securely dated archaeological sites in Australia (David *et al.* 2019). The earliest known evidence of Aboriginal presence in Australia has been found at Madjedbebe, which is located at the northern end of the Arnhem Land plateau. The oldest cultural deposits at Madjedbebe date to within 70,700-59,300 cal BP (Clarkson *et al.* 2017), at least 7000 years earlier than the first known use of Nawarla Gabarnmang, with the dating of the latter's undated deepest deposits currently underway (see David *et al.* 2019: 83-84 for discussion). The excavations at Nawarla Gabarnmang yielded the oldest dated art in Australia. A small (35.3 mm long) painted fragment of the rock shelter wall had fallen onto the ancient floor and was AMS radiocarbon-dated by stratigraphic association to 27,657-26,739 cal BP (David *et al.* 2013). Pieces of ochre with striations (use wear) were found in layers dating to within the period 52,160-34,610 cal BP (David *et al.* 2019: 74). Further, one of the oldest examples of edge grinding technology in the world was uncovered at the site. A fragment from a ground-edge axe was found in deposits dating to ca. 35,500 cal BP (Geneste *et al.* 2010, 2012). Older examples of edge grinding have since been discovered in Australia, including at Madjedbebe (Clarkson *et al.* 2017; see also Hiscock *et al.* 2016).

4. An archaeology of architectural space: the case for monumental stoneworking

In this chapter, following the research of Delannoy *et al.* (2013, 2017, 2020), we outline the ways in which Nawarla Gabarnmang was constructed as a monumental piece of stone architecture. The site is not an arrangement or construction from moved or quarried stones (though stone was moved within and out of the shelter). Rather, Nawarla Gabarnmang is a culturally fashioned and furnished place, made by extracting rock and modifying the

shape of an existing rock shelter with extraordinary morphological characteristics. Within the site, the durable quartzite pillars appear to frame the panels of rock art motifs located on the ceiling (and the pillars are themselves foci of the art). During the late Pleistocene, Aboriginal people had made decisions about which pillars should remain standing and where those pillars would be located. Before discussing these aspects of architectural choice and the active structuring of place, we must first explore the archaeological and geomorphological evidence for stone-working at Nawarla Gabarnmang.

Archaeomorphological research conducted in 2010-2012 aimed to investigate the spatial history of Nawarla Gabarnmang (Delannoy *et al.* 2013, 2017, 2020). There were four main facets to this research:

- (1) Three-dimensional (3-D) LiDAR laser mapping of the site and its immediate surroundings to characterize the internal and external topography of the site, and to quantify the volume of displaced rock.
- (2) High resolution geomorphological ground mapping, undertaken so that objects present at the site could be traced to their point of origin and, in turn, an investigation of the processes which caused objects to be translocated at the site. High resolution mapping of the rock shelter ceiling was also carried out so that items found on (and in) the ground could be understood in relation to the rock art panels above.
- (3) Characterization of the 17 quartzite strata that make up the rock shelter's ceiling slabs and pillars. The aim was to characterize each quartzite layer (in terms of its thickness, texture, and petrography) so that the strata could be compared with rock debris found in the excavations and on the ground. Thin section petrographic and X-ray fluorescence (XRF) analysis made it possible to identify the unique geological characteristics of each quartzite stratum (Fig. 4).
- (4) Archaeological excavations and radiocarbon dating of Stratigraphic Units (SUs) containing geomorphological objects (collapsed blocks, roof fall, etc.) and cultural materials.

Mapping of the location of the quartzite pillars and contours of the ceiling revealed striking differences

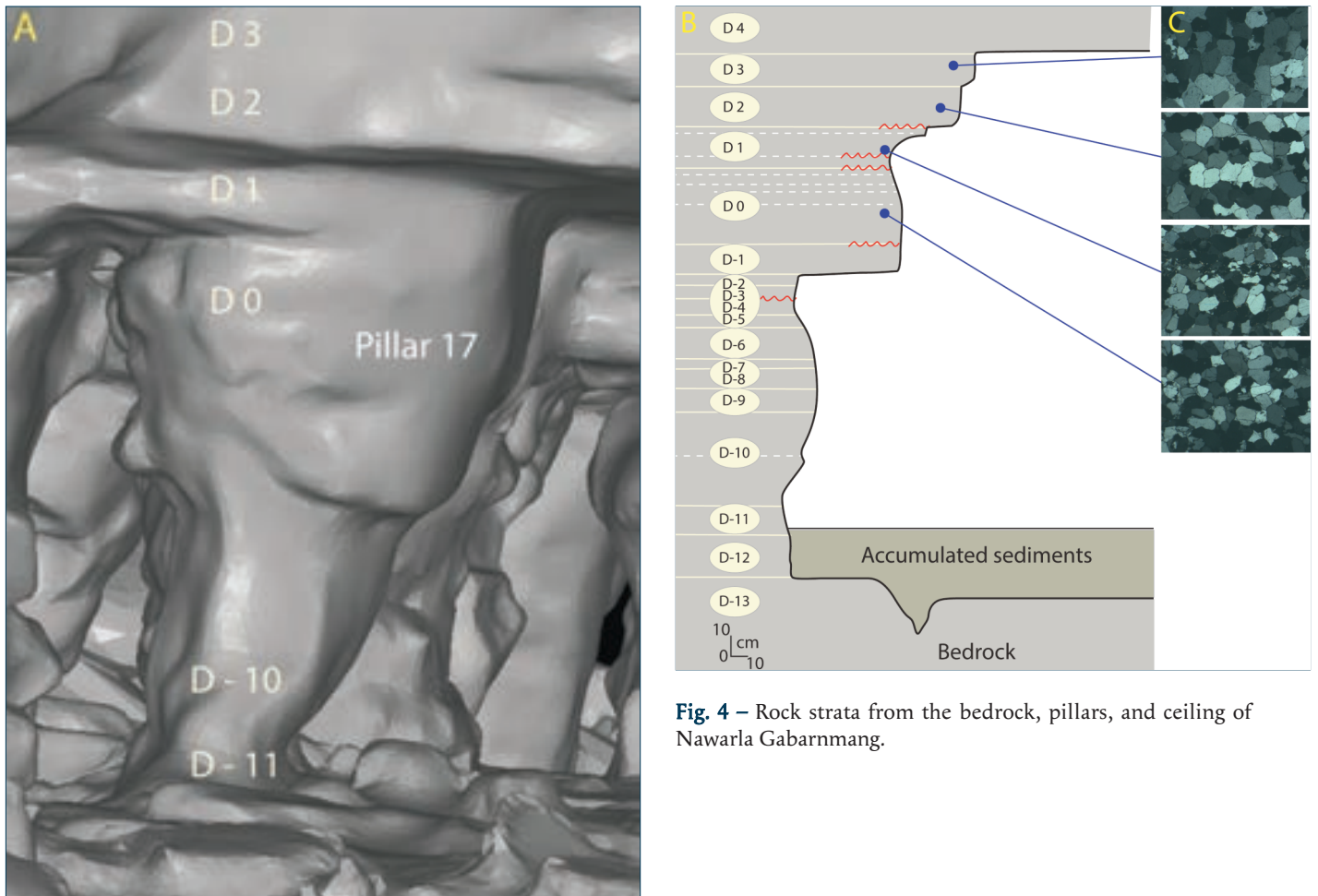
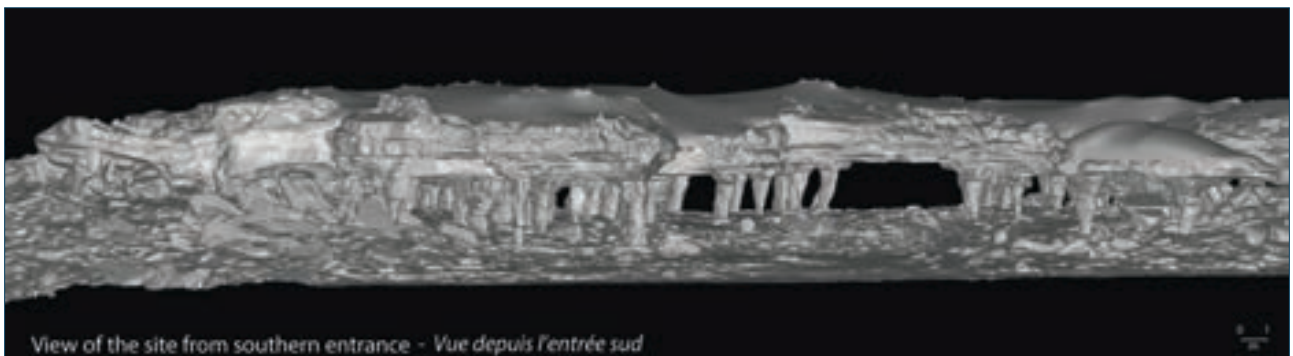
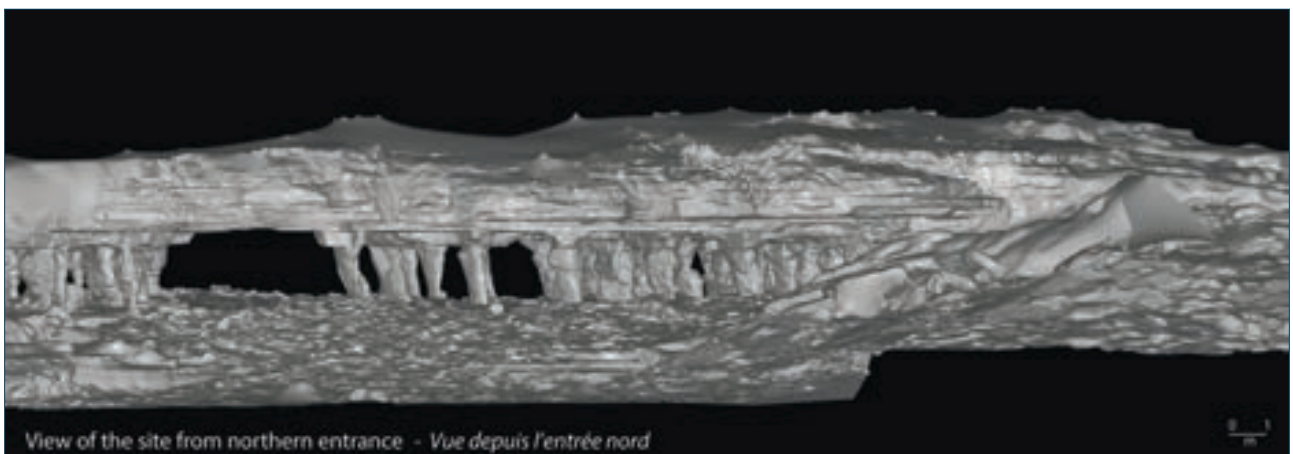


Fig. 4 – Rock strata from the bedrock, pillars, and ceiling of Nawarla Gabarnmang.



View of the site from southern entrance - *Vue depuis l'entrée sud*



View of the site from northern entrance - *Vue depuis l'entrée nord*

Fig. 5 – 3D laser model of Nawarla Gabarnmang showing the relative density of pillars inside the shelter (3D survey: B. Sadier; model processing and CAD: J.-J. Delannoy).

across the site. At the southwest corner of the site, thick forests of pillars (spaced *ca.* 1.0 m x 2.0 m apart) graduate to solid rock. Towards the southern, central, northern, and central-eastern areas of the site there is a large cavity (**Fig. 5**). There are few pillars in this zone, these being spaced up to 8.0 m apart (Delannoy *et al.* 2013). For Jawoyn today and in the recent past, this relatively spacious area is the focal point of the site, where the ‘hole goes through the rock’. Likewise, the ceiling is especially high and flat in the northern and southern sections of the site, which suggests that there has been more extensive rockfall here, where fewer pillars remain to support the roof (Delannoy *et al.* 2017: 209). Yet the floor levels below these fallen sections of ceiling are among the lowest points of the rock shelter’s ground surface. We would expect the large slabs of fallen rock to be located either on the ground or buried in the soft sediments on the rock shelter floor. Several questions emerge from these observations: why is there such a variable density of pillars across the site? In areas where comparatively more ceiling strata have collapsed, why is there so little evidence of collapse on the floor? Are the processes by which the pillarscape and ceiling formed erosional, occurring over the course of many millions of years? Or could they be anthropic, occurring within tens of thousands of years?

The geology of the local landscape provides a useful context for our investigation of Nawarla Gabarnmang’s physical structure and spatial history (see Delannoy *et al.* 2017 for details). The rock shelter together with its surrounding rock landscape is composed of quartzites that were deposited 1700 million years ago (Carson *et al.* 1999). Quartzite sandstone pillars at various stages of formation can be seen close to Nawarla Gabarnmang, including south of the site at the southern margin of the courtyard. The gaps seen today between quartzite pillars along the landscape near the rock shelter formed through processes of fracturing and slow dissolution (‘phantomization’) of the rock over the course of 120 million years (Delannoy *et al.* 2017: Fig. 10.20; see Quinif 2010 for a detailed description of ‘phantomization’).

Tectonic activity in combination with immense pressure caused the formation of narrow fissures in the bedrock. These fissures occur in a regular triple-

checkerboard pattern. The regular layout of the fissures is reflected in the spacing and orientation of the more than 50 existing pillars within the rock shelter. When mapped onto the ceiling of the rock shelter, these fracture lines enabled the mapping of where pillars would once have been located (Delannoy *et al.* 2017: Fig. 10.23). Geomorphological reconstruction of past pillar locations demonstrates that many of them have disappeared. As Delannoy *et al.* (2017: 222) explain: ‘*The rhythm and spacing of voids between pillars in sectors neighbouring those parts of the site with widely spaced pillars show that they map perfectly onto the network of fractures in the rock*’. In locations where pillars are now absent there are instead either: (a) remnant traces where a pillar was once joined to the ceiling; or (b) flat areas of ceiling where the pillar is now absent. Where there are no remnant traces of the pillars, this is either because the section of ceiling bearing the traces has since fallen, or because these traces were intentionally removed by people (see below).

5. Pillar toppling, stone removal and the maintenance of space

In the southwest section of the rock shelter there is evidence for the anthropic movement of stone and partial removal of pillars (Delannoy *et al.* 2017: 225-235, 2020). In other words, the work was not completed. As mentioned previously, the pillars are generally more densely spaced in this part of the site. The ceiling overhead is relatively flat due to a sequence of major roof fall events. Yet, unlike other areas of the site, there are still large blocks of stone on the ground here: petrographic and morphological analyses reveal that some of these stones originate from pillar strata, and others from ceiling strata. In an area designated ‘Alcove A’, analysis of a succession of anthropic rockfall events has helped historicize how the rock shelter was modified through time. In Alcove A there is a large block of stone (‘Block A’) resting on a pillar base (**Fig. 6**). Block A originated as a stratum of the rock shelter ceiling (stratum D0), which tells us two things. First, we know that stratum D0 was originally located above three other ceiling strata (D-3, D-2, and D-1). These three ceiling strata must have fallen prior to stratum D0 that capped them, but they cannot be

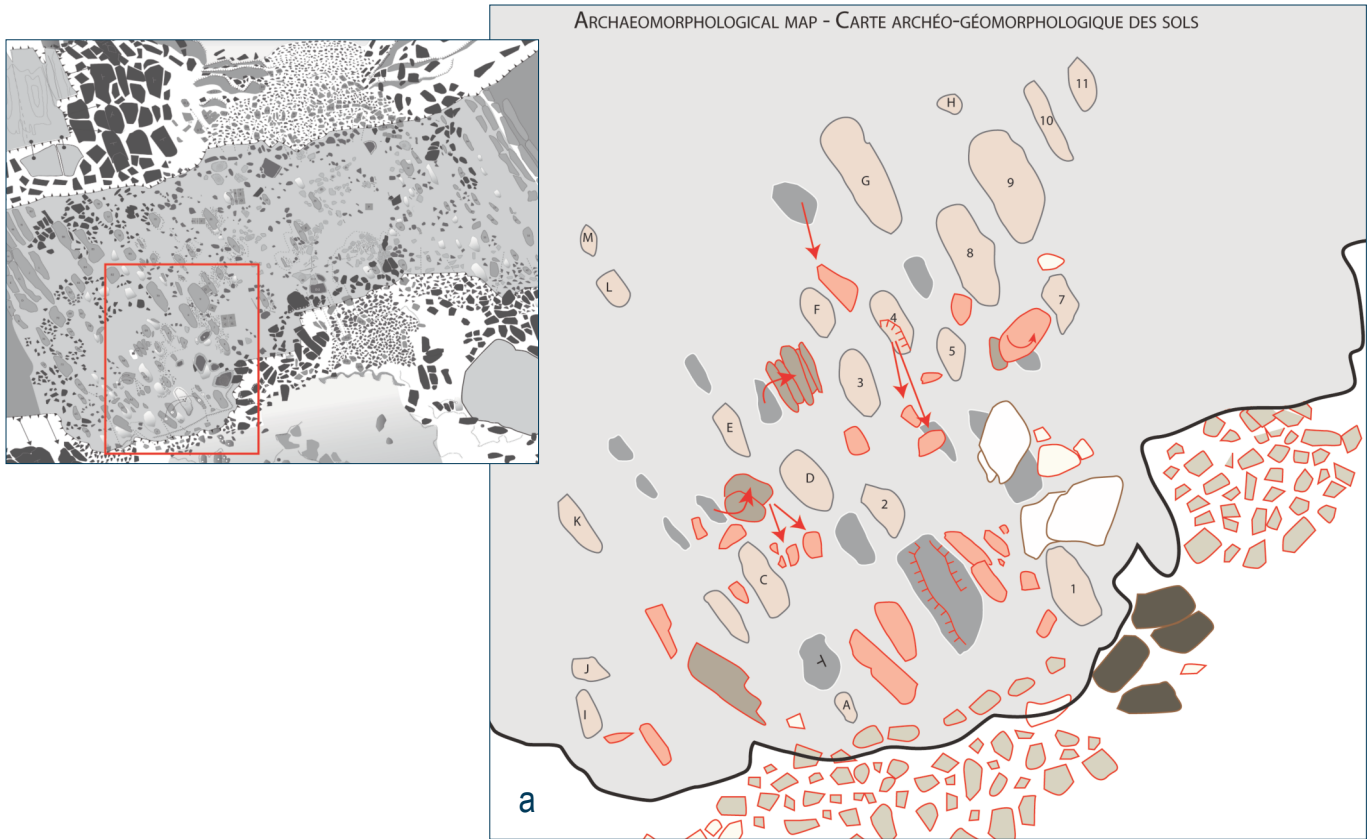
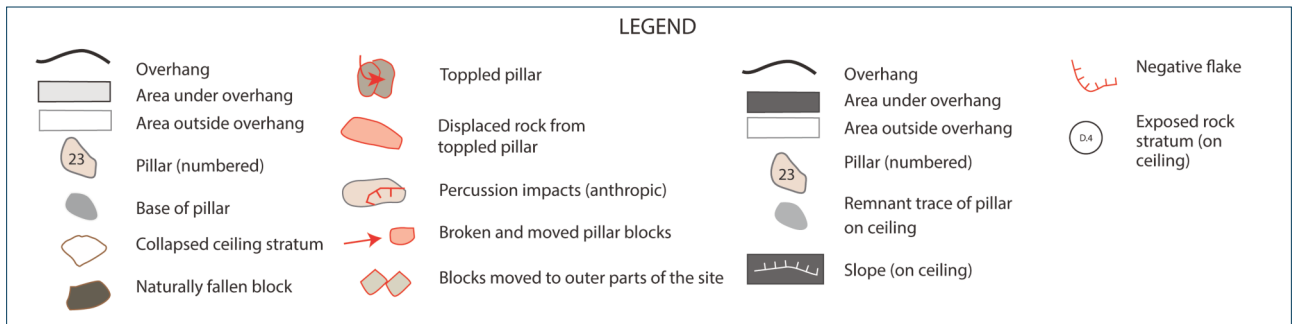
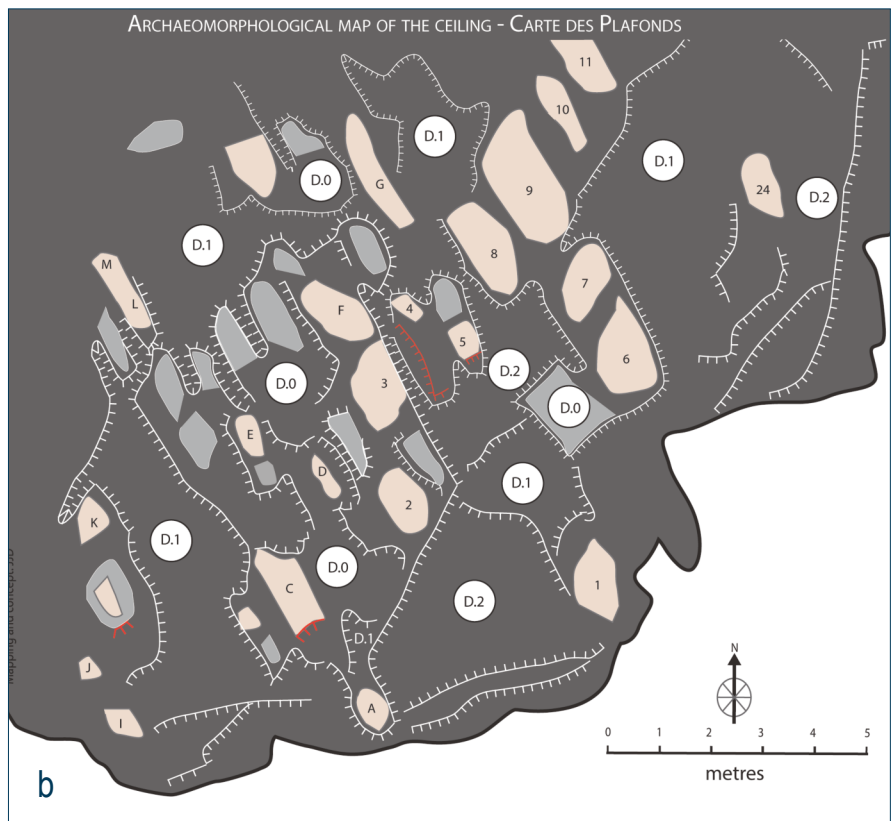


Fig. 6 – Archaeomorphological maps of the southwestern corner of Nawarla Gabarnmang, representing the area with the most recent pillar removals. a: floor; b: ceiling (Map: J.-J. Delannoy).



found underneath Block A. They had already been removed from the rock shelter floor by the time Block A collapsed. Second, petrographic analysis revealed that a partly buried block found adjacent to the pillar base is composed of strata that once sat atop the base. This means '*pillars were removed before the collapse of ceiling strata, and that they were removed to outer parts of the site*' (Delannoy *et al.* 2017: 228). Possibly, the large blocks which can still be found in Alcove A were too difficult to break up and remove. Block A has been extensively reduced by the removal of very large flakes (some conjoining flakes having been relocated a few metres away along the pathway to the southern exit of the site), apparently in an attempt to reduce its size so it could be removed.

In a nearby part of the southwest section of Nawarla Gabarnmang called 'Alcove B', and in the space between Alcoves A and B, there is direct evidence for the intentional removal of pillars by Aboriginal people. Between Alcoves A and B, we can see instances where flaking of the uppermost pillar strata is in progress (Fig. 7; Delannoy *et al.* 2017: Figs. 10.32-10.34). Percussion impact marks and negative flake scars can be seen on the uppermost pillar stratum where the pillar joins the ceiling. People were gradually reducing these layers of very hard quartzite. In this zone we can see evidence of several toppled pillars in various states of deconstruction. Invariably, the pillars that have been toppled are missing their uppermost strata, which demonstrates that people removed this part of the pillar to create a gap between the pillar and the ceiling. Once the pillar was disconnected from the ceiling, it could be toppled. In Alcove B, we can see evidence of the latter stages of this process (or evidence of a similar process of pillar deconstruction). Here, we find a pillar which has had its uppermost strata removed. Only a 70-80 cm-tall portion of the pillar's base remains *in situ* (strata D-12 to D-10). Surrounding the pillar base are pieces of rock measuring *ca.* 15-20 cm thick with percussion marks around their edges. Petrographic analysis suggests that these blocks came from strata D-9 to D-6 of the pillar they are found adjacent to. Once these pieces of the pillar were on the ground, people reduced them into smaller pieces and moved them from the positions where they fell (Fig. 6). The uppermost strata of the original pillar have already been entirely

removed from the area, as have the other pillars that are missing from Alcove B.

The archaeomorphological evidence from the southwest section of the site demonstrates that:

- (1) People intentionally removed pillars from the rock shelter.
- (2) The removal of pillars occurred prior to instances of ceiling collapse.
- (3) Once ceiling and pillar strata had fallen, people reduced the blocks into manageable sizes before moving them or removing them from the rock shelter (Figs. 2, 6 and 8).

The evidence from the southwest of Nawarla Gabarnmang helps to explain the apparent 'non-correspondence between geomorphological processes of ceiling collapse' and 'the geometry of the floor level' (Delannoy *et al.* 2017: 209) in the southern, central, northern, and central-eastern areas of the site. As is the case in the sequence of events at Alcove B, it seems that people flaked fallen stone (ceiling and pillar strata) into regular sized blocks measuring around 30-40 cm long and 10-20 cm thick, before removing these blocks to the outer edges of the site: the northern and southern scree slopes fronting the site's two entrances. Petrographic analysis of rock from the scree slopes shows that these did not originate from localized collapses of the rock shelter's overhang. Rather, they are blocks of ceiling and pillar strata from inside the rock shelter. Further, 3D laser scanning of the rock shelter and immediate vicinity revealed that the volume of rock on the scree slopes is equivalent to the volume of ceiling and pillar rock removed from the shelter (Delannoy *et al.* 2017: 235). The scree slopes themselves are anthropic accumulations.

In terms of rock use *within* the rock shelter (as opposed to removal and subsequent deposition on the scree slopes), there are three noteworthy examples. First, when senior Aboriginal Elders Bardayal Nadjamere, Peter Bolgay and Jimmy Kalariya visited the site in 2006-2008, they interpreted isolated blocks of rock lying flat on the ground in the interior of the rock shelter as 'pillows'. The men stated that their ancestors had moved the blocks to parts of the site where they slept. Further,



Fig. 7 – Upper sections of rock pillars that have been flaked during early stages of pillar removal (Photos: B. David).



Fig. 8 – Stacked and partly collapsed rock slabs that enabled access to the rock shelter's ceiling (Photo: B. David).

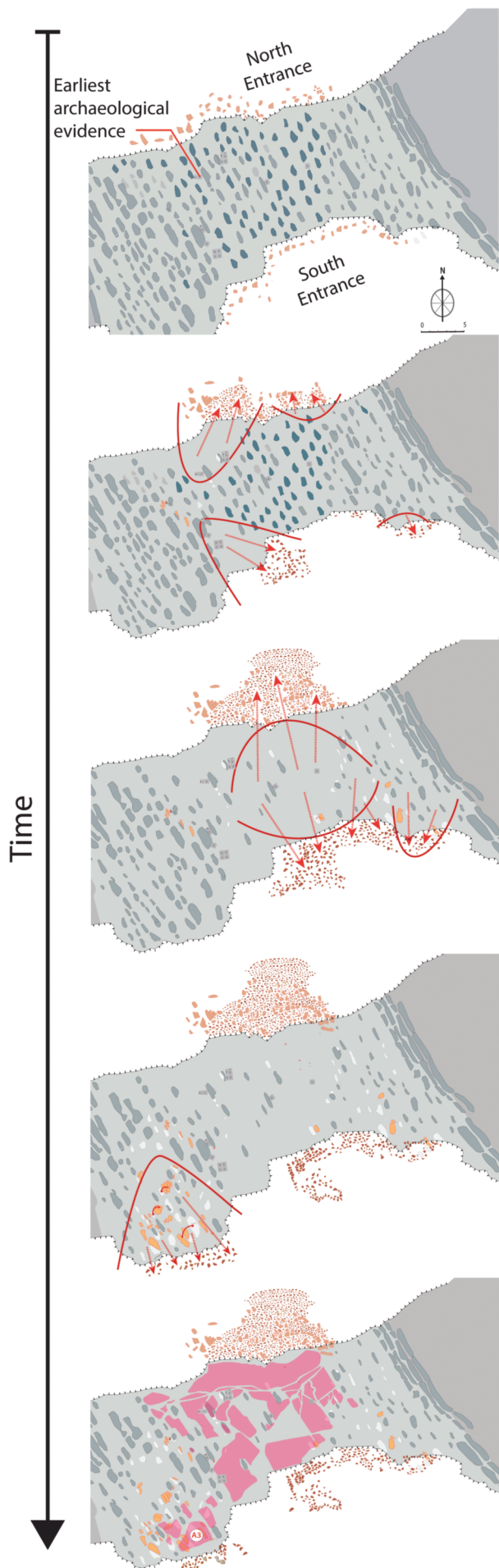
excavations at Nawarla Gabarnmang revealed that the primary material used for stone artefact manufacture throughout the cultural sequence was local quartzite (David *et al.* 2019: Table 4). There is extensive evidence that large blocks of quartzite were flaked from the rock shelter's bedrock walls and ceiling. Finally, as the floor-to-ceiling space gradually widened through time due to successive roof-fall (and pillar or block removal) events, the Aboriginal constructors of the site used stacked rocks to create stools to stand on. These stools are constructed from three to four slabs of rock, each measuring approximately 0.4 m long x 0.4 m wide x 0.1 m high (Delannoy *et al.* 2013: 26). The stacked slabs – which originated from a single ceiling stratum – were found in areas of the site where the ceiling is highest and where people flaked the bedrock or made rock art near the ceiling (Fig. 8). These modified, moved, and placed stones were used to enable further modification of Nawarla Gabarnmang.

In terms of chronology, several lines of evidence enable the timing of the anthropic modifications to be determined (Fig. 9). The earliest evidence for ceiling collapse at the site – in the form of tabular blocks found in the excavations – was found in excavation levels dating to *ca.* 35,129–33,998 cal BP (Delannoy *et al.* 2017: 237). Excavations in the northwest section of Nawarla Gabarnmang yielded blocks from a ceiling collapse event (or events) which date to between 23,909 and 21,495 cal BP (Delannoy *et al.* 2017: 237). People were visiting and using the rock shelter prior to this period, as evidenced by stone artefacts found in deeper (and older) excavation levels. Dating of rock art panels above Alcove A provide a *terminus ante quem* for when strata D0 and D1 (the upper ceiling layers) fell in this specific part of the site. A radiocarbon date of 11,624–12,024 cal BP was acquired from a wasp's nest lying underneath rock art on the existing ceiling (stratum D2) (Delannoy *et al.* 2017: 227). Thus, people removed the blocks on the floor (rock strata D-3, D-2, and D-1) before 11,624 cal BP. The radiocarbon dating of Nawarla Gabarnmang has so far provided only Pleistocene dates for periods in which pillars were toppled and blocks (re)moved.

6. Aménagement and Aboriginal Australian monumentality

The space and rock art galleries we encounter at Nawarla Gabarnmang today were formed over thousands of years by the Aboriginal people who inhabited it. People opened up the internal space through the removal of selected pillars and increased the floor-to-ceiling height by removing fallen ceiling strata. Gradually, these activities created new surfaces for living, making, and socializing. In two recent works, Delannoy *et al.* (2013, 2017) use the French term *aménagement* to describe this process. *Aménagement* is to do with the social construction of space. The making of Nawarla Gabarnmang involved not only rock extraction, but also the movement and maintenance of trimmed blocks, the arrangement of stacks and 'pillows', and the production of rock art. Nawarla Gabarnmang is a monumental stone place constructed by Aboriginal people during the Pleistocene, with other kinds of engagements and modifications into more recent times. The chronology of this engineered space is currently relatively coarse-grained, due to the difficulty of further dating the removal and deposition of stone blocks. However, we do know that these activities were taking place between *ca.* 35,000 and 11,500 years ago.

Returning to the ideas explored at the start of this chapter, the archaeology of Nawarla Gabarnmang has profound implications for how we understand Aboriginal monumentality. Like the Australian Aboriginal notion of Country – and indeed this place is part of Jawoyn Country – the site can be labelled neither in the Western dichotomy of 'natural' (as in a geological feature inhabited by the ancestors) nor 'cultural' (a structure formed by human actions) but, ontologically, lies in-between. The rock itself is inhabited by ancestral spirits of the Jawoyn who make themselves known through specific paintings and motifs (Gunn 2018: 822). In Jawoyn worldviews, even the geological expressions of the site (such as the material fabric of the quartzite rock) are metamorphosed actions of the ancestors into the present. The archaeomorphological story of the site reveals Nawarla Gabarnmang through the works of Aboriginal people across the generations, actions that transformed an extraordinary, pillared landscape through ancestral engagements.



c. 50,000 cal. BP

- The rock shelter was closed, with tightly packed pillars of low height from floor to ceiling.
- Geological rock-fall had taken place along the northern and southern edges of the site.
- People camped along the edge of the site, in more open areas where roof-fall and pillar collapses had taken place.
- The oldest signs of people (flaked stone artefacts) are highly localised, as determined by the archaeological excavations.

c. 35,000–25,000 cal. BP

- People occupied multiple parts of the site.
- Large number of stone artefacts are deposited, including fragments of edge-ground axes.
- Earliest evidence for the anthropic opening of the site in its western, northern and southern parts.
- Commencement of rock-strewn taluses at northern and southern ends of the site.
- First signs of rock art (excavated painted rock fragment c. 27,000 years old).

c. 21,500–11,500 cal. BP

- Period of major opening-up of the central and eastern parts of the site.
- Anthropic removal of pillars; collapse of ceiling strata.
- Extension of the talus slopes at northern and southern ends of site (from dismantled pillars and blocks from collapsed ceiling strata).
- From at least 14,000 years ago, expansive rock surfaces were available for painting, having been exposed by anthropic pillar removals and ceiling collapses.

Before or c. 11,500 cal. BP

- Before or c. 11,500 years ago, the final major anthropic removal of pillars took place with the opening up of the SW sector of the site.
- The SW sector is where the chaîne opératoire for the dismantling of pillars and clearing of the internal space within the shelter remains best evident.
- Rock art was created in some of the cleared sections of the site.
- Last additions to the talus slopes on the northern and southern ends of the site.

Today

- The pink infilled areas on the map (left) represent the main painted ceiling panels.
- Most of the extant rock art panels were painted in the past 450 years.
- The separation of paintings into distinct panels largely follows the creation of flat ceiling surfaces through pillar removals and subsequent corresponding ceiling collapses. The now-exposed (and largely painted) ceiling surfaces resulted from the removal of rock pillars by people at the site.

Fig. 9 – The historical sequence of rock shelter construction at Nawarla Gabarnmang.

As Tim Ingold (2000: 188) puts it: *'Building ... is a process that is continually going on, for as long as people dwell in an environment. It does not begin here, with a pre-formed plan, and end there, with a finished artefact. The 'final form' is but a fleeting moment in the life of any feature, when it is matched to a human purpose ... we may indeed describe the forms in our environment as instances of architecture, but for the most part we are not architects. For it is in the very process of dwelling that we build'*.

Nawarla Gabarnmang is a remarkable illustration of the continual process of human building-in-place. In the southern, central, northern, and central-eastern sections of the site is a cavernous space carved out for, and by, human dwelling. To the northwest, there are ceiling slabs and pillars in every imaginable state of dismantlement and deconstruction. Even after the period of intensive *aménagement* of the rock shelter itself ceased *ca.* 11,500 years ago, people continued to work on Nawarla Gabarnmang. While there was certainly rock art at the site by 28,000 years ago (David *et al.* 2013), the extant art adorning the pillar and ceiling panels is all probably more recent than 14,000 years ago, and most motifs date to within the past 450 years (Gunn 2018: 843-844). Until 1935, Jawoyn people visited and stayed at the rock shelter, lit fires and socialized, all the while contributing to the paintings and to the accumulation of soft, artefact-rich sediments on the rock shelter floor.

The monumental stone-working that took place at Nawarla Gabarnmang helps deconstruct the at-times linear trajectories of human progress suggested by global archaeological narratives. Here, monumental stone-working is to some degree associated with a period of change in mobility patterns, but this pattern runs contrary to the trajectories traditionally associated with monumental constructions. In the period 29,150-11,860 cal BP – a period that spans the onset and duration of the Last Glacial Maximum (LGM) – the site was probably visited on a seasonal

basis (David *et al.* 2019: 81). During the LGM, the climate was dry and mean temperatures were relatively low. Patterns of stone artefact manufacture and deposition suggest people procured non-local raw materials in this period, and were more mobile relative to earlier and later phases of site use. Thus, the makers of Nawarla Gabarnmang neatly fit the mobility patterns often assumed for periods of local scarcity, but their constructions challenge disciplinary assumptions of how more or less mobile populations interact with the landscape. People who had (and have) become 'the antithesis of megalithic culture' and monumental culture (McNiven & Russell 2005: 173) built places in their world in monumental stone between *ca.* 35,000 and 11,500 years ago. Even in the Australian context, we expect this case study to have a considerable impact on archaeological thought and practice. Intrinsic to the thinking of some analysts is the notion that Aboriginal people were passive recipients or transient occupiers of the world in which they lived. Few rock shelters in Australia have been reported as being culturally modified and flaked into shape, though this evidence is there when looked for (e.g., for another example from the Kimberley in northwest Australia, see Delannoy *et al.* 2020). Further, sites such as these – especially in parts of northern Australia – are at risk from encroaching mineral extraction activity (see Nicholas & Smith 2020; Wahlquist 2020) and their significance is generally under-appreciated by the wider non-Aboriginal community. As we have seen, Australian Aboriginal forms of monumentality look very different to megalithic monuments from other parts of the world. It is through fine-grained trans-disciplinary analyses especially those incorporating archaeological and geomorphological methods that such forms can be properly identified and historicized. Through this kind of research, we can seek to understand how Aboriginal people built, marked, and arranged their worlds.