

# TIME AND SPACE

Dating and spatial considerations in rock art research



*Edited by Jack Steinbring, Alan Watchman, Paul Faulstich and Paul S. C. Tacon*

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Dating and spatial considerations in rock art research

Papers of Symposia F and E, Second AURA Congress, Cairns 1992

Proceedings of Symposium F,  
'THE DATING OF ROCK ART'

Edited by

JACK STEINBRING

*Department of Anthropology, University of Winnipeg, Canada*

and

ALAN WATCHMAN

*Data-Roche Watchman Inc., Québec, Canada*

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Proceedings of Symposium E,  
'SPATIAL CONSIDERATIONS IN ROCK ART'

Edited by

PAUL FAULSTICH

*Pitzer College, Claremont, U.S.A.*

and

PAUL S. C. TAÇON

*Division of Anthropology, Australian Museum, Sydney*



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*Bradshaw figures with tassels, tallest figure about 100 cm. Kimberley, north-west Australia. (Refer to article by D. Welch, Figure 2, page 13.)*

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Edited by *Jack Steinbring* and *Alan Watchman*

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KEYWORDS: Bradshaw figures - Anthropomorphs - Chronology - Kimberley

## 2

# THE EARLY ROCK ART OF THE KIMBERLEY, AUSTRALIA: DEVELOPING A CHRONOLOGY

David Welch

**Abstract.** This paper discusses methods that have been used in order to obtain a chronological sequence for some of the Kimberley rock art. A broad chronology is established using the relative ages of straight and bent-legged human figures in relationship to each other, and to the formation of silica skins and degree of weathering. Possibilities for absolute dating of the paintings are briefly discussed.

### Introduction

The Kimberley region of northern Western Australia contains evidence that people have painted on rock surfaces for thousands of years. Early petroglyphs and later dendroglyphs also occur. The earliest dated human occupation for the Kimberley is 28 000 years BP (Bowdler and O'Connor 1991), although a much earlier age of about 50 000 years was obtained using thermoluminescence dating in Kakadu National Park, 500 kilometres to the north-east (Roberts et al. 1990).

A summary of chronological art periods for the area and terminology that has been used is shown in Table 1. This paper discusses methods for relative dating of the art, and in particular provides evidence that the 'tasselled figures' (Type I) are older than the 'bent knee figures' (Type II). Prospects for future dating research are also examined.

### 1. Chronology based on pigment and silica skin formation

The most recent paintings can be seen as thick pigments on rock surfaces, while the oldest paintings have bonded to the rock and are covered by silica skins. I observed these features after studying 217 rock art sites scattered across the Kimberley (Welch 1990: 110-24). I noted that the oldest painted human figures were usually monochrome, in red. Less aged paintings, although bonded to the rock, had areas from which the pigment was missing. These were mainly straight-lined human figures, often associated with spears or a 'hooked stick' (possibly a spear thrower). The oldest paintings were bonded only to quartz sandstone, and not to granite, basalt or limestone.

Because my main interest is the study of the oldest rock paintings I have confined my studies to areas of quartz sandstone. However, it is possible that some petroglyphs occurring in the other geological formations may predate the earliest paintings.

In 1991, after I had recorded paintings at 508 sites, I considered that the data base was large enough to analyse the earliest paintings, mainly comprising human figures. Many different styles of human figure are represented,

ranging from 'naturalistic' to rigid, stick-like ones (Fig. 1). However, two types frequently appear in the area between the Gibb River Road in the south and the northern coast. Type I (Figs 2, 3) shows straight-legged human figures, usually without weapons but portrayed with tassels hanging from their bodies, tapering headdresses, bracelets and simple belts (possibly made from string or hair). Type II (Figs 4, 5, 6) consists of human figures with legs bent at the knees, generally with a projection from their upper arms (sometimes looking like an epaulet), headdresses with a knobbed end, thick forearms (possibly representing many bracelets), holding 'boomerangs' but no 'spears', holding a possible fly-whisk, and having a waist appendage (possibly a skirt or a bag). This simplified typology ignores regional variations which are the subject of discussions elsewhere (Welch 1993).

My hypothesis is that Type I paintings are older than Type II paintings, and in order to prove this I have looked at the following five ways of dating the paintings. At this stage in my study of the Kimberley rock art, I call the Type I figures 'tasselled figures' and the Type II figures 'bent knee figures' (Welch 1993).

### 2. Chronology based on weathering

Most of the other human figures which do not fall into Types I and II appear to be younger in age. Yet, some seem very old and may have been painted at the same time or even before these two main types. In order to analyse the features of these oldest human figures, each painting was categorised as either 'Type I', 'Type II' or 'Other'. The degree of weathering and the characteristic features of the figures were also noted. The percentage of each painting lost due to exfoliation of rock with pigment was recorded. In this way, the predominant features of each painting used in stylistic analysis could be correlated with an index of weathering and an estimate of apparent age (Table 2). From the bottom of the table it can be seen that 33% of Type I figures have exfoliation, compared to 25% of Type II and 22% of 'Others'. Of the figures that are exfoliated, the average portion of the figure that is exfoliated is 21%, 22% and 20% for each group. The average percentage of uncertainty (weathering of pigment

and/or rock) reveals a score of 38% for Type I, 32% for Type II and 22% for 'Others', suggesting the depictions of human figures in Type I are older than the other paintings. This trend is interpreted as representing a chronological sequence of paintings because in my previous study of the later 'bichrome art period' human figures, I noted that exfoliation of rock had occurred in only 7.5% of these (Welch 1990: 112).

### 3. Chronology based on superimposition

Superimpositioning of paintings is a useful tool for developing a chronology of rock art, and the Kimberley region contains many suitable examples for analysis. In the analysis of the oldest paintings where there is no 'free' pigment, the determination of superimposition is unreliable because it is difficult to record which pigment overlies another. Thus, examples were sought where a section of one painting has exfoliated and a later painting has been applied to partly cover that exposed rock. Although 'bichrome' figures are found over Type II monochrome figures (Fig. 5), no examples have been found of Type II figures painted on rock which has exfoliated from a Type I figure. Only three examples were recorded of Type II figures superimposed over very faded Type I figures (Fig. 6).

Many of the earliest paintings were painted around, rather than over-painted. It is not until apparently later that considerable over-painting occurred. An example of a variant of Type I superimposition is illustrated in Figure 7, but close examination of the rock surface reveals equal exfoliation of the rock below both types of paintings. It was therefore not possible to determine which was the older painting at this site. Other examples of superimpositions are shown in Figures 8 and 9.

### 4. Chronology based on spatial arrangement of the paintings

In terms of a spatial analysis of the early human figures where Types I and II occur together on the same panel, the few examples found do support the hypothesis that Type I is older than Type II. For this to be true it must be assumed that the first artist using the site painted near the centre of a blank rock panel and subsequent artists added their paintings to the sides, above and below. A complication with this reasoning occurs when the painted shelter has a deep archaeological deposit in which the earliest art is probably one or more metres below present-day ground level.

Only 14 of the 508 sites studied contain both Type I and Type II human figures. Four sites contain Type I and II figures in equally prominent positions. Three sites contain Type II figures superimposed on faded Type I figures, as mentioned above. However, seven sites contain centrally positioned Type I figures and distally positioned Type II figures which, if one accepts spatial analysis theory, supports the hypothesis that Type I figures were painted before Type II.

In Figure 10 the centre of the panel features weathered Type I human figures with superimpositions of 'bichrome figures' with 'hooked sticks'. To the top left and right are Type II human figures. Below the central figures are small 'bichrome figures'. Elsewhere on the panel the thickly applied pigments are evidence of more recent paintings.

In Figure 11, Type I figures dominate a large rock face which also contains grass prints that are either the same age or possibly younger than the human figures. Less

elegant figures, heavily weathered in less durable pigment, appear to be superimposed over the Type I human figures. To the left of this panel, further into the shelter and on an irregular rock face, Type II human figures are depicted carrying 'boomerangs' (Fig. 12). Other human figures with knobbed headdresses were painted still further to the left in the shelter. These figures are classified temporarily as 'Others' for the purpose of statistical analysis. More recent paintings in Figure 12 include superimpositions of a lizard-like figure and a 'bichrome', pre-Wandjina anthropomorphous figure (Welch 1990: 121).

### 5. Chronology based on the content of the paintings

The Tasmanian tiger (thylacine) inhabited mainland Australia until about 3000 years ago and paintings of it are seen in the rock art of Kakadu National Park (Lewis 1977, 1986; Murray and Chaloupka 1984; Welch 1982: 30-31), and petroglyphs in the Pilbara region in Western Australia (Wright 1972). Only one doubtful example of a possible thylacine depiction was found in this study (Fig. 13). The stripes across the body, marsupial genitalia, five-toed hind paw and exaggerated jaws are features which characterise other northern Australian paintings of thylacines (Lewis 1977, 1986; Murray and Chaloupka 1984). The stripes on the macropod lower down the panel belong to a separate painting. The 'thylacine painting' is rather crudely executed on soft sandstone in the Kununurra area and does not appear to have the great age of the human figures discussed above. This supports the belief that much of the so-called later or recent art is at least several thousand years old.

The use of material culture items such as the 'hooked stick' (probably a spear-thrower) has already been discussed (Welch 1990). I had hoped that the oldest human figures were not associated with boomerangs, as this would indicate an age before boomerang usage. Most human figures in Style I lack boomerangs, but they also lack spears and other weapons. There are two possible reasons for the absence of weapons. Firstly, artistic convention may have simply excluded depicting them: the people portrayed may be engaged in activities not involving weapons, they may be ceremonially attired etc. Secondly, the figures may have been painted as bichromes, with weaponry painted in another pigment, such as white clay, which has since weathered away.

Supporting this second possibility is the existence of some examples of Type I figures with missing fingers and 'boomerangs' beside the hands (Fig. 14). In some examples, these figures have their legs bent at the knees, a characteristic feature of the later artistic style, and so they may have been painted after other Type I figures. As the sample of these paintings is too small at this stage it is difficult to place them accurately in the Type I chronology. I accept that the proposed nomenclature of my 'monochrome art period' may include some bichrome figures. Whatever nomenclature is used to describe the Kimberley rock art, exceptions will always occur when such a large corpus of art exists.

### 6. Chronology based on absolute dating

Four possible methods could be used to date Kimberley art absolutely. Firstly, occupation sites exist where large chunks of rock bearing old paintings have fallen and become partly buried in the deposit. Radiocarbon dating of charcoal from levels below these rock falls would give

a minimum age for these paintings. Secondly, and more significantly, the eyes of recent Wandjina figures have been painted with charcoal. Traditional Aboriginal practice was to repaint these sites when the Wandjina figures became faded, or to ensure that a good wet season would follow. In most cases, a bright white pigment (huntite) was spread over the faded image, and then the figure was repainted. With repetitious repainting over time some of these paintings have become 1 cm thick, and alternating layers of charcoal and white pigment are found in the eroding eyes of Wandjina figures. In many of these figures the charcoal weathers out of the eyes. In another case, the whole face, thick with many layers of pigment, is lifting from the rock and when this falls to the ground and disintegrates, the datable material will be lost. Absolute dating of Wandjina figures could be obtained by taking minute samples of charcoal from deteriorating eyes and obtaining a series of dates from different levels of paint (McDonald et al. 1990). In this way, spurious dates from older charcoal are more likely to show up when dates are obtained for all paint levels.

Thirdly, trace amounts of algal and bacterial fatty acids in the silica skins may be radiocarbon dated (Watchman 1992). Such an approach would provide minimum limiting ages for the oldest paintings covered by silica. This way the Type I ('tasselled figures') and Type II ('bent knee') figures could be dated.

Finally, some old figures are painted in what now appears as 'mulberry' to black pigments. This is especially evident in the Type II figures, where 84% of them appear this way. If this dark colour is due in part to blood, charcoal, plant dye/juice, or some other organic substance it could be radiocarbon dated (Loy et al. 1990). It appears that these pigments were selected or made to give greater visual impact to paintings on light-coloured quartz sandstone. This may have been a specific development which

occurred after many of the Type I figures had been painted using red pigment, and which gained peak usage at the time of the Type II artists. If the oldest painted art is to be dated I suggest starting with the mulberry-coloured 'bent knee' figures.

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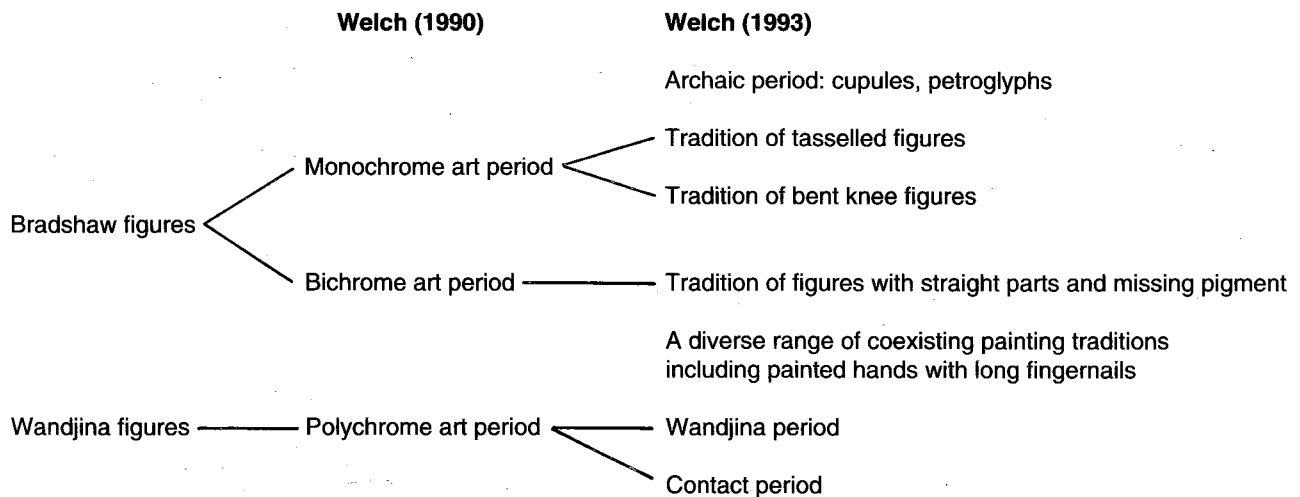


Table 1. Chronological divisions of Kimberley rock art.



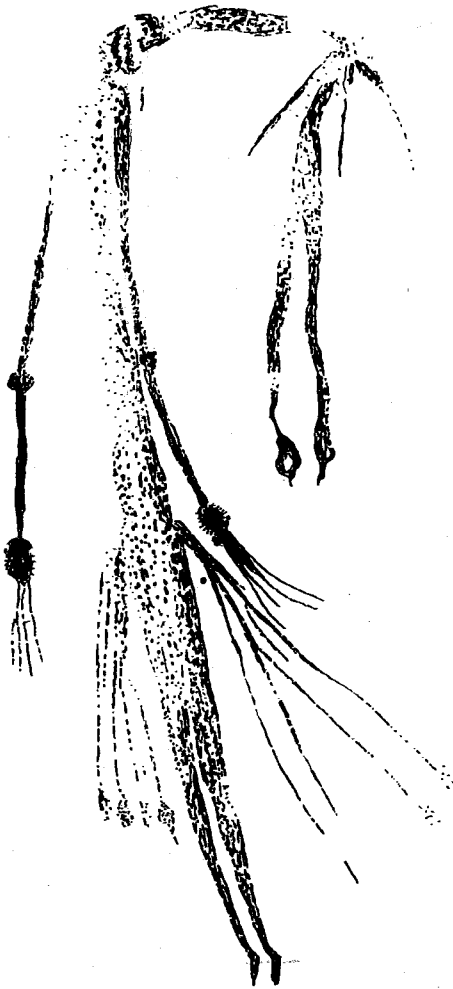
D. WELCH

Feature	Type I		Type II		"Other"		Feature	Type I		Type II		"Other"	
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%
Total number of figures	209		154		202		Tassels from Waist present	128	61	1		27	13
Colour: Red	115	55	11	7	73	36	Weathered	64	31	52	34	50	25
Yellow	3	0	0	0	0	0	Other tassels(holding etc)	20	10	0		1	
Orange	6	2	2	0	0	0	Weathered	87	42	50	32	37	18
Red-Brown	8	1	1	0	0	0	Dilly Bag/Pendant from neck or shoulder						
Brown	26	12	11	7	22	11		10	5	24	16	11	5
Mulberry	46	22	107	69	81	40	Weathered	81	39	52	34	45	22
Black	5	2	22	14	26	13	Holding triangle-shaped object ( ? fan or fly whisk )	22		60	39	6	3
Head Orientation: Profile	92	44	113	73	75	37	Holding Dilly Bag/Pendant	8	4	2		2	
Frontal	41	20	32	21	100	50	Holding and hanging objects						
Weathered	76	36	9	6	27	13		8	4	14	9	1	
Body Orientation: Profile	64	31	103	67	50	25	Waist: Belt (Hair/String)	97	46	47	31	50	25
Frontal	119	57	41	27	147	73	Small Skirt/Apron/?Bag	120	57	2		18	9
Weathered	26	12	10	6	5	2	Two Skirts/Aprons	2		51	33	11	5
Legs bent at knees	17	8	86	56	15	7	Wide Skirt	0		0		31	15
Average degree of bend	26°		32°		39°		No Skirt or Belt	4		20	13	52	26
Weathered	62	30	32	21	29	14	Weathered	68	33	51	33	35	17
Headress: Tapered end	53	25	8	5	25	12	Paunch shown	75	36	23	15	17	8
Tassels present	36	17	4	3	12	6	Weathered	64	31	41	27	24	12
Knobbed end	30	14	78	51	27	13	Toes shown	3		1		2	
Pendant present	8	4	53	34	10	5	Weathered	108	52	62	40	90	45
Bun present	0	0	8	8	8	8	Female form (Breasts present)	0		0		7	3
Other headresses	14	7	5	3	26	13	Number of figures exfoliated	69	33%	39	25%	47	23%
No apparent headress	12	6	4	3	42	21	Average percentage exfoliated	21%		22%		20%	
Weathered	97	46	40	26	63	31	Average percentage weathered	38%		32%		22%	

**Table 2. Analysis of early 'monochrome' human figures.**  
 It should be noted that when this analysis was undertaken, a few figures with wide, full skirts were placed into the 'Others' category. Some of these may actually belong to one of the other two categories. The same may be the case for other characteristics, but as the number of figures is small, the relative ages of the two groups should not be affected significantly.



*Figure 1. Early paintings include stick-like human figures. Mulberry colour, 13 cm.*



*Figure 3. Tasselled red human figure, Mitchell Plateau, 70 cm. (Please note that Figure 2 is located on page v, Frontispiece.)*



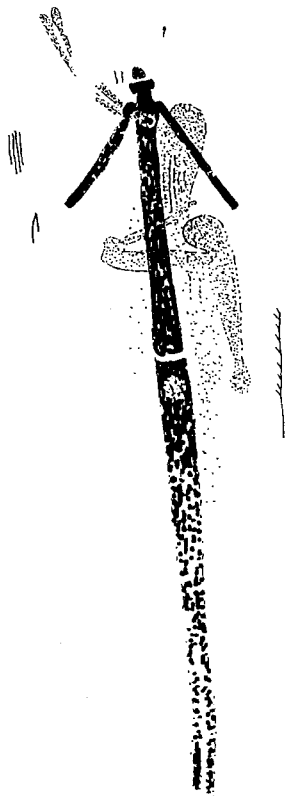
*Figure 4. Mulberry-coloured human figure with 'boomerangs', thickened forearms, waist appendage and bent knees, 55 cm.*



**Figure 6.** 'Bent knee' human figures of Type II superimposed over faded earlier human figures (Type I) with thin arms, bracelets and fingers seen in centre and at right. Largest figure 125 cm.

**Figure 7.** Three different types of 'tasselled figures' have similar exfoliation. The complete figure is 65 cm. Orange circles lower in the panel appear fresher.

**Figure 5.** A 'bichrome' figure, shown here in outline, is painted over an exfoliation scar from a 'bent knee' figure, 50 cm. (Please note that this Figure is located on the front cover of this volume.)



**Figure 8.** 'Bichrome' human figure, 90 cm long, with incomplete 'spears' and a 'hooked stick' superimposed on 'tasselled figures'.

**Figure 9.** A thin anthropomorph, 86 cm long, with large, rayed headdress is superimposed on a 'bent knee' figure.

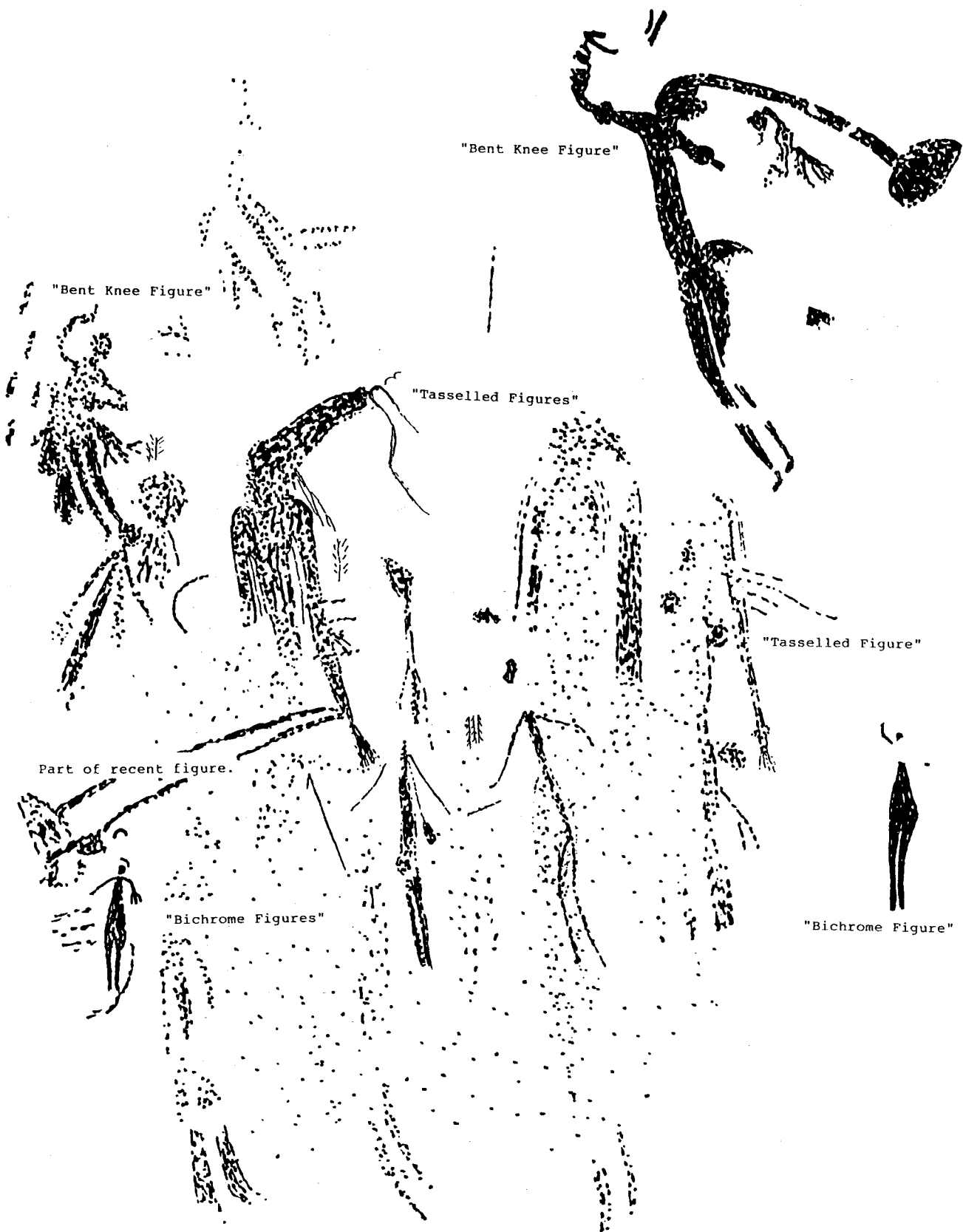


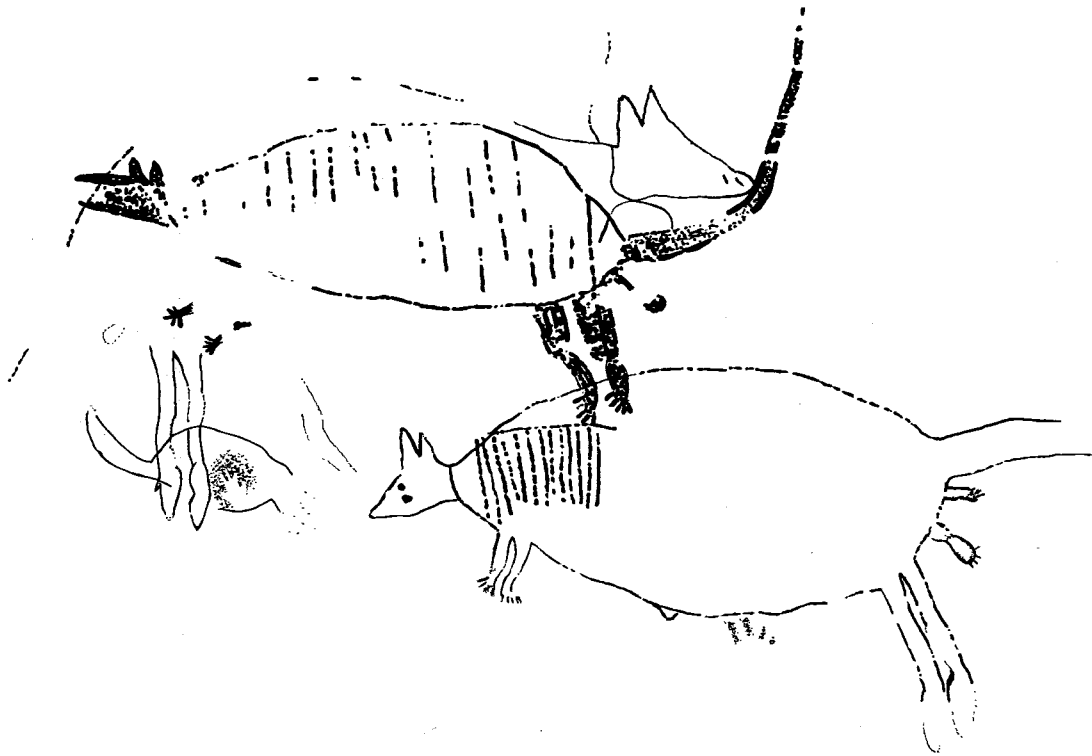
Figure 10. 'Bent knee' figures and 'bichrome' figures are painted around and over earlier, weathered 'tasselled figures' in the centre. Top right figure is 70 cm.



*Figure 11. Human figures with tassels from elbows and waists. The large central figure and the sloping figure to the left appear more recent. Fine grass prints are also present. Figure at right is 73 cm.*



*Figure 12. 'Bent knee' figures with 'boomerangs', 'epaulets' and waist appendages. Bottom figure is 51 cm.*



*Figure 13. Possible thylacine (Tasmanian tiger), 187 cm long, identifiable by its stripes, hind paws and large jaws which clearly distinguish it from the surrounding macropods.*



*Figure 14. Human figures without fingers, and with 'boomerangs' beside the hands. The lower right figure appears more recent than the others. Figure at left is 82 cm.*