Changing ecological concerns in rock-art subject matter of north Australia's Keep River region

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Abstract
The Keep River region has a complex body of engraved and painted rock-art, distinct from but with links to regions to the east, west and south. At least four major periods of figurative rock-art have been identified with differing subject matters and ages. Significant changes in depictions of human figures and animals are evident, reflecting shifts in emphasis associated with ecological concerns and environmental change. We flesh out the relative rock-art chronology by highlighting these changes, from worlds dominated by humans to those dominated by mammals and birds, and finally to a recent world of reptiles and humans. Symbolic aspects of the imagery are also considered within a larger ecological approach.

1 Placing Keep River regional rock-art in time and space

Recent multi-disciplinary research in the Keep River region of Australia's Northern Territory has revealed a rock-art sequence distinct from either that of the adjacent Victoria River region (including Wardaman Country) to the east or the rest of the Kimberley to the west (fig 1). However, influences from both directions, as well as from the immediate and perhaps the far south are detectable in various parts of the rock-art sequence. A preliminary outline of the Keep River region rock-art sequence was published in 1997 (Taçon et al 1997). The overarching outline and sequence has not changed since but further field recording has incorporated dozens of previously unknown sites, which have fleshed out the sequence and added much greater detail. Currently, a total of 18,915 individual rock-art motifs have been recorded and analysed from 117 sites. These images provide a sufficiently robust sample size to compare changes in

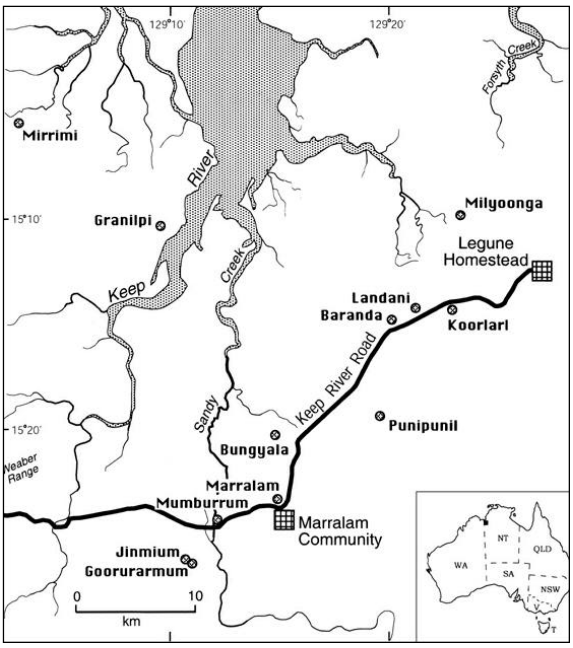

Figure 1 *Map of the Keep River study region, northern Australia*

subject matter, technique and colour preference over time. The 117 sites are clustered in three areas, the Weaber Range (46 sites) in the west, Granilpi (21 sites) in the north and Goorurarmum (50 sites) in the south of the study area. Previously recorded sites within Keep River National Park further to the south are not included in this analysis (see instead Gunn 1988; McNickle 1991). However, indications are that the rock-art sequence and subjects depicted do correspond with that of the lower Keep River area.

Two important early forms of rock-art that need better definition and placement are purple rock-paintings and pecked rock-engravings, both of which are dominated by figurative motifs. Among other things, their chronological relationship to each other needs to be ascertained, as well as estimates of age and their relationship to what seem to be more recent rock-paintings. As the purple rock-paintings include clear examples of human-like figures, resembling the so-called 'Tasselled Bradshaws', influences from the Kimberley, to the west, are evident. The pecked figurative motifs, on the other hand, have no clear links to the west or east, or to the painted rock-art. They may, however, have links to the south. It also appears that the rock-engravings were made over a considerable time period and that dual systems of engraving and painting operated at many times in the sequence, as they have in other regions, such as greater Sydney (McDonald 1991, 1994, 1998) and Cape York, Queensland (eg, Trezise 1971; Rosenfeld et al 1981; Flood 1987; Cole & Trezise 1992). An analysis of subject matter reveals differing ecological concerns reflected in engraved and painted art, as well as differences between old and recent rock-art.

2 Rock-engravings

2. 1 Proposed sequence and age estimates of Keep River rock-engravings

A total of 16,893 rock-engravings (89.3 per cent of motifs) was recorded at 74 sites (63.25 per cent of 117 sites). The vast majority of rock-engravings take the form of cupules of varying ages (15,047 cupules from 43 sites; 36.75 per cent of 117 sites). Cupules are half-hemispherical anthropogenically pecked and/or ground out hollows that occur on both horizontal and vertical rock surfaces. Cupules are rather like half a ping-pong ball and are distinct from subsistence grinding technology in size, shape and placement (see Taçon et al 1997 for details). At 11 sites (9.4 per cent of all 117 sites) 1649 abraded grooves were also recorded. These grooves are usually purposely positioned in sizeable arrangements of up to several hundred. To date, a total of 187 pecked/pounded figurative motifs (1 per cent of motifs) have been recorded at 42 sites (35.9 per cent of 117 sites). Of these, 93 are tracks or geometric designs (from 16 sites; 13.68 per cent of 117 sites), while 88 animal-, human- or object-like motifs were recorded at 32 sites (27.35 per cent of 117 sites). Also recorded are very recent scratched motifs (10 from 7 sites; 5.98 per cent of 117 sites). However, for the purposes of this paper, the human- and animal-like figures are our focus.

2.1.1 Cupules

The upper age limit of cupules in northern Australia is yet to be determined. Importantly, some cupules predate all other surviving rock-art or markings. Watchman et al (2000) report first results of direct dating attempts from Keep River cupule sites, suggesting they were made at least 5000–6000 years ago (eg, lab number OxA-7369, 5,840±65). At one site a determination of over 11,000 years BP was obtained (lab number OxA-7367, 11,050±650). However, the process needs to be repeated before such dates can be accepted. Samples collected at other sites during the 2000 field season will throw further light on maximum and minimum ages, with first results from Goorurarmum indicating one row of deep

vertically-placed cupules was made at least 1200 years ago (lab number OZE867; Watchman pers comm 2001).

2.1.2 Figurative rock-engravings

In the Keep River region, it has been concluded that figurative rock-engravings were made at various times but there is little convincing evidence, in the form of crusts or weathering, to support ages of over 10,000 BP. However, at one site an upside-down purple emu is painted over a pecked figure. If purple rock-paintings, including Bradshaws, are over 17,000 years of age as Roberts et al (1997) suggest, then this superpositioning is problematic. Figurative rock-engravings can be sorted into a local sequence at some places, with tracks, circles and map-like designs appearing older than depictions of humans and animals. This age determination is based on weathering, patination and crust formation, with the only exception being a single patinated snake-like depiction.

2.1.3 Abraded grooves

All abraded groove sites look fresh, lack patination and have no evidence of oxalate crusts. This is in keeping with the knowledge of traditional Aboriginal owners of this area, with the oldest living generation recalling the production of such abraded grooves. In composition and occurrence, they are very similar to Wardaman sites of less than 3000 years of age (see David et al 1999), although minimum ages of 7000 and 5000 BP have been obtained in the Wardaman area (Mulvaney 1975; David et al 1990).

2.1.4 Scratched figures

Scratched figures are relatively rare and always are among the most recent motifs of a site. McNickle (1991:44) notes that 250 kilometres to the south:

> the scratched line technique is most prolific in the West Baines. They are rarely recorded in the far northern regions of the VRD [Victoria River District], although on occasion very small rock-paintings appeared to have been outlined crudely by scratched lines.

McNickle (1991) observed only motifs found in recent painted art and contact subjects, including horses, sometimes with figures on their backs, and even a helicopter in the West Baines district. Farther to the south-east, in the Wattie Creek area, scratched figures are invariably of stock and station subjects (Mulvaney 1992).

2.1.5 Preliminary chronological sequence for Keep River rock-engravings

Our rock-engraving sequence is as follows:

- some cupules (potentially > 19,000–10,000 BP)
- cupules + circles, tracks, map-like designs (< 10,000 BP)
- cupules + deep, patinated animal + human figures (< 5000 BP)
- cupules + pecked animal + human figures + abraded grooves (3000–55 BP)
- scratched figures (< 150–55 BP).

2.2 Figurative rock-engravings

Walsh (1994, 2000) makes no mention of figurative rock-engravings in his key publications on Kimberley rock-art. However, according to Welch (1993), the oldest rock-art of the Kimberley consists of figurative and non-figurative rock-engravings – mostly cupule panels on vertical surfaces. Importantly, he notes that engraved figurative motifs are chiefly from the east and considers them more recent than cupules:

> Other petroglyphs in the Kimberley are not common, but appear in both figurative and non-figurative forms. For example, petroglyphs of turtles and animal tracks appear more recent than the vertical hollows discussed above, and are found in several sites in the Kununurra area (Welch 1993:101).

McNickle (1991) notes that figurative rock-engravings are scattered across the greater Keep River – Victoria River regions, an area he refers to as VRD. He claims they are mostly found in the south, being rare in the 'central northern regions of the Pinkerton Range, Collibah and Victoria River Crossing' (1991:44). Although acknowledging the Keep River region as important, he argues areas to the south have the highest frequency:

> Of the VRD regions to have been surveyed in any detail, those with the greatest distribution of pecked petroglyphs are the West Baines and Keep River regions, but the individual sites with the largest number of such petroglyphs are two sites in the southern VRD. At remote Kirkimbie Station, in the far south-west, several hundred

> pecked figures have been placed along a 100 m section of a sheer wall of a gorge, many of them so high that it is almost impossible to reach them. This may be the most prolific petroglyph site in the Northern Territory. At Camfield Station, further to the east, one site features many detached blocks scattered over a wide area, bearing small, mainly non-figurative motifs (1991:44).

McNickle's (ibid) description of the rock-engraving sites he visited is virtually identical to Keep River sites:

> Many panels contain only 'geometric' designs such as circles, ellipses, meandering lines etc, motif types that were once included in the so-called 'Panaramitee Style'. Anthropomorphs and figures of birds, mammals and fish occur also at many sites. The larger figures tend to be executed in outline only, whereas smaller figures are often fully engraved.

Similar rock-engravings are virtually unknown in the heart of the Kimberley or in Arnhem Land. One has to travel to locations further south, including as far as the MacDonnell Ranges of central Australia, to encounter similar rock-engravings. For instance, at Roma Gorge there is a pecked human hand similar to those of Granilpi, two pecked emus, a bird and snake. Figurative rock-engravings are, however, generally rare compared to tracks and geometric designs (Taçon 1992). Indeed, most of the engraved rock-art at Roma Gorge consists of circles, concentric circles, meandering lines, map-like designs, other geometric designs and animal tracks. Some resemble weathered Keep River examples, including a map or ladder-like design at Granilpi. In other parts of the West MacDonnells there are pecked lizard-like depictions, hands and anthropomorphs (eg, Worrall 1994). However, lizards portrayed as seen from above are not infrequent in Panaramitee 'rack-and-circle' rock-art (Flood 1997). Rayed anthropomorphs can be found in the East MacDonnells, including N'Dhala Gorge (Forbes 1983). They are, however, dissimilar to Keep River region figures in form, size and in terms of head features. Between the MacDonnell Ranges and Kirkimbie, there are concentrations of rock-engravings at places like The Granites. Although most motifs are tracks or geometric designs, there are some figurative motifs, including a large number of possum-like marsupials (Graham & Mulvaney 1995). The Keep River rock-engravings do not resemble engravings from the Pilbara, to the far south-west, in style, subject matter or infill technique (eg, see Wright 1968; McNickle 1984, 1985).

Lewis & Rose (1988) studied some of McNickle's southern sites, adding that 'pecked engravings' are found at approximately 15 per cent of Victoria River sites (see also Lewis & McCausland 1987).

> Consequently, the range of motifs is comparatively limited. Plain outlines and outlines filled with parallel pecked lines or with partially or fully pecked interiors occur... Subject matter includes humans, anthropomorphs, fish, reptiles, birds, animal and human tracks, and mammals (plate 11). No clear representations of the animal-headed Rainbow Snake, sorcery figures or contact motifs have been located (Lewis & Rose 1988:38–41).

In the Keep River region, figurative rock-engravings (figs 2, 3 & 4) are found at about 36 per cent of sites. As one moves east they become increasingly rare so that when one reaches Wardaman country they are found at only a handful of sites, with tracks more common than humans and animals (Flood et al 1992). Figurative rock-engravings are even rarer in the heart of Gurindji country, near Daguragu and Wave Hill, south of the Wardaman. For instance, at Seale Gorge, of 390 motifs recorded, the only pecked rock-engravings (38) consist of 25 bird tracks, some geometric designs and a scatter of small, shallow dots. There also are four abraded human figures, a macropod, fish and three unidentified motifs (Mulvaney 1992:217). Further south and east, at Kurutiti, between Elliott and Katherine, there is a complex of

Figure 2 *Large panel of animal rock-engravings being traced by Sven Ouzman (right) with assistance of Joakim Goldhahn, Granilpi*

Figure 3 *Birds are common in Keep River region rock-engravings. This one, from the Weaber Range, is part of a large panel high above the ground*

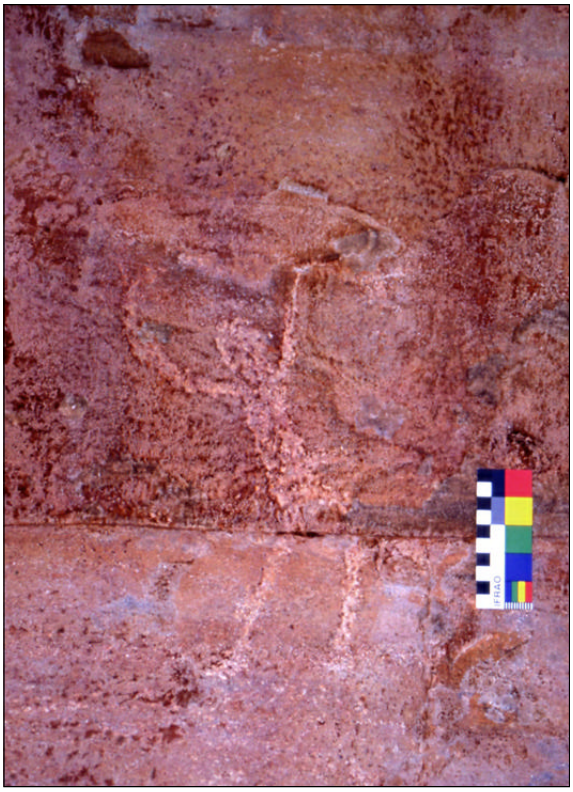

Figure 4 *An animated engraved human figure, Goorurarmum*

at least 2249 rock-engravings but only 54 are figurative (most are either geometric designs or tracks). Only 17 of these are depictions of animals, ten being snakes (Mulvaney 1997:123). Stylistically they are unrelated to Keep River rock-engravings.

Although it is evident that figurative rock-engravings were made both in recent and in ancient times, it is not yet possible to determine what their minimum or maximum ages might be. In addition, a refinement of identifying motifs produced during different periods of rock-engraving requires further study. For instance, most geometric motifs and tracks appear to have been made under different circumstances to the large pecked human and animal figures. However, some small pecked and pounded figurative motifs may have been made alongside the geometric rock-engravings. On the other hand, a few geometric motifs have a recent appearance, with little patina.

3 Pigment based rock-art and beeswax imagery

3.1 Proposed sequence and age estimates of pigment-based and wax rock-art

Pigment- and wax-based rock-art is present at the majority of sites studied (75.2 per cent). A total of 2022 motifs (10.7 per cent of motifs) was recorded. This body of rock-art was divided into 'Old' and 'Recent' periods, on the basis of style, superimpositions, weathering, colour and technique. For the purposes of analysis, 'Old' period wet-painted motifs were separated from stencils/prints. For the 'Recent' period, wet-painted motifs were separated from stencils/prints, dry pigment motifs and wax figures. However, four figures are made of both wax and paint and some figures have both wet and dry pigment-based components. Unusually, there were almost no rock-paintings that appeared to be part of a transitional phase between Old and Recent traditions.

In the west Kimberley, the oldest surviving rock-paintings of human figures may be over 17,000 years of age if experimental results from the optical luminescence dating of a mudwasp nest that overlies a Bradshaw-like figure are proven accurate and are repeatable (Roberts et al 1997). However, they might be considerably younger or, at least, made over many millennia. Indeed, there are recent age estimates of about 4000 years based on AMS radiocarbon dating of chemical deposits containing oxalates, diatoms and algal remains that were found overlying and with-

in Bradshaw rock-paintings (Watchman et al 1997). Importantly, Bradshaws are found early in Kimberley rock-art sequences, as determined by superimpositioning at numerous sites, something consistently noted by different researchers (eg, Welch 1993, 1996; Walsh 1994, 2000; Taçon et al 1997). At Carpenters Gap, O'Connor (1995) recovered ochred roof fall from deposit dated to 39,000 years ago, suggesting some form of rock-painting occurred that early but we do not know what was depicted. If we accept Optically Stimulated Luminescence (OSL) and carbon-dating results from sites such as Punipunil and Jinmium, all non-purple pigment-based rock-art may be less than 3000 years of age. A preliminary analysis of ochre deposition patterns at these and other sites (Leslie 2000) supports this contention but it needs to be followed up with analysis from more recently-excavated Weaber Range and Goorurarmum sites. Support for a recent age for non-purple rock-paintings comes from Wardaman country, to the east, where there is rock-art with a resemblance to this component of Keep River region rock-art. David et al (1999:17) have concluded 'Most of the paintings probably date to the last 3000 years BP'. This statement is based on excavation results, environmental change, subject matter and the nature of the rock-art itself. Importantly, in all eight excavated rock shelters, 'all have peak deposition rates of ochre during the last 3000 years' (David et al 1999:18).

Beeswax figures have been radiocarbon dated to between 80 – 220 years ago, but most were likely made less than 150 years ago, soon after contact with Europeans (Taçon et al 1997:958).

The terminal phase of Keep River rock-art was placed at 55 years ago (mid-1940s) following Mulvaney (1996:19) who recorded that Keep River rock-art was made 'well into the 1930s and 1940s but seems to have not continued much later'. Just prior to then, some `crude' charcoal drawings and white outline rock-paintings were made at a range of locations. There was quite a lot of rock-painting and drawing activity at some sites in the Weaber Range in the 1920s and 1930s, with many large figurative motifs added on top of earlier depictions (Mulvaney 1996).

3.2 Preliminary chronological sequence for Keep River pigment-based and wax rock-art

Based on an analysis of superimpositions, our sequence for pigment and wax art is as follows:

- purple-red object imprints, purple hand stencils, human figures, animals (various superimpositions) (>17,000 BP or > 4000 BP)
- red figures/stencils, red hand prints (< 3000 BP)
- red figures/stencils, yellow figures/stencils (< 1000 BP)
- red figures/stencils, white figures/stencils, white outline figures, dry red figures, red+white figures (< 500 BP)
- curvy red figures/beeswax figures related to sorcery (< 150 BP)
- charcoal figures (< 100–55 BP)
- white outline figures (> 55 BP).

3.3 Old purple rock-paintings

Welch (1993) is unsure whether rock-painting survives from what he has named the 'Archaic period', the first of his sequence and dominated by cupules. Walsh (1994, 2000) also considers cupules to be the oldest surviving form of Kimberley rock-art, placing them in a period of his 'Archaic Epoch' that precedes what he labels an 'Irregular Infill Animal period'. He does not associate Bradshaws with 'Irregular Infill Animals', instead separating them completely in terms of 'epochs' and ' periods'. However, both groupings of rock-art are considered to be very old by Walsh and most survive as purple or mulberry figures. Sufficient overlap and association between the two forms at Keep River sites is evident to consider them to be part of the same 'style-period'. This is in agreement with Welch's sequence as his second period, the 'period of Tasselled Figures', that includes not only 'Tasselled' Bradshaws but also 'yams, fish, macropods, grass prints, hand stencils and small figures' (Welch 1993:100). In other words, Welch lumps together Tasselled Bradshaws with motifs Walsh has placed in his 'Irregular Infill Animal period', seeing the two as part of a larger contemporaneous art body. Welch (1996:79) further notes an association between Tasselled Bradshaws and what he has labelled 'secondary stick figures' in hocker poses (figures with bent knees and arms that face the viewer – see Schuster 1951 and Taçon 1989). This is exactly the situation noted at two sites in the Weaber Range. Lewis (1997) also suggests that much of Walsh's 'Irregular Infill Animals' should be placed in the same period as Bradshaw rock-paintings. The evidence from the Keep River region supports this lumping. Thus, for the purposes of this study all of these forms are grouped together.

In terms of so-called Bradshaw figures, Walsh (1994:18) considers 'Tassel' forms to be the oldest, as do Welch (1993), Taçon et al (1999) and others. In the Keep River region, however, most Bradshaw-like figures resemble 'Tassel' forms but there are also regional differences evident (figs 5 & 6). Even a cursory comparison of the form of old Keep River human figures and those studied by Walsh (eg, 2000) to the west reveals the two sets of figures are related but sufficiently different as to best not be considered as one socio-cultural unit. Furthermore, at one site we found four examples surviving in a mustard-yellow colour (fig 7), something not reported from sites to the west. Although the two sets of figures may be close 'cousins', the term `Bradshaws' is inappropriate. Instead, we have named them `Karlinga Figures', after the indigenous name for a key Weaber Range location containing a number of important sites with both old and recent rock-paintings. In the Keep River region a total of 173 Karlinga Figures (including human and animal forms, prints and stencils; 0.9 per cent of motifs) have now been recorded at 22 of the 117 documented sites (18.8 per cent). Of these, 76 were figurative, while 97 were stencils or prints. Most of the figurative Karlinga rock-paintings are human-like (57 or 75.0 per cent of figures), with 37 of these resembling tasselled 'Bradshaw Figures', as mentioned above. In addition, a tasselled Karlinga figure has recently been reported from a site within the new extension of Keep River National Park, about 20 kilometres south of the study area (Kerin pers comm 2000).

3.4 Recent pigment-based designs

To date, 822 stencils/prints (4.4 per cent of all Keep River motifs) from 63 sites (53.8 per cent of sites) have been recorded. In addition, 702 (wet) rock-paint-

Figure 5 *A cluster of old 'Karlinga' rock-paintings is superimposed by recent red-and-white figures. Ken Mulvaney holds a two-metre scale, Weaber Range*

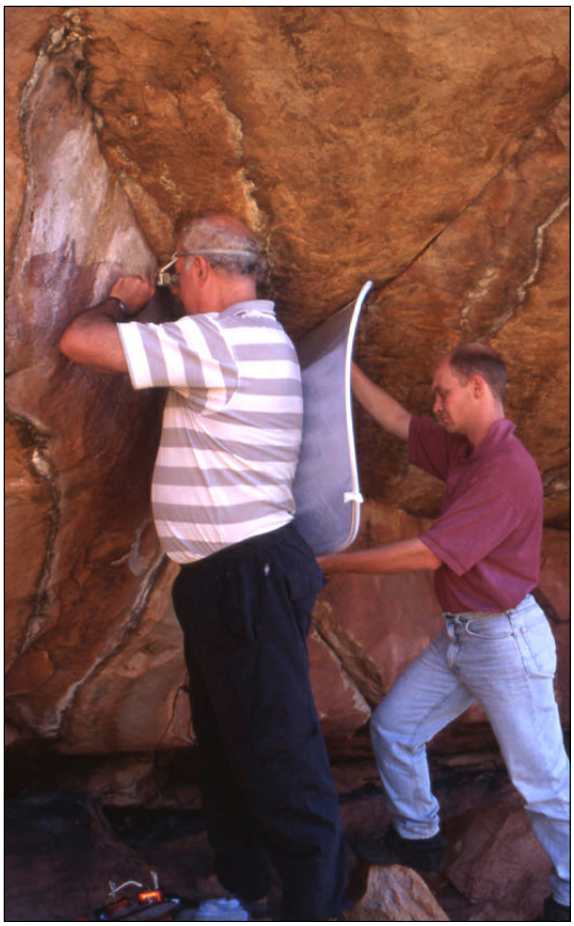

Figure 6 *Alan Watchman samples an old 'Karlinga' macropod from Goorurarmum for dating and pigment analysis, with Sven Ouzman shielding the sample collection from wind gusts*

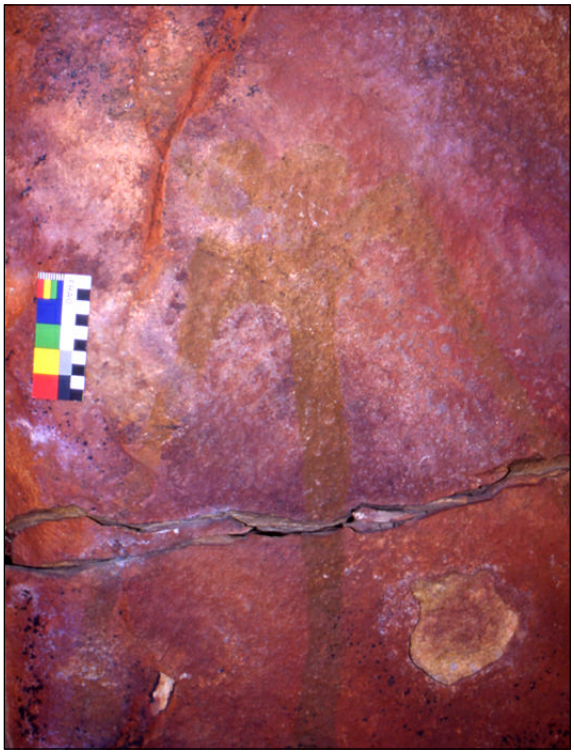

Figure 7 *An extremely rare yellow 'Karlinga' human figure with pronounced shoulders, straight arms and torso. It is similar to so-called Bradshaw or Gwion Gwion rock-paintings of the west Kimberley. Rediscovered in the Weaber Range in 2000*

ings, including four tracks, 177 lines, various geometric designs and patches of pigment, were recorded at 65 sites (55.6 per cent of sites). Further, 220 figures (1.2 per cent of motifs, including 32 lines, geometric designs or patches of pigment) made with dry pigment occur at 37 sites (31.62 per cent of sites). Most wet and dry pigment-based art is red, white or red+white. Some red rock-paintings and stencils appear much older than the majority of pigment-based rock-art in terms of weathering, subject matter, style and technique. The few yellow rock-paintings and stencils also, for the most part, appear to have been made early in the Recent period. These yellow rock-paintings and early red rock-paintings may link to Walsh's 'Clothes Peg' period (see map in fig 1 of Walsh & Morwood 1999:46) and his 'Clawed Hand' period. There are a few motifs with black but these are rare and mostly consist of charcoal 'drawings'. Most Recent 'wet' and 'dry' pigment-based designs are figurative (figs 8, 9 & 10), with subject matter that is amenable to comparison with Old rock-paintings and engravings. However, there appears to be little resemblance between recent Kimberley Wandjina rock-art and recent Keep River region rock-art in terms of style, technique or subject matter. On the other hand, there are some similarities with rock-art to the east. Comparisons with Wardaman rock-art could be fruitful in this sense.

4 Subject matter

Figure 8 *A large red-and-white rock-painting of a 'ceremony man' painted in the Weaber Range in the 1920s by rock-artist Bubble Bubble Dick*

Figure 9 *Granilpi curvy limb figures with beeswax blobs radiocarbon dated to about 150 years ago (see Taçon et al 1997:958). Thought to relate to sorcery in response to ecological and social change brought by Europeans*

Figure 10 *Reptiles, such as this goanna from a Weaber Range site, are the most common subject in the recent pigment based rock-art. Ken Mulvaney holds a two-metre scale next to the dry pigment lizard.*

An analysis of subject matter versus rock-art type revealed many differences between some types, as well as similarities between others. Differences can be observed between pecked engravings and all rock-painting types. There also are differences between Old purple rock-paintings and those made of red, white or red+white pigment. Similar trends can be seen between dry and red/white wet imagery, but both are likely part of same style period.

The general trend that can be discerned from this analysis is that the Old rock-painting subject matter is dominated by depictions of human-like figures (75.0 per cent), followed by mammals (9.2 per cent).

Reptiles make up 7.9 per cent of the sample while the rest of the categories (fish, bird, geometric) account for less than 4 per cent each. This is in contrast to figurative rock-engraving, which is dominated by mammals (44.3 per cent) and birds (22.7 per cent). Recent pigment-based rock-art consists mainly of humans (54.4 per cent) and reptiles (25.1 per cent). Within the Recent period pigment rock-art reptiles are even more common among dry motifs, making up 37.2 per cent of the sample. The dry pigment motifs are consistently found over most rock-painted rock-art and appear to have been made toward the end of the Keep River rock-art sequence. In this sense, it appears that reptiles were depicted with increasing frequency during the Recent period, reaching a peak in its last centuries, if not decades.

5 Implications

Certainly, much further work has to be done in terms of direct rock-art dating and links to the archaeological, depositional and environmental records. However, it is possible to make some preliminary observations about subject matter change in terms of Aboriginal perceptions of the environment (ecological concerns) and ties between neighbouring cultural groups. On the other hand, for most of the rock-art, the precise meaning for the actual artists is unlikely to be recoverable except for a few instances from the early 1900s (see Mulvaney 1996).

5.1 Rock-engravings and rock-painting relationships

One of the questions to answer is whether rock-engraving was part of a contemporaneously dual tradition with rock-painting or whether the two were more-or-less chronologically distinct forms of expression? This is an important consideration because if they were practised at the same time it is curious that the subject matter differs so much. This is true when taking the entire sample of rock-engravings compared to that made with pigment, or in focusing on depictions of humans and animals. Furthermore, if they were done together, as part of a larger regional tradition, the differing subject matter reflects different ecological concerns, using different techniques to express different sorts of ecological relationships. For example a 'wet' reptile versus 'dry' mammal environment, is most intriguing and not consistent with the rock-art of other regions of Australia. This situation is in contrast to that of the greater Sydney region of NSW, where McDonald (1991,1994,1998) has shown that rock-painting and rock-engraving traditions, previously thought to be chronologically distinct, certainly do overlap significantly in time and space. Her conclusions are particularly relevant here as they highlight a method for determining relationship:

> Synchronic analyses of the two extensive regional art bodies have shown that they do represent different manifestations of the same art tradition – while demonstrating inherently distinctive stylistic traits because of their techniques. As well as striking similarities in the motif preferences, similar stylistic clines and boundaries are demonstrated by both art bodies, and there is considerable congruence in their locations (McDonald 1998:323).

As noted above, in the Keep River there are significant differences between engraved and painted rock-art. On the other hand, there are stylistic similarities between some motifs and there are 21 sites that have both rock-paintings and figurative rock-engravings. However, of all the figurative rock-engraving sites (42, including those with tracks) this only represents a 50 per cent concurrence. Furthermore, figurative rock-engravings have a somewhat different regional distri-

TYPE	**SUBJECT** (figures as percentages)						
	Human	**Mammal**	**Reptile**	**Bird**	**Fish**	**Other***	**Total Number**
Old Purple	75.00	9.21	7.89	1.32	3.95	2.63	76
Engraved	11.36	44.31	15.91	22.72	3.41	2.27	88
Recent wet	58.54	4.22	20.73	5.37	9.21	1.99	521
Recent dry	43.09	5.32	37.23	4.79	7.45	2.13	188
Recent wet+dry	54.44	4.51	25.11	5.22	8.74	1.97	709

bution, being most frequent in terms of percentage of all sites recorded in the north (Granilpi) and west (Weaber Range) of the study region. This contrasts with the distribution of both the Old rock-painted figurative art and the recent pigment-based motifs. The Old art is mostly confined to the Weaber Range in the west while, as a percentage of total sites, recent motifs are fairly evenly distributed but reach a peak in the south. In terms of sheer numbers of motifs, Old rock-paintings are least frequent, figurative rock-engravings are next while recent figurative art is most common. What this suggests is that, although some figurative rock-engravings may have been made at an early time and some continued into the recent period, most were made after the Old purple rock-painting tradition but before the Recent rock-painting and dry pigment episodes. If this is true, it is curious how the ecological focus of the art has shifted from (a) humans (75 per cent of sample) with a lesser concern for mammals and reptiles to (b) mammals and birds (67 per cent of sample) to (c) humans and reptiles (just under 80 per cent). The subject concerns could relate to perceptions of changes in the environment, as well as cultural shifts in the selection of motifs for rock-art production. It also is curious that the rock-art technique employed in the particular subject depictions would oscillate so dramatically.

Other forms of rock-marking do not assist with our understanding of changes in figurative motifs as, for the most part, cupules and stencils appear to have been made throughout the rock-art sequence while abraded grooves are associated with the most recent end of the sequences. Furthermore, as Forge (1991), Rosenfeld (1997) and Flood (1999) have pointed out, these sorts of marks (cupules, stencils and grooves) resulted from very different motivations and concerns than those associated with figurative motifs.

5.2 Influences from elsewhere

Given that the Keep River pecked motifs appear to have more in common with sites to the immediate and far south, from West Baines River to possibly the West MacDonnell Ranges, they may have been made during a period of extensive ties to groups to the south. This is in contrast to the rock-painted, cupule and abraded groove rock-art, all of which has strong ties to either the west or east. For instance, older cupule sites resemble comparable clusters both east and west while abraded groove sites have arrangements that are very similar to those found across the Victoria River region, to Wardaman country and beyond to Jawoyn locations north-east of Katherine. Old purple rock-paintings have very direct connections with the Kimberley, to the west while the recent red/white wet/dry rock-art is similar to that of many groups to the east. Thus, it would be very important for future research to compare the rock-art with that of the West Baines area, especially the figurative rock-engravings. In this regard, the Kirkimbie Station gorge site is significant (McNickle 1991).

5.3 Reptile depictions

An investigation into the significance of the high number of reptile depictions in Recent period art also needs to be undertaken as reptiles are one of the three most commonly depicted animal subjects. For instance, in the recent wet pigment art, snakes are the most common animal (43 + 5 Rainbow Snakes [composite snake-like beings]), followed by goannas (25) and crocodiles (16). The same is true of the dry pigment rock-art, with snake depictions most common (27), then goannas (21), crocodiles (11) and turtles (11). Does the change from other rock-art subject matter to reptiles correlate with environmental change, symbolic change, a combination of these two factors or something else? For instance, the increased incidence of depicted reptiles may be related to a change in the ecology, with the development of wetlands in the past 1000 years making it possible for many more reptiles to exist in the environment. Thus they became more of a focus as both food and symbols. Indeed, the black headed python, sand goanna and crocodile are important local Ancestor Beings in the mythological traditions of this area. The frequency of these three creatures in recent rock-art cannot be coincidence.

5.4 Social and ecological concerns

Finally, the change in the rock-art's subject matter over time speaks of shifts in social and ecological focus. When the Old purple rock-paintings were made the primary concern in rock-art and perhaps ecology was with human figures, a tradition seemingly linked with the 'Bradshaw' rock-paintings to the west. There then may have been a period of Keep River region abandonment, as the archaeological depositional record suggests, followed by a movement of people into the area from the south (or perhaps even the now submerged north). This group

was most concerned with depicting mammals and birds, creatures characteristic of drier environments. In the Recent period, the ecological focus of the art shifted to a wetter ecology, with reptiles a special feature. There is also evidence that a significant body of the rock-art is associated with or contains depictions ascribed to the Dreaming narratives and sacred lore. At this time ties with neighbouring groups may have been primarily focused to the east and perhaps north-east, with the Wardaman of Victoria River and others near Port Keats. Certainly, both the rock-art and recent ethnography suggests this but with the arrival of Europeans ties have also become further strengthened with western peoples. The complex task of teasing out the environmental versus social influences on Keep River region rock-art has only just begun. This task is worth pursuing because it not only gives us insight into changing ecological concerns or perceptions of the environment but also changing connections between people and landscapes. Furthermore, a better understanding of regional social connections, movements of people across time and space and the development of symbolic expressions of relationship can be gained by studying the region's rock-art subject matter from different periods. The trick is to not read too much specific meaning into the rock-art but rather to see what trends are highlighted by its formal analysis. These trends can then be tested against other forms of evidence with the goal of defining a picture of past change in art, land, ecology and culture. In the process, interrelationships between these can also be better understood.

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