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ROCK ART RESEARCH

Volume 5, Number 1

MAY 1988

The journal *Rock Art Research* is devoted to developing theory and methodology for the systematic and rigorous understanding of this form of human expression. It is supposed that rock art is the major surviving record of the nonmaterial aspect of prehistoric cultures, that which primarily defines any culture. Rock art is believed to be better suited than the study of the material aspects of prehistoric life, for detecting cultural change or continuity.

Although this journal is concerned principally with the Australasian region, the subject served by it is characterised more by its goals and approach than by its geographical bounds. Emphasis is given to communication across the various disciplines related to the study of rock art, and to synthesising related subjects around its focus: the surviving externalisations of prehistoric world views.

Contributions should be consistent with these general goals. Notes for contributors can be found on the inside of the journal's back cover. All articles submitted will be refereed; authors will receive a summary of the referees' comments, plus an editorial view. While final responsibility for the acceptance or rejection of an article rests with the Editor, responsibility for opinions expressed, or data introduced, always rests with the author.

Selected manuscripts will be sent to international or Australian commentators for reviews which may be published in order to promote scholarly debate. Where appropriate, the author may be requested to respond to these comments in the spirit of the involvement and discussion for which AURA stands. In addition to articles reporting original research, the submission of short reports, reviews, abstracts and bibliographical entries is also invited.

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ROCK ART RESEARCH

The Journal of the Australian Rock Art Research Association (AURA)

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The principal objectives of the Australian Rock Art Research Association are to provide a forum for the dissemination of research findings; to promote Aboriginal custodianship of sites externalising traditional Australian culture; to co-ordinate studies concerning the significance, distribution and conservation of rock art, both nationally, and with individuals and organisations overseas; and to generally promote awareness and appreciation of Australia's immovable cultural heritage, particularly prehistoric rock art.

Archaeological Publications, Melbourne

CONTENTS

Volume 5, Number 1, May 1988

The Beaufort Convention Complex, Darwin - Site of the First AURA Congress

KEYWORDS: **Rock paintings - Kakadu - Fish motif - Identification**

IDENTIFYING FISH SPECIES IN THE RECENT ROCK PAINTINGS OF WESTERN ARNHEM LAND

PAUL S. C. TAÇON

Abstract. The problem of ascertaining exactly what has been portrayed in a particular rock painting is one that all members of the discipline have encountered. Often general conclusions about what has been represented can be drawn and a certain subject may be recognised but more specific details, such as species of animal, are elusive. In this paper depictions of fish found in the recent body of western Arnhem Land rock art are examined with the goal of determining the artistic conventions used to distinguish different species. Fish paintings predominate in the art and often are clearly distinguishable at a species level. For the Aboriginal people that produced the paintings it was important to distinguish species as this allowed them to use the paintings to illustrate particular ideas, experiences or myths more effectively when story telling.

Introduction

The most frequently found subject in the recent rock art of western Arnhem Land, and especially that of Kakadu National Park, is a fish. Fish account for well over half of all paintings and over 60% of those with internal, or 'x-ray', features. Fish are found in almost every painted shelter and at some sites near Ubirr and Oenpelli they are the only motif depicted. Aboriginal people still living in the area regard fish highly and consider them an important and tasty staple of the traditional diet. Fish have great mytho-totemic importance as well, figuring prominently in creation myths, men's rituals, dreamtime stories and other metaphysical expressions. Fish are also associated with water, life and human origins and are often used metaphorically to explain complex notions about life, death, rebirth and other aspects of human existence (Taçon 1988a). Because fish are so central within the traditional sphere of Aboriginal life in this part of the country, specific artistic conventions have developed so that various species may be easily distinguished. Once the conventions have been learned up to a dozen species readily become apparent.

Many researchers have focused their attention on the problems of identifying specific subjects depicted in rock art (see Brandl 1980; Calaby and Lewis 1977; Chaloupka 1984; Flood 1987; Lewis 1986; Macintosh 1977; Murray and Chaloupka 1984; Rosenfeld 1984 for some north Australian examples; and Swanson 1981 for misidentifications of Kakadu fish). One of the main conclusions reached is that we will never be able to positively identify many rock paintings and that it is very easy to misidentify. To help overcome this it has been argued that we should focus on identifying the common elements found in classes of paintings or engravings and then compare these to those found in actual subjects that they resemble. As well, when possible, informed Aboriginal knowledge should be used to more precisely define both the common elements and the subjects themselves. This may entail consulting any ethnographic texts associated with the material that may exist, or consulting with actual rock artists or their immediate relatives, if they are still extant. Occasionally, other Aboriginal people that have traditionally been associated with the rock art sites and land within a study area may also provide insight if they still are knowledgeable about their traditions. As Andrée Rosenfeld has remarked, however, 'in the case of truly prehistoric art, the investigator is left with no alternative but to examine the extent to which his own concepts of zoological reality can be unambiguously recognised in the art' (1984: 401).

In western Arnhem Land (Figure 1) rock painting has continued until very recently, with many paintings having been produced this century (Haskovec and Sullivan 1988; Taçon 1987: 42, 1988a). Many elders living in and around Kakadu National Park still care for and manage rock art sites and some of them witnessed the production of specific paintings when they were young. Others continue the painting tradition on bark and some of their stylistic conventions have recently been ana-

This paper is a special feature dedicated to the forthcoming First AURA Congress in Darwin; it is most relevant to understanding the rock art at the congress field trip destinations.

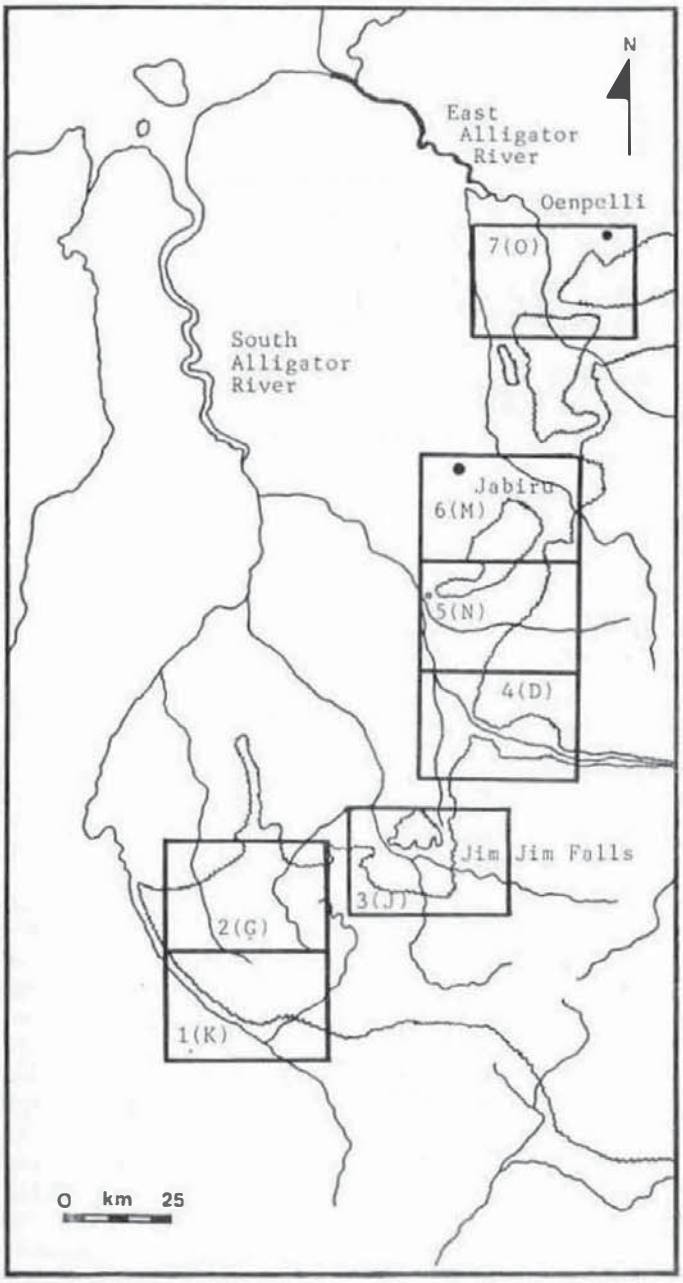


Figure 1.
Western Arnhem Land with areas surveyed for recent rock paintings indicated as numbered rectangles.

lysed (see Taylor 1987, 1988). During the course of over 14 months' fieldwork investigating the nature of the recent rock painting tradition in western Arnhem Land, between June 1985 and January 1987, over a dozen Aboriginal people were consulted (see Taçon 1988a, 1988b for some preliminary results). Among other things, the artistic conventions that distinguish various species of fish were delineated. This data is presented now to more adequately prepare and inform visitors associated with the 1988 AURA Congress. Those people intending to visit Kakadu National Park on field trips will see numerous depictions of fish, including some of those illustrated here, when they reach the rock shelters. The information provided within this paper will allow visitors the chance to identify species of fish for themselves and it is recommended that they take a copy along with them.

The Nature of Fish Representations

Fish occur frequently in the art of many peoples but few studies have sought to systematically identify specific species represented (see Jett and Moyle 1986 for an important North American exception). Often this is because clearcut distinctions were not made by the artists or because there was no need to do so within the contemporary studies of regional art forms. Among pictographs from the Sydney Basin, for instance, fish forms can easily be distinguished from other drawings but they are most often generalised and resemble each other. There are few that have species-specific characteristics (Jo McDonald, pers. comm. 1987). In the rock art of western Arnhem Land, however, elaborate artistic conventions have developed so that a great variety of species may be portrayed and distinguished in the art. Most conventions are based on observations of real fish with particular attention paid to fin arrangement, tail shape, body proportions, head shape, internal anatomy and unusual features (see Figures 2, 3 and 4). These formal conventions are more or less rigid but paintings do vary along stylistic lines from artist to artist and region to region. As well, there are no species-specific colour rules associated with the paintings and internal infill and aspects of anatomy often vary. In other words, in order for a particular painting to be distinguishable at the species level, the artist had to adhere to prescribed rules about the way external features associated with particular species could be portrayed. When it came to the internal features and infill, however, he had more latitude. But even here some regularity can be found in that in certain areas, such as the tail or head, one would be allowed to incorporate clan designs while in others one would not. If one disobeyed the 'rules' then one was judged not to have produced a 'good' painting. This is partly because for Aborigines of this region a talented artist is one that produces detailed paintings that communicate meaning on more than one level and that can be identified by more than one individual. Therefore, paintings have to be distinguishable on many levels and one of the most basic is that of species versus genera or species versus species. A second important distinction often made between paintings is in terms of infill with solid or stroke-infilled paintings contrasted with x-ray works. Many differences in terms of species represented can be found between these two types of painting.

During the 1985-87 study paintings from 316 sites were examined. Of these, 231 sites were found to contain recent x-ray paintings less than 3000 years of age (see Taçon 1987: 43-7) and 2979 paintings were recorded. A further 1633 solid or stroke infill non-x-ray paintings of similar age were recorded from 127 of the 231 sites. Fish were found to predominate in both samples, making up 62.54% of the x-ray art and 36.93% of the non-x-ray. Fish were found at 189 of the 231 sites with x-ray paintings, or 81.82%, and 85 of the 127 sites with non-x-ray paintings (66.93%). Significant differences were found between each sample in terms of specific frequency and differences were also found between art sites from different areas of the region.

The greater Kakadu National Park region was divided into seven 1000 sq. km (40 km x 25 km) areas for comparative purposes. The boundaries between areas were based on traditional territorial and linguistic limits, geographic features and ecological zones or niches. Area 1 (K) comprises El Sherana, Christmas Creek, Koolpin Gorge and territory between Koolpin and Barramundi Gorges, to the north. Area 2 (G) includes Barramundi Gorge, Graveside Gorge (Bilkbilkmi), the escarpment between the two gorges and land south to Area 1. This area was found to have few art sites of any age and yielded the smallest sample of both sites and individual paintings. Area 3 (J) lies east of Area 2 and includes the escarpment between and on either side of Jim Jim Falls and Twin Falls, Upper Jim Jim Creek, Upper Twin Falls Creek and adjacent portions of escarpment and plateau as indicated on Figure 1. Area 3 extends north to Deaf Adder Gorge, which makes up Area 4 (D).

Area 5 (N) includes Nourlangie Rock, Lightning Dreaming on the nearby escarpment, Koongarra Saddle and Baroalba Springs. This area adjoins Area 6 (M), Mount Brockman (including Djerlandjal) and the two have a similar range of recent art sites and paintings. Area 7 (O) was found to have the highest concentration of sites and is located in the north-east corner of the study area. It includes the Ubirr complex, Cannon Hill and Hawk Dreaming, East Alligator River sites, Malangangerr, Wurdidjileedji, Red Lily Lagoon and Oenpelli sites, and escarpment and outliers as far south as Ngarradj-Warde-Djob-keng and 'Three Pools'.

Preliminary results have revealed more stylistic, form and subject matter similarities than differences between the art of Areas 4, 5 and 6. As well, there are many similarities between sites in Areas 1, 2 and 3. As a consequence, more pronounced trends and differences can be observed if one combines the first three samples and then compares them with the second three samples and to the last sample, Area 7. One of the most striking regional differences found was with the percentage of fish paintings. At the south end of the study area, for example, fish comprise between 13 and 40% of paintings with internal features and 11 to 16% of those with solid or stroke infill (see Table 1). In the central district they comprise roughly 45% of the x-ray art and 25 to 34% of the non-x-ray. Fish are found most frequently, however, in the north-east end of the region, making up over 76% of the x-ray and almost 50% of the non-x-ray rock art. Important differences in terms of species portrayed were also noted.

Table 1.
The frequency of fish in recent western Arnhem Land rock art.

Type/Area		K	G	J	D	N	M	O	Total
X-Ray	No.	11	1	18	181	212	71	1369	1863
	%	13.25	25.00	39.13	42.25	42.66	45.51	76.35	62.54
Non-X-Ray	No.	8	0	18	54	102	64	357	603
	%	11.27	0.00	16.51	25.59	34.00	28.44	49.79	36.93

A total of 43 native fish species have been recorded in Kakadu National Park (Fox et al. 1977: 53) and others are still to be classified (Midgely 1973: 1). Only just over a dozen of these can be identified in the area's rock art, however, and of these only the barramundi, saratoga, forktail catfish, eel-tail catfish and mullet occur frequently (see Tables 2 and 3). Together these five species account for 72.95% of all x-ray fish paintings and 58.04% of those with solid or stroke infill, or 69.30% of all fish depictions. Other species represented include the freshwater long-tom, archer fish, black bream, boney bream, and various species of terapon perches or grunters.

SPECIES DESCRIPTIONS

(A) *Kulujbirr*, Saratoga (*Scleropages jardini*)

The saratoga can easily be distinguished from depictions of other fish species. External features include prominent barbels forming a V-shape adjacent to the mouth, two large pectoral fins with pointed ends, an elongated almond-shaped body, two broad, curving dorsal/anal fins on either side of a large caudal peduncle and a prominent convex caudal fin. The mouth is usually portrayed as open and the head is smallish in comparison to depictions of barramundi or catfish. The gill opening is usually indicated by a solid band of colour or parallel lines at the neck, as with most other paintings of fish species. The body length is generally about three times the width. Saratoga are buccal incubators and it is the female that incubates the eggs in its mouth (Lake 1971: 47). Paintings range in size from 0.25 m to over 1 m in length.

Internal features included in most saratoga paintings are the backbone and vertebral processes (usually thin), the gill arch, demarcated areas of flesh above the backbone, and various internal organs and aspects of the digestive tract. The internal configurations are similar to those shown in barramundi paintings but with slight differences, such as the width and size of vertebral processes, that reflect differences in the species' anatomy (see Figures 2, 5, 6 and 7).

(B) *Namangol*, Silver Barramundi (*Lates Calcarifer*)

Paintings of barramundi are generally larger than those of saratoga; some are almost 2 m in length. Their bodies are also portrayed as being wider than those of saratoga with the length generally being twice the width. This approximates the actual differences between the two species. External features include a roughly triangular-shaped head, sometimes with a convex underside, two pelvic and pectoral fins with rounded ends, a spinous dorsal fin with the spines emphasised, a rounded or square-shaped soft dorsal fin and a similarly shaped anal fin on either side of the caudal peduncle, and a large, prominent convex caudal fin. The mouth is usually open.

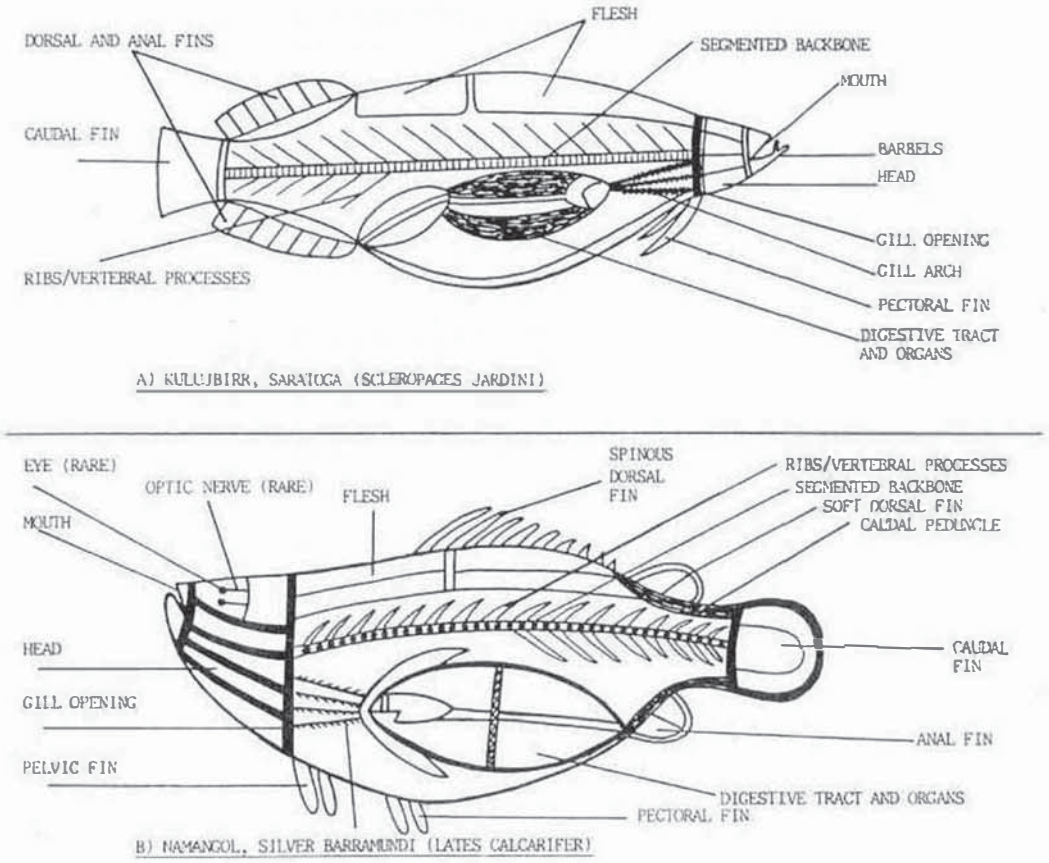


Figure 2. *Generalised saratoga and barramundi with internal and external distinguishing features highlighted.*

Barramundi paintings often have the most detailed anatomy. The backbone is usually quite large and prominently displayed but is occasionally conspicuously absent. It is sometimes segmented with lines or circles and often the segmentations correspond with projecting vertebral processes. Flesh is depicted above the backbone and is demarcated with lines that define rectangular strips. The gill arch and most internal organs and aspects of the digestive tract are included. On rare occasions eyes, and sometimes even optic nerves, are indicated. At Ubirr there is one painted with an eel-tail catfish depicted inside the stomach (Pollard [1974: 1-35] has found eel-tail catfish in the stomach contents of numerous specimens from the nearby Magela lagoon). Clan designs may often be found on the head and tail, within organs, or in fleshy areas (see Figures 2, 8 and 9).

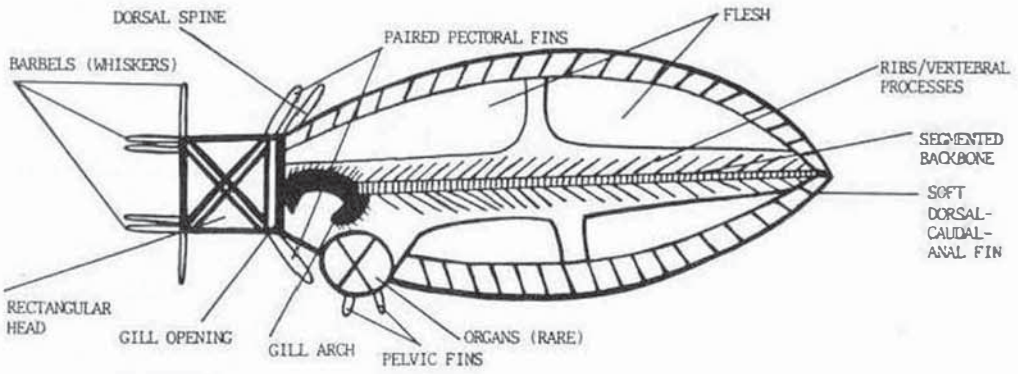
The silver barramundi has an unequalled reproductive cycle. Barramundi usually reach maturity in freshwater rivers or billabongs and move downstream to spawn in saltwater estuaries, often with the assistance of flood waters (Lake 1971: 31). Then they migrate back 'up to the freshwater reaches before the wet season flow subsides' (Fox et al. 1977: 53). The silver barramundi is 'an hermaphrodite, changing from male to female at roughly two years of age' (Vaughan 1982: 5). Males are long and slim while sexually inverted, aged females are fat and bulky, sometimes reaching weights of over 50 kg (Lake 1971: 31). Aborigines recognised this and in the Gundjeibmi and Kunwinjku languages there are separate terms for immature, developed male and sexually inverted aged female specimens (Gillespie 1982: 18). Most paintings are of older, larger females but there are also some of younger, slimmer males with body proportions approaching that of the saratoga.

(C) *Bindjarran*, Eel-tail Catfish (*Neosilurus sp.*)

Paintings of eel-tail catfish are generally quite small, under 0.4 m in length, but there is one enormous painting on a boulder near the escarpment, across from Mt Brockman, that measures over 2 m in length (Figure 11). Eel-tail catfish are very distinctive because of their pointed or eel-like tails but it is difficult to distinguish exactly which of the many species of *Neosilurus* is portrayed in a given painting. Adding to the difficulty is that many species still have not been adequately described or named by Europeans. Aborigines distinguish between at least three species in the art but most are *bindjarran* and eel-tail catfish depictions were not further categorised in this study.

External features include a square or rectangular head, a shape actual fish attain if they are large and fat, with numerous barbels or 'whiskers' (usually 4 to 8), and the prominent pointed tail or soft dorsal-caudal-anal fin. As well, a dorsal spine and paired pectoral fins are often displayed and sometimes the pelvic fins are included. All of these are generally portrayed immediately behind the head. The body is almond shaped and is often stylised into a rough ellipse with a symmetrical form. The generalised fin that surrounds the fish body is almost always demarcated and often is infilled with parallel lines, hatching or solid blocks of colour. An 'X' or Union Jack-like pattern was often added to the head.

Flesh is occasionally portrayed within eel-tail catfish bodies but organs are extremely rare. The backbone and vertebral processes are nearly always emphasised, often with fine, delicate lines that radiate outward from the area where the lateral line would be found on the exterior of the fish. The gill arch is common and is sometimes quite prominent. It is interesting to note that most species of



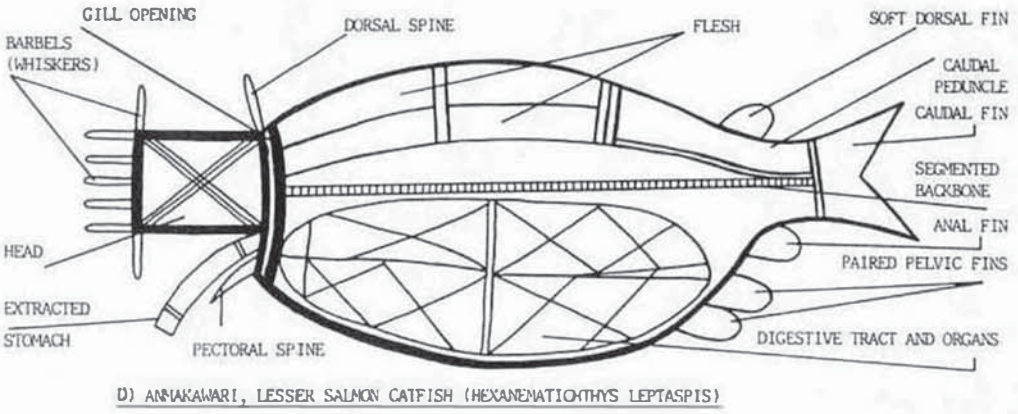
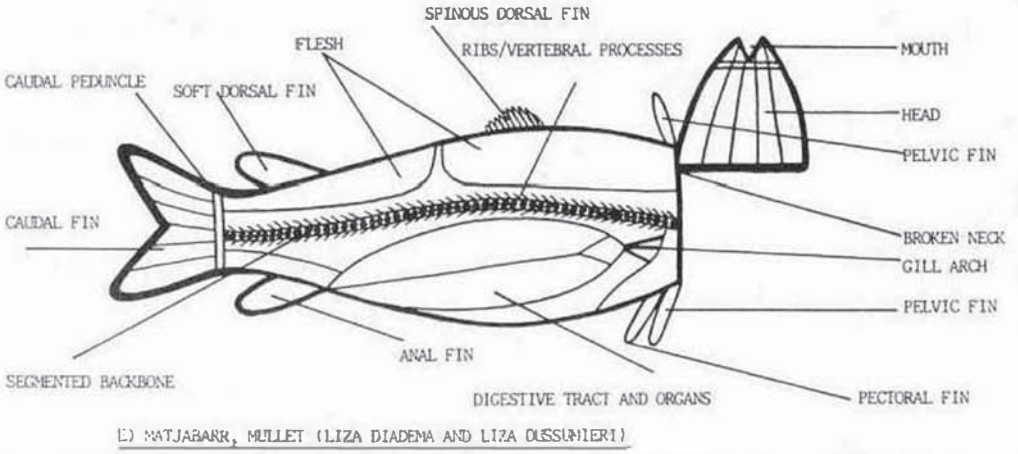


Figure 3. *Generalised eel-tail and fork-tail catfish with internal and external distinguishing features highlighted.*



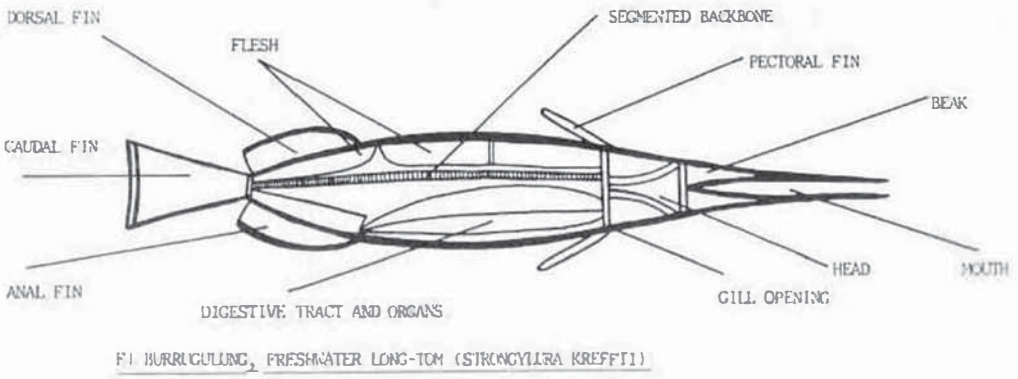


Figure 4. *Generalised mullet and long-tom with internal and external distinguishing features highlighted.*

eel-tail catfish are translucent or even transparent when young so that one can observe their backbone and vertebral processes when they are swimming through the water (see Figures 3, 10 and 11).

(D) *Anmakawari*, Lesser Salmon Catfish (*Hexanematichthys leptaspis*)

The lesser salmon or fork-tail catfish figures prominently in the art. As its alternate name suggests, it has a very forked tail and this is always

Figure 5.
Saratoga caught in Deaf Adder Creek, Area D.

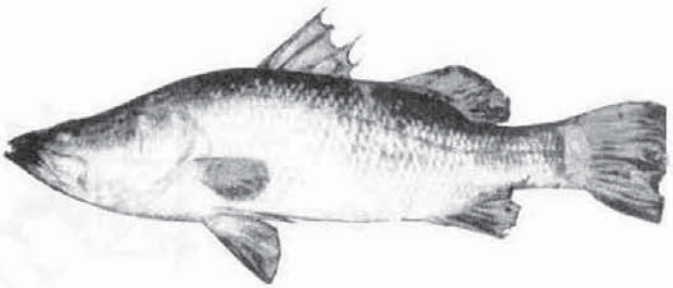


Figure 8.
Barramundi caught in a billabong near Anlar, Area N.

Figure 6.
Recent painting of a saratoga, Nourlangie Rock, Area N.

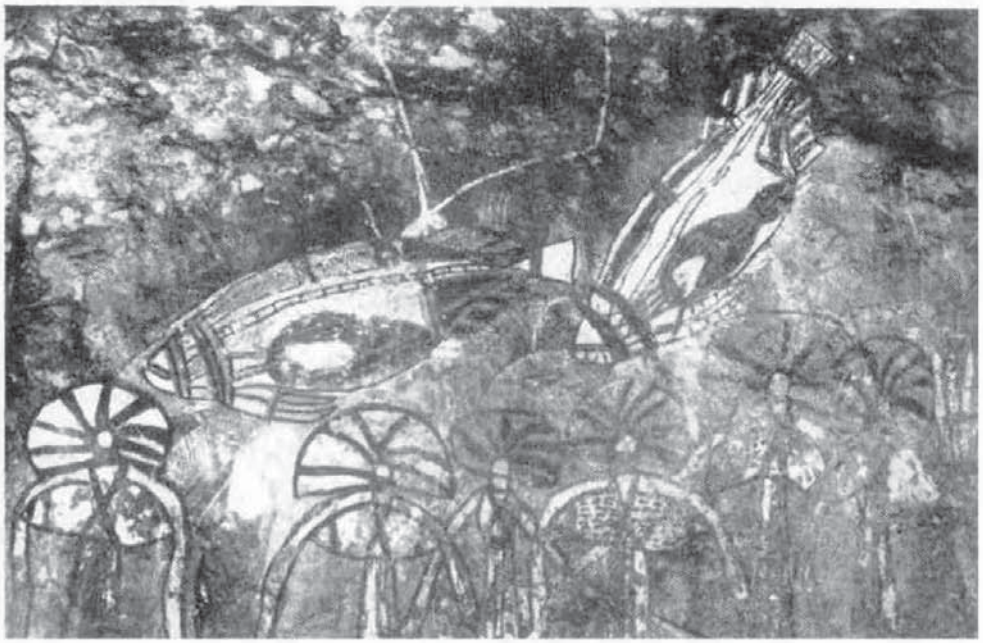


Figure 7.
Two paintings of saratoga by Najombolmi, Nourlangie Rock Main Gallery, Area N.

Figure 9.
Recent painting of a barramundi, Injuluk, Oenpelli, Area ●.

Figure 10.
Eel-tail catfish caught in Namargon Creek, Area N.

Figure 11.
Painting of an eel-tail catfish by Najombolmi, escarpment north of Namargon, Area N.

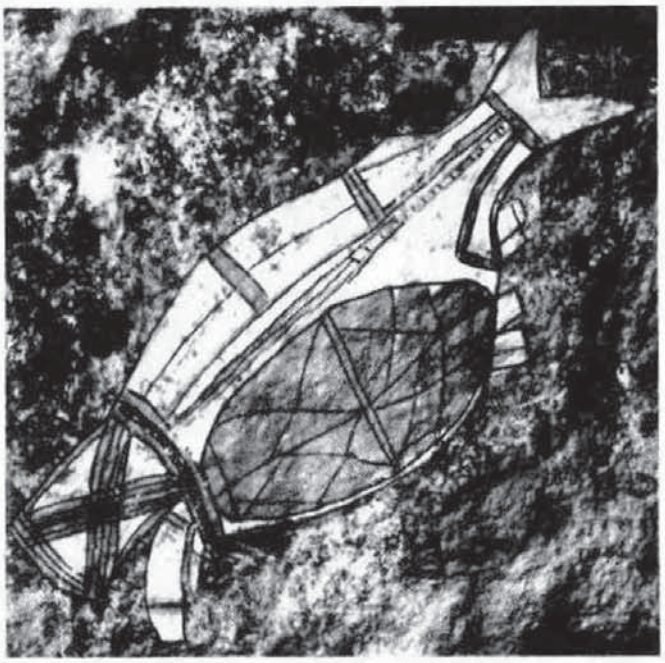


Figure 12.
Painting of a square-headed fork-tail catfish by Old Nym, Nangalore, Area N.

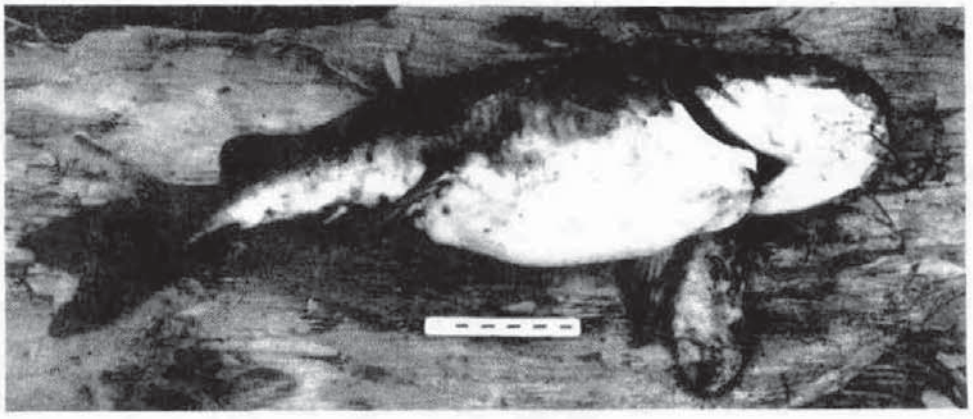


Figure 13.
Fork-tail catfish caught in Deaf Adder Creek, Area D.

emphasised in the art. Paintings also include a rounded or square soft dorsal fin situated above three other fins, on the opposite or underside of the caudal peduncle. This distinctive '3-and-1' configuration of fins around the caudal peduncle is one of the key features of fork-tail catfish paintings. As well, they generally have rounded, often fat, bodies with lengths approximately twice their widths. The dorsal spine is indicated behind the head and a pectoral spine is often included below. The head is usually square or rectangular and has an 'X' or related design inside it, like that of the eel-tail catfish, but a variant with a bulbous round head also exists. In the latter the 'X' design is always lacking but sometimes parallel lines or various forms of hatching are included. Often a lengthy, fat appendage is added below the head at the neck, immediately above the pectoral spine (see Figures 3 and 12). Discussions with Aboriginal elders revealed that what is being indicated in these paintings is an extracted stomach. In cases such as these, the neck of the fish would have been broken and then the stomach squeezed out. This was graphically demonstrated by a group of people in Deaf Adder Gorge. After catching a large fork-tail catfish (Figure 13) and squeezing out the stomach it was roasted on the embers of a fire. The cooked stomach is a tasty delicacy, not unlike calamari in

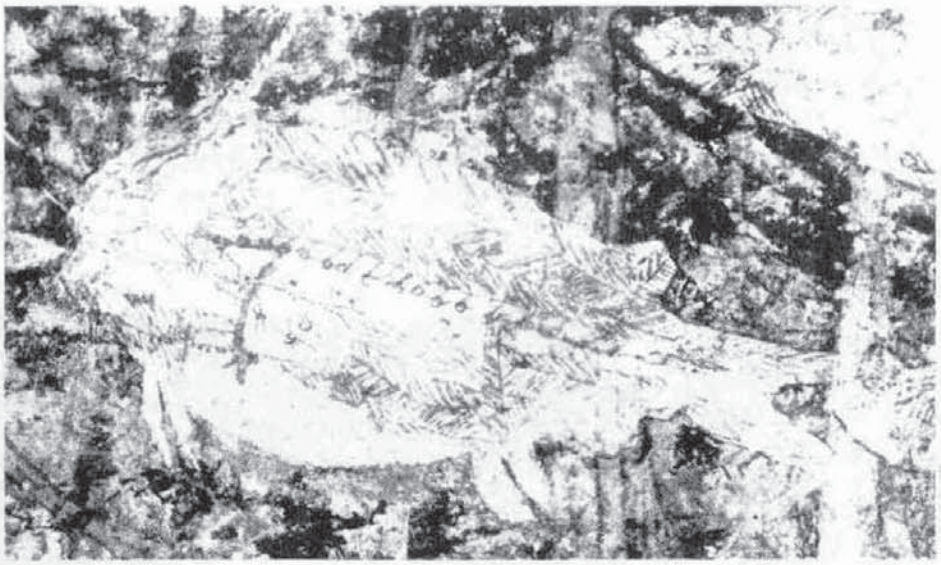


Figure 14.
Recent painting of a round-headed fork-tail catfish with insects portrayed in the stomach, Nourlangie Rock, Area N.

taste and texture. I was told that occasionally one is lucky and finds a small fish inside. A painting of a fork-tail catfish with insects portrayed inside the stomach can be found at one of the Nourlangie Rock sites (see Figure 14).

The backbone is nearly always indicated but the vertebral processes frequently are not. Fleshy areas are usually delineated between the backbone and the dorsal surface. The internal organs and digestive tract are often stylised into a globular mass that often incorporates clan designs, such as diamond or lozenge patterns or forms of hatching. Like the saratoga, the fork-tail catfish is a buccal incubator but in this case it is the males that incubate the eggs in their mouths. Paintings range in size from 0.4 to 1.8 m in length.

(E) *Matjabarr*, Mullet (*Liza diadema* and *Liza dussumieri*)

Some depictions of mullet remotely resemble depictions of young male barramundi and it is important to note the distinctions. The most obvious is that of a prominently forked tail and slender body. The soft dorsal and anal fins are generally rounded and slightly more elongate than those of the barramundi. The spinous dorsal fin is usually a bit smaller. The pectoral and pelvic fins are similar to those of some barramundi paintings but often only one pelvic fin is depicted on the barramundi while two are shown on the mullet, one above and one below the neck. The mouth is always open and is shown halfway between the top and bottom of the head. The majority of mullet paintings show fish with prominently broken necks and upward-pointing heads (65.85% of x-ray mullet and 52.38% of solid and stroke infill mullet—see Figures 4 and 15). Mullet jump around quite a bit after being caught and if their necks are not broken they can jump off the bank, back into the water. Mullet paintings usually range between just under half a metre to a metre in length.

The internal features illustrated generally resemble those of the barramundi or saratoga but the vertebral processes are often finer and smaller. Tails and heads are usually infilled with parallel lines.

The mullet, along with the four other fish mentioned above, are the most frequently found species in the art. They also contribute the most to the traditional diet.

(F) *Burrugulung*, Freshwater Long-tom (*Stongylura Kreffti*)

This fish has a very distinctive elongated, slender body and pointed head or beak. The mouth is almost always portrayed as gaping and pectoral fins are usually shown above and below the neck. The tail is broad and triangular shaped with a flat or slightly concave end. It is relatively long and distinctive from the caudal fins of other species. The dorsal and anal fins are broad, rounded appendages and resemble those of the saratoga. The body length is generally five or six times the width and most paintings range in size from 0.3 to 0.8 m.

Internal features include stylised, elongated organs and digestive tract, an occasionally segmented backbone and demarcated fleshy areas. Generally long-toms have less anatomical detail than other species in the rock art (see Figure 4).

(G) *Nabardebarde*, Boney Bream or Herring (*Nematolosa erebi*)

Depictions of this species may instantly be recognised by the prominent dorsal finray behind the dorsal fin and the distinctive 'feathery' tail. The finray is elongated and filamentous, as in the actual species, and the tail is strongly forked. As well, the inside of the fork is depicted with fine lines giving it its feather-like appearance and reflecting the transparent nature of the fins. The head is shown with an open mouth and is similar in form to that of the mullet. Paired pelvic fins are usually shown and sometimes the pectoral fins are indicated on the underside as well. The anal fin is roughly rectangular with a slight concavity, mirroring the distinctive anal fin of the actual fish. The dorsal fin is often shown with soft and hard components and closely resembles the actual arrangement (see Figure 16).

Internal features are often stylised with the backbone and vertebral processes frequently absent

Figure 15.
Two recent paintings of mullets with broken necks superimposed under and over various other species of fish, Injuluk, Oenpelli, Area O.

Figure 16.
Recent painting of a boney bream (herring), Ubirr, Area O.

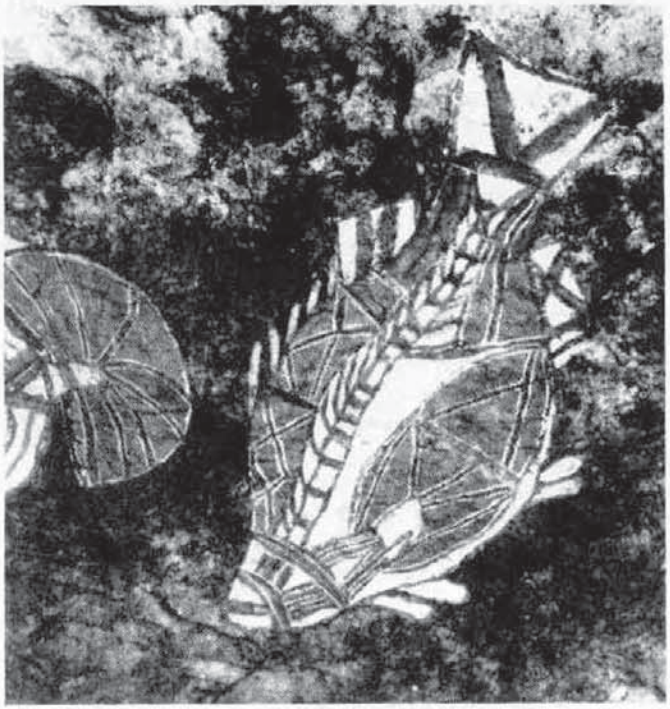


Figure 17.
Painting of a black bream retouched by Najombolmi, Blue Paintings Site, Area N.

or indicated with fine white lines. A large body cavity is often included and some aspect of the digestive tract and internal organs can usually be found. Fleshy areas below the dorsal surface are always included. The gill arch and opening is also illustrated on most x-ray paintings of this fish.

(II) *Nageynjtmi* (if male), *galarrk* (female), Black Bream (*Hephaestus fulignosus*)

This species is harder to identify and can easily be confused with depictions of archer fish or other species if faded or poorly executed. As a consequence, many paintings resembling black bream could not be positively identified and were relegated to the 'unidentified fish' category. Those that could be precisely determined generally exhibited most of the following features: a continuous spinous and soft dorsal fin complex, paired pectoral fins, above and below the neck, two pelvic fins behind the lower pectoral fin, a large, broad anal fin, a moderately concave caudal fin and a fat body with a length between one-and-a-half to two times the width (see Figure 17). Internal features are similar to those of the barramundi or saratoga but the vertebral processes are usually indicated with fine lines. Paintings range in length from 0.25 to 0.60 m and are usually found near permanent sources of freshwater, along the escarpment. They are especially frequent in the Deaf Adder Gorge area (Area 4).

(I) *Njalkan*, Rifle or Archer Fish (*Toxotes chatareus*)

The archer fish has a roughly triangular-shaped body and is often portrayed as being slightly wider or fatter than the black bream. It also has a

distinctive broad tail adjoining a thin caudal peduncle in well-executed paintings. The tip of the tail is depicted as being flat or slightly concave. The dorsal and anal fins are usually shown as extensions of the body and often are very rounded. They appear more stylised than the same fins of other species. One large pelvic fin can usually be seen extending down from the underside, behind the neck. The mouth is usually open. At one of the Ubirr sites an archer fish has been depicted shooting a jet of water at a nearby painting of a spider, mimicking its real-life activities and giving it a sense of vitality (Figure 18). Others are sometimes found to be arranged in schools that appear to be 'swimming' across the rock wall (Figure 19).

Not as much attention to internal detail is given to the archer fish as is with other species but usually fleshy areas, the backbone, body cavities and some aspect of the digestive system are indicated.

(J) *Other Species and General Notes*

Depictions of various perclets (*narangi*) were pointed out to me at some galleries (Figure 19) and I was told by one elder that at one site not visited there is a painting of a mudcod (*djuludj; Oxyeleotris lineolatus*). At the Blue Paintings site, Nourlangie (Area 5) there is a depiction of a primitive archer fish (*botjalk; Toxotes lorentzi*) and an ox-eye herring (*kalalba; Megalops cyprinoides*) but these are rare. There is a possible example of a one-gilled eel (*bullugurri; Synbranchus bengalensis*) elsewhere and several examples of unidentified saltwater fish in galleries scattered throughout Area 7. A large number of paintings could be identified as fish but could not be classed according to species (12.45% of the x-ray paintings and 25.53% of the non-x-ray) because they were badly faded or poorly executed (for a list of Gundjeibmi names of various species see Chaloupka et al. 1985: Appendix II; for scientific descriptions of Alligator Rivers fish see Pollard 1974).

Most paintings of fish were rendered in more than one colour and have outlines, usually red, of varying thickness. Up to six colours were used in some paintings to delineate and highlight certain features but the most commonly used were red, white, yellow and black. Infill consists of solid blocks of colour, hatching, crosshatching, bold strokes, parallel lines, diamond-shaped designs, and sometimes dots or dashes. Often the infill is said to be related to clan designs and is the more sacred part of the figure.

Although, at first, paintings of fish with internal detail may seem surreal, they actually attain a high degree of realism if they are considered to be scientific diagrams. A great deal of attention has been paid to both internal and external detail so that the species portrayed can easily be determined. If one is to fillet any of the actual species portrayed, what remains after the flesh has been removed closely resembles what is shown in x-ray paintings. There is one notable and fascinating exception, however. When one fillets a fish one sees that the vertebral processes (ribs) extend to just under the dorsal surface. In the paintings there is a large area between the top of the vertebral processes and the dorsal surface that is filled with rectangular blocks of colour or hatching. Aborigines describe these as flesh. What in effect has happened is that the artists have compressed a three-dimensional image into two dimensions and the flesh that normally lies on either side of the backbone, the fillets, has been depicted as lying above it. In this way the artists have ingeniously conveyed all aspects of the fish to the audience and have successfully coped with a perspective problem that baffles many other groups of people.

DISCUSSION

As can be seen in Tables 2, 3 and 4 regionalism is evident in terms of the species of fish predomi-

SPECIES/AREA	K	G	J	D	N	M	O	#	%
Barramundi	1	0	2	25	38	8	271	345	18.52
F-tail catfish	1	0	1	13	29	12	253	309	16.59
Saratoga	1	1	4	20	25	4	195	250	13.42
Mullet	0	0	0	4	9	2	231	246	13.20
Eel-tail catfish	2	0	2	19	42	23	121	209	11.22
Archer fish	0	0	2	27	14	2	44	89	4.78
Black bream	1	0	0	19	11	1	36	68	3.65
Herring	0	0	0	2	0	2	53	57	3.06
Long-tom	3	0	1	10	5	1	35	55	2.95
Other	0	0	0	2	2	0	1	5	0.27
? Fish*	2	0	6	40	37	16	129	230	12.35
TOTAL	11	1	18	181	212	71	1369	1863	

*Unidentifiable.

Table 2.
The species of fish portrayed in x-ray rock paintings.

SPECIES/AREA	K	G	J	D	N	M	O	#	%
Eel-tail catfish	0	0	4	6	45	14	31	100	16.58
F-tail catfish	2	0	0	2	13	4	60	81	13.43
Mullet	1	0	1	3	0	3	55	63	10.45
Saratoga	0	0	0	8	7	11	35	61	10.12
Barramundi	2	0	0	3	6	0	34	45	7.46
Long-tom	1	0	0	9	3	7	21	41	6.80
Archer fish	0	0	4	10	6	0	14	34	5.64
Herring	0	0	0	2	1	2	12	17	2.82
Black bream	0	0	0	0	1	0	6	7	1.16
? Fish*	2	0	9	11	20	23	89	154	25.54
TOTAL	8	0	18	54	102	64	357	603	

*Unidentifiable.

Table 3.
The species of fish portrayed in non-x-ray rock paintings.

Figure 18.
Recent painting of an archer fish shooting a jet of water at a spider, Ubirr, Area O.

Figure 19.
Recent composition of a school of six archer fish and two perchlets (lighter colours, bottom right) by Najombolmi, Balawurru, Area D.

Table 4.
The percentage of various species of fish portrayed in recent rock paintings.

X-RAY SPECIES/AREA	K&G&J	D	N	M	O	TOTAL
Barramundi	10.00	13.81	17.92	11.27	19.80	18.52
F-tail catfish	6.67	7.18	13.68	16.90	18.48	16.59
Saratoga	20.00	11.05	11.79	5.63	14.24	13.42
Mullet	0.00	2.21	4.25	2.82	16.87	13.20
Eel-tail catfish	6.67	10.50	19.81	32.39	8.84	11.22
Archer fish	6.67	14.92	6.60	2.82	3.21	4.78
Black bream	3.33	10.50	5.19	1.41	2.63	3.65
Herring	0.00	1.10	0.00	2.82	3.87	3.06
Long-tom	13.33	5.52	2.36	1.41	2.56	2.95
Other	0.00	0.00	0.94	0.00	0.07	0.27
? Fish*	26.67	23.20	17.45	22.54	9.42	12.35
NON-X-RAY						
Barramundi	7.69	5.56	5.88	0.00	9.52	7.46
F-tail catfish	7.69	3.70	12.75	6.25	16.81	13.43
Saratoga	0.00	14.81	6.86	17.19	9.80	10.12
Mullet	7.69	5.56	0.00	4.69	15.41	10.45
Eel-tail catfish	15.38	11.11	44.12	21.88	8.68	16.58
Archer fish	15.38	18.52	5.88	0.00	3.92	5.64
Black bream	0.00	0.00	0.98	0.00	1.68	1.16
Herring	0.00	3.70	0.98	3.13	3.36	2.82
Long-tom	3.85	16.67	2.94	10.94	5.88	6.80
Other	0.00	0.00	0.00	0.00	0.00	0.00
? Fish*	42.31	20.37	19.61	35.94	24.93	25.54

*Unidentifiable.

nant in the art; species differences can also be found between the x-ray and non-x-ray art. These general trends are outlined below but their greater significance and relationship to various cultural ideas and practices will be presented later, at the upcoming AURA Congress in Darwin.

The barramundi is the most frequently portrayed species in recent x-ray rock art, comprising 19.80% of all x-ray fish, but is only the fourth-most common species found in solid and stroke infilled paintings of the same age and from the same sites. Indeed, barramundi account for only 7.46% of recent non-x-ray fish—less than half the x-ray percentage. In both groups they are found most frequently in Area 7 and increase in frequency as one moves from south to north through the Kakadu region. Non-x-ray depictions of barramundi are more evenly spread out, with the exception of Area M where they are deficient.

Fork-tail catfish are also frequent in the two samples. They account for 16.59% of x-ray fish and 13.43% of non-x-ray, or the second most frequent species depicted and the most frequent species depicted, respectively. They occur most commonly in Area 7 and increase from south to north in both samples. It is interesting to note how closely the frequencies are in the two samples in contrast to the barramundi where the two frequencies are divergent.

Greater contrast still can be found when one looks at the occurrence of saratoga in the two samples. In terms of x-ray art, saratoga are most commonly found in the south, in Areas 1-3. Here they comprise 20% of the sample but further north, in Area 6, they comprise only 5.63%. Elsewhere they make up between 11 and 14% of the totals. The opposite trend occurs with non-x-ray paintings. With these, saratoga are totally absent in the sample from Areas 1-3 and are most frequent in the sample from Area 6, making up 17.19%. In other areas, such as Areas 4 and 7, there is a difference between the two samples but it is not as pronounced.

Mullet paintings are concentrated in the north of the region, and Area 7 in particular. In both samples they increase in frequency as one moves from south to north. Eel-tail catfish, on the other hand, are most frequently found in the central part of the study area in both samples. In Areas 5 and 6 they make up between 20 and 44% of each sample and these are the highest percentages of any species per sample per area. Archer fish, whether x-ray or non-x-ray, are found most often in Area 4 and generally are found less frequently in recent rock paintings as one moves north. X-ray depictions of black bream are concentrated in Areas 4 and 5 but non-x-ray black bream are relatively rare in all areas. The boney bream or herring is most frequently found in the more northern and central areas in both samples. Long-tom with internal features are concentrated in the south and decrease in frequency as one moves north. Long-tom without internal anatomical detail are concentrated in the central part of the region, especially Areas 4 and 6.

As can be seen, each major section of the greater Kakadu region produces a different profile in terms of predominant fish species. The northern region is characterised by barramundi, fork-tail catfish, mullet and herring in terms of both x-ray and non-x-ray rock art as well as x-ray saratoga. The central region is characterised by x-ray eel-tail catfisch, archer fish, black bream and barramundi as well was non-x-ray eel-tail catfish, long-tom, saratoga, archer fish and some barramundi and herring. At the southern end x-ray saratoga, long-tom and barramundi are frequent, as are non-x-ray archer fish, eel-tail catfish and barramundi. Barramundi are relatively common everywhere but occur with x-ray detail over twice as frequently. Long-tom and mullet more often are found not to have internal features added to them.

Conclusions

Aboriginal elders remarked that most paintings of fish were done after the catch, and not before. 'It was explained that often when someone returned to a shelter with fauna someone else would suggest that its likeness be painted on the shelter wall or ceiling. When this was done the artist would sometimes refer to the actual species brought back as a model but the final painted product always conformed to the stylistic conventions of the group' (Taçon 1988a: 11). Paintings of fish were done for other reasons as well, and they are not merely a reflection or tally of the catch. This does explain some of the regionalism exhibited, however, as some of the species, such as the long-tom, archer fish, black bream, herring and mullet are more frequently found in the rivers and water courses near the shelters where they are most often seen represented in the art. Cultural factors may have influenced the depiction of barramundi, saratoga, fork-tail catfish and eel-tail catfish as the distributions of their images do not mirror the natural distributions of these species as closely. As well, it is these species of fish that figure most prominently in myth and ritual. All four are good eating fish and are carnivorous. All spawn in the spring (Lake 1971; Pollard 1974), at the same time that people traditionally returned to the shelters to escape the storms of the build-up and wet, and for social intercourse (see Chaloupka 1981; Haskovec and Sullivan 1988). These species of fish are also the ones that have the most potential as symbols and are species that were thought to have positive associations. As a consequence, it was thought that they were good to have in the environment and on the shelter walls. Not only were they the most sought after food species, but also they were the ones most often used for intellectualisation.

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were dona by Najombolmi, a Bardmardi man who passed away in 1965. He was cousin to Kapirigi and Canari. All photographs and drawings are by the author.

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Résumé. *Le problème d'apprendre exactement ce qui a été figuré dans une peinture rupestre particulière se pose à tous les chercheurs de notre discipline. Souvent on peut tirer des conclusions générales sur ce qui a été représenté, et on arrive à reconnaître un certain sujet, mais des détails plus spécifiques (comme l'espèce de l'animal) nous échappent. Dans cet article on examine des figurations de poisson trouvées dans le corpus récent d'art rupestre dans l'ouest d'Arnhem Land, afin de déterminer les conventions artistiques utilisées pour différencier des espèces. Les figurations de poisson prédominent dans cet art, et souvent se différencient au niveau des espèces. Pour les Aborigènes qui ont produit les peintures il était important de différencier les espèces, ceci leur permettant d'utiliser les peintures pour illustrer des idées, des expériences ou des mythes particuliers d'une façon plus efficace lorsqu'ils racontaient des histoires.*

Zusammenfassung. *Allen in dieser Fachdisziplin tätigen Forschern sind die Schwierigkeiten bekannt, die mit der Ermittlung, was es genau sein soll, das in einer Felsmalerei dargestellt ist, verbunden sind. Während allgemeine Folgerungen oft möglich sind, mehr spezifische Einzelheiten, wie etwa die Art eines abgebildeten Tieres, bleiben meist unergründlich. Die vorliegende Arbeit untersucht rezente Fischdarstellungen in der Felskunst des westlichen Arnhem Landes mit dem Ziel, die künstlerischen Konventionen zu ermitteln, durch die verschiedene Arten unterschieden werden. Fischmalereien überwiegen in dieser Kunst, und spezifische Arten sind oft deutlich erkennbar. Für die Aboriginal Leute, die Hersteller der Malereien, war es wichtig, Arten zu unterscheiden, da ihnen dies ermöglichte, die Bilder zur Illustration gewisser Ideen, Erfahrungen und Mythen heranzuziehen.*

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ROCK ART SEQUENCES: A MATTER OF CLARIFICATION

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Abstract. The author seeks to clarify certain critical issues raised by several writers about his pan-Australian rock engraving sequence and his Sydney-Hawkesbury rockshelter drawing sequence, and he considers questions of rock art terminology. He believes that the objections raised by the reviewers do not disprove either sequence, but that they have shown the need for more detailed research on sites, and of regional variations in rock art elsewhere in Australia. Research workers are asked to examine rock art as archaeologists and look for evidence of stratification in sites. Many other issues are raised which have a bearing on the chronology and development of rock art in Australia.

This contribution has been written to clarify misconceptions about several aspects of my work on rock art in Australia that have appeared in writings on this subject in recent years. These aspects include my sequence of phases in the engravings throughout Australia and in the shelter drawings in the Sydney-Hawkesbury region of eastern New South Wales, and the terminology used to describe the engravings in the latter region. Since I first claimed that these sequences existed there has been much misunderstanding of my proposals and some opposition to them. It is now necessary for me to clarify these matters.

Both of the above sequences were rejected by McMah (nee Maynard, 1965) and Maynard (197), who divided the art into 'figurative' and 'nonfigurative' divisions. Officer (1984) and Morwood (1980) did not accept my sequence in the shelter art.

Koneeny (1981) stated that

> Breuil's impact on McCarthy is immediately apparent, he analysed Australian prehistory along European lines, sequences, chronologies, interpretations, having no geographical limitations. Breuil's chronology was based on the view that only one style and technique of painting or engraving was in use at any one time—McCarthy relied on this also.

Let me say that I placed a geographical limitation on my shelter art sequence in the Sydney-Hawkesbury region, but not on my engraving sequence because the evidence from Australia as a whole overwhelmingly supports an Australia-wide series of phases in this art. My approach to the analysis of the rock art is based on several criteria:

(1) That just as there were changes (phases) in the prehistoric assemblages of artefacts in midden deposits over time, changes in the art were also likely to have taken place.

(2) I did not adopt any of the European interpretations because knowledge of the culture of the people responsible for this art is practically nil, while we possess a comprehensive knowledge of the culture of the Australian Aborigines.

(3) I believe that technique and style are critical factors in the identification of changes over time.

(4) I wanted to form an independent and personal judgment of our rock art based upon examination of the sites.

Rock Engraving Sequence

At Port Hedland, in north-western Australia, I identified (1962) a sequence of (1) abraded grooves; (2) punctured outline naturalistic figures; (3) linear, and (4) fully pecked figures. I pointed out that these styles and techniques had diffused over a vast region of Australia, but whether this had taken place from the north-west or north-east, or even from a point of origin within Australia, I do not know. The sequence of (3) linear and (4) fully pecked phases is widespread in the north and interior of the continent, the western New South Wales and Flinders Ranges sites being typical examples, and the linear series spread into north-western Tasmania. I believe the evidence from hundreds of sites indicates that diffusion was responsible for this widespread distribution in Australia of the above four phases and techniques and styles. Furthermore, one phase was in use in one region or area while another phase was in use in other areas—there were no separate periods of time or phases over the whole continent during which only one phase was in use as diffusion progressed over the whole continent. Thus punctured outline engraving continued into the early European occupation period in the Sydney-Hawkesbury region though it had gone out of use long ago at Port Hedland, the linear style was in use in Tasmania while

MS received 2 November 1987

the fully pecked style prevailed in the north and interior of the continent, and the latter style was in use in those regions while the punctured outline style survived in eastern New South Wales.

Outline figures, in fact, could have formed the basic art of the Aborigines. They made them in sand and hardened mud in many parts of Australia, and on the sandy bora grounds of south-eastern Australia. The huge expanses of Hawkesbury sandstone in the Sydney-Hawkesbury region were ideal for this type of art, a medium of which the Aborigines took full advantage. Outline rock engravings occur more commonly in the north and east of the continent and appear to be rare in the interior.

The basis of Maynard's (1965, 1976) and Franklin's (1984) analyses of rock art is statistical, a sound method for establishing style and its variation in the figures, but not, apparently, for detecting phases in the art which must be studied at a site. Thus Franklin (op. cit.: 69) quoted Maynard's hypothesis that the pecked intaglio engravings are included in the Panaramitee style (1976: 182-93)

> represents an advance on the work of McCarthy, whose sequence of styles was based on a superficial examination at Port Hedland and was extended to the rest of Australia (Maynard 1979: 81).

Two comments need to be made on this statement. Firstly, the pecked intaglios form a later phase than the Panaramitee nonfigurative series and the two phases must be separated. Secondly, apparently my three-months study of the Port Hedland sites, combined with field studies of those in western New South Wales, Sydney-Hawkesbury region, Flinders Ranges and Tasmania, is considered to be superficial, while statistical studies of any kind are acceptable. A particular emphasis is placed by these writers on the similarities and differences between the outline engravings at Port Hedland and the Sydney-Hawkesbury region. Franklin's Correspondence Analysis separated the two series more than did Maynard, and the former stated that 'The two regions are as distant from each other as they are from the paintings—Laura, Cobar and the Grampians'. She admitted that the engraving technique in these outline engravings is the same in both regions, and one would naturally expect a variation in the subjects. My long experience of studying the Sydney-Hawkesbury engravings convinced me at once when I visited Port Hedland that I was dealing with a similar art phase.

Some archaeologists regard the whole of the art in an engraving site as one body of art in which no change has taken place, and on this basis Maynard dismissed my rock engraving sequence. Other writers believe that changes in subjects, style or technique are local in origin. They reject diffusion either in favour of the people or their ancestors having brought the art with them as they spread over the continent, which is really a form of diffusion, or that they developed each of these arts in their own territory, thus assuming that the principle of local invention operated in the various sites of engravings. To some archaeologists the occurrence of suitable rock surfaces, such as those in the Hawkesbury sandstone of the Sydney-Hawkesbury region, inspired production of the huge body of punctured outline engravings which occur in this area, when in fact the Aborigines merely transferred their art from the sand and soil of their bora initiation grounds to these rock surfaces. Thus differential evolution in local areas is regarded by some archaeologists as an important factor in the development of rock art techniques and styles. But several pertinent questions might be asked here: why is the same sequence of techniques and styles present in hundreds of sites over the continent, especially the fully pecked style succeeding the linear one in every locality? Why did every group of artists use a similar range of motifs—circles, concentric circles and many others—in the linear phase? Why did they all change from the more easily engraved linear figures in the latter phase to the more laborious and time-consuming fully pecked motifs? None of the above approaches explains the origin of these various techniques and styles as well as diffusion, and I cannot accept local or differential evolution as the answer to this problem. The continent-wide trading network and gift-exchange system promoted both local and widespread distribution of objects, techniques, ideas, mythology and religious movements and in my view also rock art techniques and styles. Inter-band visits for ceremonies and other purposes formed another avenue for the acquisition of culture traits by one band from another. The cultural evidence supporting diffusion of rock engraving phases is overwhelming, as it is in other aspects of Aboriginal culture. It is, however, only one factor in the latter's overall development.

Terminology

Another criticism I would like to make is of the description, as 'pecked and abraded', of the technique used to fashion the outline engravings in the Sydney-Hawkesbury region, first used by Maynard and now widely adopted. Pecking is a technique in which the outline or whole surface of a figure is fashioned by relatively tiny pits; it is characteristic of the linear and fully pecked phases of engraving in a vast region of the continent, and its use as a term describing technique should be confined to them (cf. Flood 1987: 120; Steinbring et al. 1987: 5). The Sydney-Hawkesbury technique differs markedly in that the outlines or grooves of the figures are formed by a series of large punctures (or holes) mostly overlapping one another, or conjoined, but sometimes separated in part of an outline. This technique is well described by Campbell's term of 'conjoined punctures' (1899). In addition, the punctures were not joined by abrasion, cutting or chopping, they were joined by additional punctures. Where an outline has been abraded from generation to generation by the artists the punctures are either completely obliterated or the bottoms of them only are visible. Abrasion in these engravings was applied to the whole outline, over the punctures, as part of rites associated with them, and it has the

added advantage of preserving them from generation to generation. Thus the description of the technique as pecked and abraded is incorrect and should not be used. The vast majority of the figures have punctured outlines, while a minority are punctured and abraded. The same techniques were employed at Port Hedland for the outline figures.

The technique of engraving, however, can also be influenced by the texture of the rock. At Mt Cameron West in Tasmania the very soft aeolianite enabled the artists to work in a bold punctured technique but further south at Sundowner Point the harder, fine grained rock compelled them to restrict the size of the figures and work in a typical pecked technique of tiny pits. Both sites are typical of the linear phase of engraving.

Syndey-Hawkesbury Shelter Art Sequence

In my statements in the past about superimpositions in the shelter art of this region I have made it quite clear that none of my phases is limited to one colour, and further, that my sequence has a geographic limit, the Sydney-Hawkesbury region or Sydney Basin. I would emphasise that it is a multi-colour sequence and not a single colour one—thus red and white appear in every phase, but in one phase black is absolutely predominant, and yellow is likely to crop up in any phase. Styles, too, vary considerably. These phases are as follow:

(1) *Stencil phase*. Stencils in red and white, also yellow, of human hands and feet, and artefacts, in wet paint, together with imprints of human hands and feet, and an occasional outline figure. This is the earliest phase.
(2) *Red and white phase*. Drawings in dry pigment in outline, solid and various infilled styles of culture-heroes, humans, animals and artefacts.
(3) *Black phase*. Drawings in dry charcoal in a wider range of subjects than Phase 2, in outline, solid and various infilled styles, with an important series of black and red, black and white, black and yellow bichromes, red, white and black trichromes; the richest phase of shelter art in the region.
(4) *Polychrome phase*. This is known in only one figure, a culture-hero in four colours, associated with a large red bora initiation ground figure.
(5) *White stencil phase*. A very rich phase of stencils of human hands and feet, animals' paws, a wide variety of artefacts, parts of plants and other subjects.

This sequence is based on a study of shelter art at Conjola (McCarthy 1959), Canoelands (McCarthy 1961) and other sites such as the Bull Cave at Minto, and rockshelters at Wollombi, Middletown and elsewhere.

Clegg (1971) rejected this sequence on the grounds that one figure was drawn over another for a specific purpose and they were thus related to one another, but this explanation of superimpositions in European caves is no longer accepted as a general principle nor should it be in Australia. Certainly there are examples of related figures in European caves where pairs of the same two motifs occur in a number of instances in one site. In eastern New South Wales, at Canoelands, the great red bora ground figure is clearly related to the polychrome culture-hero over which it is drawn, and other examples no doubt exist, just as they do in rock engravings. The comparatively few examples of related superimpositions, however, cannot explain away the superimpositions of phases in the rock art, especially widespread phases. The almost unlimited space on the open sandstone surfaces in the Sydney-Hawkesbury region enabled the engravers to avoid overlaying figures in the manner forced upon the artists by the limited space within rockshelters.

A number of critics have erred in interpreting my sequence as a single colour one. On this basis Morwood (1980) produced a table demonstrating the number of times red, white, yellow and black occurred over one another, in disagreement with my sequence. Both Konecny (1981) and Officer (1984) wrongly based their criticism on a single colour sequence. Konecny said 'We do not know when the colours were added—it could have been the same day or the same year'. We are not, however, dealing only with the colours. There was a change in subject from stencils to naturalistic figures, and then a change from red and white figures to black ones, and so on. Unfortunately we do not know the time periods of the various phases but they are consistent in numerous sites. Criticism of the above kind ignores the changes of technique, subject and style that took place in the various phases. It is probable that the last three phases described above, Nos 3-5, are recent, and 4-5 contemporaneous.

The white stencils in particular have caused confusion in the judgment of those who oppose the sequence. It is not generally realised that stencils ceased to be made for a long period of time after the first of the above series of phases until the late resurgence of stencilling in white took place towards the end, or at the end of the black charcoal phase, throughout south-eastern Australia. I identified the white stencils as the latest phase in rockshelters at Mootwingee in western New South Wales (McCarthy and Macintosh 1962), and there are innumerable examples of them superimposed over black and red figures in the Sydney-Hawkesbury region, some of which are illustrated in early papers by Mathews and others. Macintosh (1965) recorded white stencils over black and red figures at Mt Manning, and Moore (1981) found them over a black and red culture-hero at Milbrodale; both authors claimed that the occurrence of these late white stencils invalidated my sequence when in reality they confirmed it. Thus the late use of white stencils means that they overlie all other figures in many friezes of shelter art. Morwood (1980) identified a late white phase in shelters in south-central Queensland.

The complex development of re-outlining figures in the Macdonald valley site described by Sim (1969) and neighbouring areas (Vinnicombe 1980) was apparently part of the rites associated

with the art, and raises the interesting point that a hero or animal drawn in an earlier phase still retained its importance in a later phase of shelter art in the same way as an ancient engraving, abraded in different generations, did in the Sydney-Hawkesbury region. The use of more than one colour for re-outlining figures again exemplifies the continued use of red and white in each phase of my sequence. All of the colours were used in body painting by both men and women at the time of European contact, and probably traditionally as the rockshelter art demonstrates. The retention and wide use of red and white also means that inconsistencies may occur in the sequence.

Cox, Maynard and Megaw (1968) found that a sequence at Audley was comparable with mine, as did Vinnicombe (1980) in the Black Hands Cave on lower Mangrove Creek, while Smith (1983) agreed that the sequence existed in the big series of sites she studied in the Mangrove Creek-Macdonald River area. Officer (1984), in analysing the sites recorded by the Sydney Prehistory Group east of the upper Georges River, said that in this area

> The systematic superimposing of drawn figures over stencils partially supports McCarthy's contention that stencils represent an earlier phase of art in the area.

He thus confirmed two major phases in my sequence. Sim (1969) recorded a sequence in his Macdonald valley site that agreed in the main with mine, though he pointed out several differences between the two.

I would suggest to those studying our shelter art to abandon the single colour approach, and look for a consistent superimposing of techniques, styles and subjects in which various colours are present—only then will they understand my sequence. Whether an earlier art than the first stencil phase exists in the Sydney-Hawkesbury region is a problem worth pursuing.

Classification

It is timely, however, to consider the terminology in use for classifying the engraving and shelter arts. I have used 'naturalistic' and 'linear' as my main divisions in the engravings with subsidiary categories to describe the styles. I described the techniques as abrading, cutting, scratching, percussion (pecking, pitting, gashing, puncturing), percussion and abrading, and drilling. Maynard adopted 'figurative' and 'nonfigurative' for her main divisions, and pecked and abraded as the major techniques. She also called my linear phase of engraving the 'Panaramitee style'. I believe that local names of this kind should not be used for a whole phase, either in engravings or shelter art. The linear phase of engraving varies considerably throughout Australia, and it is premature to identify local variants until a great deal more recording and analysis of motifs has been done. Local names should only be used to identify local variants of a phase.

Officer (1984) in his thesis proposed a hierarchical system of classification because he could not fit his rock art into Maynard's figurative and nonfigurative scheme. The shelter drawings pose problems similar to those of the engravings. I have used drawing with dry pigment, rubbing paint on rock surfaces, splattering, stencilling, imprinting, finger and brush painting as describing the main techniques. The numerous styles in many of the engraved, drawn and painted figures are listed on pages 48-50 of my handbook on the rock art (2nd ed., 1979).

Whether my classifications of engraving and shelter art techniques and styles are satisfactory or not in the changing approach to the study of rock art, especially the trend towards statistical analyses, is a matter for discussion. Flood (1987) can see no reason why my system should be changed, others may require more complex systems. *Rock Art Research* will welcome comments on the problems discussed in this paper.

COMMENTS

By JOHN CLEGG

F. D. McCarthy is correctly recognised as the most important contributor to the study of Australian prehistoric pictures. We are lucky that he continues to produce very valuable and interesting work (for instance the present paper, and his 1983 *Catalogue of Rock Engravings in the Sydney-Hawkesbury District, N.S.W.*), but, for the purposes of exposition, it is convenient to compare the achievements and attitudes of McCarthy in the mid-1960s with more recent paradigms. Almost all of McCarthy's work has stimulated his followers on prehistoric pictures in the last 25 years. Some has never been questioned, some (recordings of Sydney engravings) has been under attack for a long time (and who else can meet John Lough's rigorous standards?). Some has withstood all criticism; some (the pan-Australian sequence of engraving techniques) is not now accepted; some (the Sydney region drawing superimposition sequence) has passed through a stage of doubt to be recently reinstated; much has been misunderstood (the distinction between pecking and puncturing); some has been complicated by analysis ('style' is not now equated with technique: they are studied separately); some has been simplified in practice (engravings, drawings, paintings, and stencils from one area are now considered as one body of artefacts until chronological subdivisions are firmly established). Every part of McCarthy's work has been scientifically productive, for it has stimulated further work on prehistoric pictures.

Knowledge is advanced through many means, including the rigorous pursuit of established problems. But without injections of new ideas, whole disciplines can stultify (Schrire et al. 1986: 127), and some well-intentioned insistence on rigour can effectually prevent the adoption of new ideas or methods which are necessary for progress (Clegg 1978: 43-5, 1984: 112-3). New

ideas can be generated through the stimulating effect of some sites—as McCarthy hints happened at Canoelands and Port Hedland, and has happened to others (Clegg 1971; Garcia 1987).

In the years following 1965 the number of archaeologists in Australia increased enormously. The new people brought new ideas, assumptions and practices, not least in the study of prehistoric pictures. The newcomers were not always as deferential as they should have been to the incumbents, nor were the incumbents always welcoming or encouraging. But there was very little outright confrontation. Perhaps this was a bad thing, because discussion could have clarified issues. As it was, sensitive workers read criticism where none was intended. Unfortunately any novelty can appear to be an attack on the status quo. This can lead to escalating agonies of non-communication. There was certainly something of this sort going on twenty years ago. It is not worth disinterring, but perhaps now we can clear up one or two points, as McCarthy's generous-hearted paper proposes.

The incomers a quarter century ago were aware that F. D. McCarthy had done a heroic amount of work with the available resources, and that no-one could hope to rival his knowledge and experience. There was no serious questioning of McCarthy's conclusions until the mid-1970s. McCarthy did as well as anyone could with his paradigms and data. It would be stupid as well as insolent to claim to know what were McCarthy's aims and assumptions, or how they appeared to others, but I can report how they seemed to me. McCarthy seemed to believe—among many other things, which are not of concern here—that pictures were mostly representations, whose meanings were obvious to people knowledgeable about Aboriginal cultures. Detailed relative dating could be obtained through the careful examination of superimpositions. There is nothing at all wrong with such beliefs, in fact many of them are current, and, as I am reminded by correspondence about the forthcoming Darwin conference, the all-pictures-are-depictions argument is undergoing a forceful renaissance. But I did not share these beliefs, and felt that there was room for different approaches, founded on other assumptions.

My background was in geography, and the English school of Palaeolithic archaeology. I had some practical experience and knowledge of technical terms in the fine arts. Lacking McCarthy's knowledge and experience, I was unable to identify the subjects of pictures. Art was often not figurative, or even representational, so some 'rock art' might not 'be' what it looks like. There are complex problems of interpretation with all arts, and even superficial acquaintance with Aboriginal stories indicates that a kangaroo could be an animal, or a snake disguised as a kangaroo, or a human being. Only very recently (Whitley 1987) has an archaeologist attempted to tackle such problems. The English school of Palaeolithic archaeology had always laughed at well-meaning amateurs who are sure that a naturally broken flint must have been made on purpose because it 'fits so well into the hand'. Instead certain observable criteria were used to determine the stages in the production of the artefact (if such it was). Those same criteria were used to describe and classify the stone artefacts. By examining the temporal and spatial distribution of artefact types and associations some sort of prehistory could be drawn up, apparently based on objective description, and completely bypassing the interesting but intractable questions centred on function, use and meaning. It might be possible to try something of the sort on prehistoric pictures, moving necessarily subjective *interpretation* from the beginning to the end of a chain of argument. Any classifications which arose from such procedures could be productively compared with those produced by other systems.

Dating prehistoric pictures is a very difficult task whose difficulty should not be used (as it still occasionally is) to preclude other approaches. In the Sydney sandstone drawings I was (and still am) unable to satisfactorily discern superimpositions. Since the surface is rough, each drawn line consists of a series of dots, rather than a continuous line; at the point where any two lines cross only one of them is visible, and without actually removing the spot of pigment it is not possible to determine whether or not some other line is underneath. Even the wet pigment stencils are not clear about superimposition, for some pigments are fugitive and wear off or vanish, some paints sink into the surface and percolate beneath it. Then there is the problem of retouching. If a red outline figure was much later outlined in yellow, the figure must be analysed as belonging to two separate styles, and two separate periods, for it might occur simultaneously above and below some other figure. Occasionally a retouch is wrong: careful observation shows that a figure incorporates an erroneous retouching of earlier figure(s). These complications are inconvenient in the field, but full of interest, as they allow insights into prehistoric behaviour—points forcefully made by McCarthy. They raise a whole swag of other questions about what precisely we are trying to date—changes in fashion, medium, and the preferred ways of doing things, or instances of human activity. It seemed to me in the 1960s and 1970s, as it still does, that relative dating of drawings by superimposition studies can reveal general trends of great interest, as Dr McCarthy reminds us in the present paper, but they cannot often provide a firm foundation for further inference.

By contrast *where the pictures are* can be firmly established. It is possible to determine which pictures are close to or overlap each other, which are on the same surface, and the geographical relationships between sites and their pictures. Studies of association, composition, and distribution, which might or might not reveal any interesting patterns, could at least be based on repeatable, checkable observations. Such studies have been proposed and used extensively on all sorts of artefacts, including pictures (Binford 1966; Clegg 1977, 1983a, Whitley 1987). McCarthy him-

self is clearly interested in association, but I do not know where he gets the idea that association *explains away* temporal superimpositions. I have searched Clegg (1971) in vain for mention of the opposition to McCarthy's sequence which he found there. I deeply regret that this misunderstanding was not cleared up 17 or more years ago. My recollection of my attitude at the time of writing is, as stated above, that association and superimposition studies are complementary, rather than in opposition. Composition is a different matter. For me the term is technical and refers to the placing of pictures in relation to each other and the support. For McCarthy the word refers to the meaning of a whole picture if any can be discerned, as in a hunting scene. The study of composition in my sense has progressed slowly. The study of the placing of pictures in relation to the support has been occasionally productive (Clegg 1971; Garcia 1987). The techniques and a few potential uses for further analysis have been worked out (Clegg 1981: 92-124, 1983b: 467-81). The sort of composition which arises from normal drawing activity, performed by several different people over some time on one surface has been defined, and pictures at Bare Hill and in the Sydney area have been shown to differ from that compositional norm.

The study of superimposition of unpatinated engravings is less promising than the study of drawing superimpositions, for a little experimentation reveals that all combinations of engraved grooves or pits can be reproduced by making either groove first. As Dr McCarthy reminds us, his sequence of engraving techniques was established through the study of such engravings at Port Hedland, where four different styles and techniques, incorporating all those known from the whole continent, were discerned. During the 1974 AIAS conference, some geologically knowledgeable persons asserted that the Port Hedland engravings are made on rock which is itself recent—I forget whether the number was a few hundred or a few thousand years. In any case the Hedland engravings cannot possibly be Pleistocene, as are some Panaramitee engravings. McCarthy's reassertion of a pan-Australian engraving sequence which has a punctured outline (simple figurative) phase before a linear (Panaramitee) phase before a fully pecked (figurative) phase certainly provides a challenge. If some of the Sturts Meadows Panaramitee is Pleistocene (as the radio-isotope dates suggest; Dragovich 1986), and the Sydney engravings are older, then the Sydney techniques originated at least in the Pleistocene, and continued right through to contact times—as attested by the engravings of tall ships. The Panaramitee techniques originated later, and did not diffuse as far as Sydney—or did not reach Sydney long enough ago to replace the punctured outline engravings. This scenario is fine, and to be welcomed, partly because it contrasts with what we are used to. If there are any linear Panaramitee engravings in the Sydney area, they should turn out to be very recent. There are in the Sydney area pictures which Maynard recognised fitted technically into her definition of the Panaramitee (Maynard 1976: nos 33, 34, p. 226; 1979: nos 33, 34 p. 96). Unfortunately, these sites have not been dated, but they certainly do not look young. Let us hope Jo MacDonald obtains unequivocal results from her recent excavations of a technically Panaramitee site to the north of Sydney.

McCarthy's comments about diffusion are well taken, though no amount of spreading will account for the ultimate origin. Precisely why some elements diffuse and are readily adopted by neighbouring cultures, while others do not, is an interesting problem. Franklin's ongoing work about the replacement of Panaramitee by simple figurative (or vice-versa!) is an interesting example. I imagine that Franklin used the word 'superficial' to refer to the fact that McCarthy studied the engraved surface, not in a derogatory sense.

McCarthy redefines Maynard's (1976: 85) word *pecked*. Maynard's careful definition states that pecking makes a 'PIT (round, oval, deep, shallow etc.)' which could without violence be extended to include large, small etc. McCarthy's reminder that the Sydney sandstone conjoined punctures are larger than the overlapping peckings of central Australia is well taken, but I must disagree with his cavalier attitude to classification. This is not the place to write a long essay on archaeological classification, which has already been done several times (David Clarke 1968, for starters), but several basic points must be made. There are three essential elements to classification: *description* of the entities involved; *definition* of the classes, which involves at least an implied key, and *naming* the classes. Of these the last is the least important; Dr McCarthy is the only person I have heard of who minds what the classes are called—as long as the names adequately identify and distinguish, that is all we need. Maynard made a pretty good showing at describing her classes, at several levels, as is demonstrated by the fact that many of her definitions are still current (see Flood 1987: 120). The work of definition—the discovery of those traits which distinguish between classes, and allow the construction of keys, was well started by Maynard, and has been subject to criticism and discussion, but not yet improvement (e.g. Rosenfeld 1981: 89). Most of us are unfortunately lazy about providing descriptions and definitions of our classes, with the result that some discussion which could otherwise be productive is not (e.g. the ongoing discussions of the comparison between the undefined categories of trident and 'bird track' in the discussions of Flood 1987). I neither mind nor see any point in McCarthy's proposal to rename some of Maynard's classes. If his proposal is of a reclassification, we need much more information about the description and above all the definition of the entities proposed.

Others may have shared my reservations about McCarthy's Sydney-Hawkesbury shelter art sequence, but, as McCarthy points out, plenty of results supported his conclusions. The result which seems to me most convincing was produced by Laurajane Smith in 1983. Her work was con-

cerned with all the then known pictures in the Mangrove Creek area north of Sydney. In one of her experiments (Smith 1983: 79-80) she counted the instances of various techniques in 98 shelters, which were subjected to a correspondence analysis. There seem to be three rough clusters of sites, relating to the following techniques:

(1) black, one colour, outline, infill, wet and dry;
(2) white, three colours, infill, stencils;
(3) yellow, two colours, outline and infill.

These clusters seem to fit quite well with McCarthy's *black* and *red and white* phases, enough to believe that the relations between McCarthy's phases and the distribution of shelters containing different sets of techniques is well worth pursuing. Morwood (1979: 287, 293, 298) profitably examined the distributions of colour and techniques among shelters.

Sometimes McCarthy was wrong, but stimulated further progress; sometimes he seems to have reached correct answers through data and methods inadequate for the results they achieved; sometimes he was unequivocally right; always his work has been productively stimulating.

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In this paper McCarthy addresses numerous issues. Some deal with regional-specific questions, whilst others address broader issues valid for rock picture studies throughout Australia. I shall only review those which can be illuminated in some way by my own empirical work in the Chillagoe region of north Queensland.

First comes the question of rock engraving *sequences*. McCarthy tells us that in his previous works, he 'placed a geographical limitation on [his] shelter art sequence in the Sydney-Hawkesbury region, but not on [his] rock engraving sequence because the evidence from Australia as a whole overwhelmingly supports an Australia-wide series of phases in this art'. Which of course poses the familiar question 'Was there ever a pan-Australian engraving tradition?' This question remains as important today as it was ten years ago when Maynard wrote her classic paper on Australian Aboriginal rock art, and I believe can only be answered through continued, regionally based empirical studies of individual engraving traditions.

Underlying McCarthy's conclusions is the view that not only was there a pan-Australian engraving *phase*, but that this phase was preceded in many regions by other phases, and followed by consecutive changes in the *technique* employed and *motifs* depicted, resulting in a pan-Australian *sequence* of engraved art. I shall address each part of this model separately.

(1) *A Question of Sequences?*

Following Edwards (e.g. 1966; 1971), Maynard (cf. 1977; 1979) has repeatedly argued that Australia's earliest surviving body of rock art consists mainly of pecked circles, macropod and bird tracks, 'with a smaller number of crescents, groups of dots, human footprints, radiating lines, "tectiforms" or line mazes, and a tiny fraction of other nonfigurative designs' (Maynard 1979: 92). McCarthy, in this and previous papers (e.g. 1962; 1967) has argued that only in certain parts of Australia do the pecked engravings categorised as *Panaramitee* by Maynard form the earliest surviving rock pictures, and that in areas where earlier engravings survive, these consist of (1) abraded grooves, and (2) punctured outline (simple figurative) pictures. Critical to McCarthy's argument is that the change from one engraving phase to another was not necessarily synchronous in all parts of Australia, and that indeed many regions bypassed certain phases. Hence at any point in time, more than one phase was in use throughout the continent. McCarthy proposes that in all regions a strict *sequence* was followed, so that, for example, the linear (nonfigurative) style always follows the punctured outline (simple figurative) style wherever both occur within the one region.

It is only by comparing regional sequences that we may legitimately answer the types of questions which McCarthy has raised. I will examine here the evidence from Chillagoe, north Queensland, where 41 sites were located and recorded (David and David 1988). These contain 67 engravings only, and all are peckings with a very limited range of motifs represented, although there is some evidence of change as there is a clear distinction between heavily patinated engravings and recently engraved pictures with little to no patination of the engraved surface. Both the older, heavily patinated engravings and the more recent unpatinated ones are technically of McCarthy's third phase (Maynard's Panaramitee type). The recent engravings have been seen to *overlie* unfaded paintings, whilst the older engravings have never been noted in direct association with paintings. In Figure 1 I illustrate and quantify the distribution of individual peckings from Chillagoe.

Thus whilst McCarthy's proposed sequence cannot be said to be applicable for the Chillagoe region, his broader theory states that not all phases will occur in all regions, and therefore the Chillagoe data neither supports nor falsifies his claims. The fact that the Chillagoe sequence consists of an initial linear (Phase 3) tradition followed by another Phase 3 tradition, however, somewhat restricts the decriptive value of McCarthy's sequence. Furthermore, at Chillagoe the earlier engravings consist of circles, macropod and bird tracks, crescents, and a small number of other nonfigurative peckings, whereas the later engravings consist entirely of groups of small, shallow, circular pits, usually arranged in roughly circular clusters. Both phases are hence characterised by nonfigurative peckings, and the absence of all but McCarthy's Phase

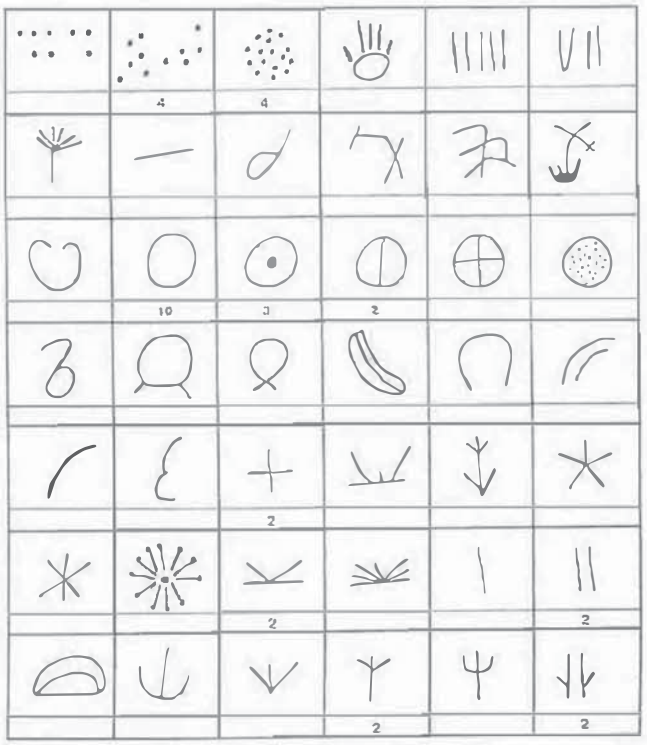

Figure 1.
Chillagoe engravings. Each motif is represented by a single picture unless otherwise stated.

3 type engravings weakens McCarthy's claim that his sequence is valid for all parts of Australia where engravings occur.

(2) *McCarthy, Maynard and the Panaramitee*

Having said this, it is now necessary to compare Chillagoe's engravings with Phase 3 (Panaramitee) engravings from other regions of Australia. If the Panaramitee-type engravings from different parts of Australia really are of a common tradition, then we must show the similarities in the *forms* of each region's engravings.

Information on the engravings from only three areas of north Queensland is available for comparison. These are the Chillagoe region (David and David 1988); the Koolburra Plateau (Flood 1987); and the Laura region (Rosenfeld et al. 1981; Woolston and Trezise 1969). I limit myself here to a brief discussion of some of Australia's recorded engravings, by comparing eight bodies of engravings. These are:

(1) the early Koolburra engravings (Flood 1987);
(2) the late Koolburra engravings (Flood 1987);
(3) the Olary Province engravings (Nobbs 1984);
(4) the Carbine Creek (near Mt Isa) engravings (Morwood 1985);
(5) south/central Australian engravings (Maynard 1979; Flood 1987);
(6) the early Chillagoe engravings (David and David 1988);
(7) the late Chillagoe engravings (David and David 1988);
(8) the Laura engravings (as tabled in Flood 1987).

For comparative purposes I use the same categories as Maynard (1979) and Flood (1987). The pattern which emerges is interesting. First, there is a very narrow range of motifs used in all regions: a high proportion of all bodies of engravings are macropod and bird tracks, circles and crescents, with other linear but nonfigurative motifs also being common. The degree of homogeneity is marked, whilst the *composition* in each region varies dramatically in terms of the numerical importance of each motif. There is a marked similarity between the early engravings of the Chillagoe region and those of Carbine Creek. They differ significantly from those of sites from Laura and the Koolburra Plateau, whilst the engravings from south/central Australia and the Olary Province are likewise different in terms of motif composition.

I would have to agree with both McCarthy and Maynard that there does appear to be a relatively early pan-Australian engraving tradition which is reflected in the surviving art of many parts of Australia. However, important regional differences exist, differences which call for at least an extension of McCarthy's model. It is possible that Australia's earliest artistic

	Early Koolburra	Late Koolburra	Laura	Early Chillagoe	Late Chillagoe	Carbine Ck (Mt Isa)	South/ central Australia	Olary Province
Macropod tracks	29	16	18	3	-	2	35	21
Bird tracks	46	12	20	8	-	10	29	13
Pits	14	-	3	2	100	8	4	16
Circles	-	19	8	34	-	41	24	35
Crescents	-	-	19	10	-	5	2	3
Human foot & hand prints	-	6	13	2	-	1	2	3
Other figurative	-	18	8	-	-	3	1	2
Other non-figurative	10	17	10	41	-	30	2	8

Table 1. *Percentages of motif types, engravings.*

tradition(s) were based on a common tradition, but I do not find much support for the contention that this early phase was followed by further phases which were common to most, if not all, parts of Australia. Rather I find it more convincing that an initial, *possibly* pan-Australian, engraving tradition was followed by regional-specific sequences. In north Queensland at least there is no support for McCarthy's sequence of phases.

Underlying McCarthy's model is the concept that ideas, and with them stylistic conventions, disperse in space and time. This may or may not be associated with the movement of *people* throughout the continent. For this reason McCarthy has once again addressed important issues, for I believe that it is through rock art studies that we will, in future, most profitably be able to address issues concerned with past social relations in Australian prehistory. For example what are the implications of an early pan-Australian art style to the way people related in early Australian prehistory? What do the subsequent changes in local artistic traditions tell us about changes in the social life of Australian Aborigines? Is an initial period of relative homogeneity followed by an 'efflorescence' of local artistic styles, and if so, what does this tell us about the dynamics of prehistoric Aboriginal populations? I feel that Australian art studies (and hence Australian archaeology) are at an exciting stage, and this is only so because of the types of questions that McCarthy and his peers have asked.

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By NATALIE R. FRANKLIN

This paper represents an overdue response by McCarthy to criticisms levelled against his chronological framework of Australian rock art. In particular it attempts to clarify two contradictory sequences, proposed by McCarthy (1959, 1961, 1962, 1964) and Maynard (1976, 1979), both of which synthesise the patterned variation within rock engravings, paintings and drawings found throughout the continent. The sequence of phases McCarthy claims for engravings was applied to the whole of Australia, while that for the rock drawings is specific to the Sydney-Hawkesbury region.

It is unfortunate that the paper has only partially clarified the situation. McCarthy has failed to address the specific, fundamental problems which Maynard (1976, 1979) and others (Clegg 1971; Morwood 1980; Konecny 1981; Franklin 1984; Officer 1984) have observed in the chronological schemes for engravings and drawings. I shall in particular consider the former sequence since my own research has been concerned with rock engravings. According to McCarthy,

> Some archaeologists, including Maynard, regard the whole of the art in an engraving site as one body of art and on this basis Maynard dismissed my rock engraving sequence at Port Hedland, western New South Wales and in the Flinders Ranges.

However, Maynard (1976, 1979) proposed that the Port Hedland engravings belonged to one broad period of time as an alternative to McCarthy's hypothesis of multiple phases only after a detailed examination of some fundamental problems with his sequence. It is worth briefly reiterating these specific criticisms here:

(1) Maynard (1976: 60-1, 1979: 90-1) considered the most significant problem with McCarthy's sequence of rock engravings, formulated at Port Hedland from a study of superimpositions, was the difficulty of determining the order in which two or more intersecting engravings were made. One aspect of this problem is the erosion and patination of engravings subsequent to their manufacture, such that their intersecting facets can no longer be seen, a particular difficulty when dealing with a superimposition sequence of solid figures over lines (McCarthy's fourth phase over third phase). The use of photographs to deduce the occurrence of the latter sequence at sites in the Flinders Ranges (McCarthy and Macintosh 1962: 288) indicates that the possibility of a reverse order for such figures has not been considered. McCarthy never described how he derived superimposition sequences at Port Hedland, but merely listed instances as if their determination were elementary. As Maynard has stated (1979: 91),

> . . . it would be impossible to determine by superficial examination the sequence in which these were made although detailed work with powerful lenses and artificial lighting might produce some results . . . *Superficial examination* would be very good for confirming a preconceived idea of the order in which two figures ought to have been made [emphasis mine].

An investigation without the use of such powerful lenses and artificial lighting at Port Hedland is the context of 'superficial examination' in the quotation of mine cited in McCarthy's paper. It was not intended to imply the amount of time spent recording the site, as McCarthy believes.

(2) McCarthy claimed that the same styles as those identified at Port Hedland occurred at many other sites in all parts of Australia, and that invariably the same patterns of superimposition are revealed. However, Port Hedland is the only site for which the whole sequence has been documented (Maynard 1979: 90), and this has been merely in the form of a simple listing of instances, hardly an adequate demonstration that the sequence occurs.

(3) The extension of this sequence from the site at which it was formulated to the whole continent is unjustified since most of the motifs at Port Hedland are dissimilar to those at other sites. For instance, McCarthy equated outline figurative engravings at Port Hedland with those found in the Sydney region, even though the range of subjects and their infill

decoration are quite different (an observation which was quantified in a Correspondence Analysis [Franklin 1984]) and there are no similar or intermediate figures anywhere in the vast intervening regions (Maynard 1979: 91). McCarthy appears to have taken the similarity in technique between the two regions as a factor overriding more fundamental differences, as is implied by his response to my conclusions (Franklin 1984, cited by McCarthy) that the Sydney and Port Hedland engravings are as different from each other as they are from rock paintings at Laura, Cobar and the Grampians.

(4) The spread of dates for McCarthy's first phase, abraded grooves (20 000 BP at Koonalda Cave [Maynard and Edwards 1971]; 4000 BP at Devon Downs [Hale and Tindale 1930]; and within the living memory of Aboriginal informants at Delamere [Arndt 1962]), destroys their use as a chronological marker within the sequence. Maynard (1976: 61-2; 1979: 90) also argues that it seems inappropriate to consider abraded grooves as a whole phase in a sequence of styles, since the technique is so simple and produces such invariable results.

(5) McCarthy has failed to clearly define the units, or 'styles', in the Port Hedland material, and there are many internal inconsistencies in his classification. For example, the anthropomorphous *Minjiburu* figures are classified by McCarthy (1962) as 'outline', despite the fact that the lines of which they are composed do not enclose space, and their hands and feet consist of pecked solid forms, which should belong to the final phase at the site (Maynard 1976: 62-4, 1979: 90).

McCarthy has considered none of these quite substantial criticisms in his paper. It is essential that he address each of the problems discussed by Maynard (1976, 1979) if his proposed sequence of rock engraving styles is to be given any credibility. In particular McCarthy must describe precisely how his sequence was derived, since its very basis—the study of superimpositions of engravings—has been questioned.

Other problems are apparent in the sequence of rock drawings proposed for the Sydney-Hawkesbury region. McCarthy states that superimpositions do not occur among engravings in this area due to the large expanses of sandstone available for such artistic activity, and that by contrast rock artists were forced to overlay figures as a result of the limited space of the shelter walls. However, this argument contradicts McCarthy's main thesis, in that it implies the superimposition of drawings is a function of the space available for art, and not necessarily a function of time at all.

McCarthy has also failed to deal satisfactorily with the problem raised by Konecny (1981) that the duration of time between the addition of the colours in the sequence (possibly the same day or the same year) is unknown. McCarthy has not recognised the possibility of a 'cultural' sequence in which different colours were applied—a 'way of doing things' involving the addition of colours to rock walls in the prescribed sequence that McCarthy has observed in the superimpositions.

Another major point I would like to take up is McCarthy's position with regard to the use of statistics in the analysis of rock art. I shall deal with some specific points first, and then address McCarthy's general criticism of statistical studies of art through the use of an example derived from my own recent work on rock engravings in the Laura region, north Queensland.

McCarthy claims that his sequence of colours in the drawings of the Sydney region is 'consistent in *numerous* shelters' (emphasis mine). However, he has never provided any documentation of the number of shelters at which the superimpositions occur nor of the number of superimpositions involved at each shelter. Such documentation is essential if his sequence is to have any validity. The extrapolation from a number of specific instances of superimpositions at one site to general inferences about a regional sequence demands an 'adequate sample size', requiring many examples at one site and many sites with superimpositions (Morwood 1979, 1980). It appears that neither of these conditions has been met in McCarthy's colour sequence, as far as can be discerned from the articles in which it is presented in detail (McCarthy 1959, 1961). For example, one whole phase in the sequence (the polychrome phase) has been based on the occurrence of one example at one site.

A clarification is required of McCarthy's (not strictly correct) observation that a statistical analysis of rock art is '. . . a sound method for establishing style and its variation in the figures, but not, apparently, for detecting phases . . .'. The groups derived from a statistical analysis may be the result of chronological changes within the art, which must then be tested against some independent form of evidence, or they may be the result of cultural factors which remain to be explained.

However, some multivariate reduction techniques can be used directly for the seriation of archaeological material (Kendall 1971; Doran and Hodson 1975: 269-84), and Correspondence Analysis is particularly useful for this purpose. This technique is especially appropriate for the analysis of 'abundance type' data (percentages or counts) (Hill 1974; Teil 1974; Bolviken et al. 1982; Wright 1985) and the results are in the form of joint plots of the representations of units and variables in various two-dimensional sub-spaces. If there is some dominating effect of time in the data, this effect will usually show up in the first two dimensions (Bolviken et al. 1982: 57. See pp. 51-4 for a practical example). A quantitative analysis from my own recent work will suffice to illustrate the use of multivariate techniques in the seriation of rock art.

A modified Correspondence Analysis (C.A.) program (Wright 1985) has been used in a study of the internal patterning present in 17 rock

engraving sites in the Laura region, north Queensland, described by the frequency (abundance) of 19 variables (in this case motifs) present at each site. The motif counts used in the analysis have been derived from illustrations in Rosenfeld (1981), and Woolston and Trezise (1969), and unpublished scaled drawings lodged by Trezise with the Australian Institute of Aboriginal Studies. The aim of the analysis was to compare the groups derived from the C.A. with the three 'Complexes' of rock engravings in the Laura region defined by associations of motifs (Rosenfeld 1981: 85-8). The three groups were given some chronological integrity on the basis of excavated evidence, differential patination of motifs and the few instances of superimposition (Rosenfeld 1981: 85). Listed below in terms of the motifs which distinguish them (with the corresponding variables used in the C.A.) and the sites at which they occur, the Laura engraving 'Complexes' are:

(1) *The Early Man Complex*: pits in clusters and in isolation (variables 1 and 2); 'tridents and their variants' (3-8) (Rosenfeld 1981: 85); mazes of rectilinear (9) and curvilinear configuration (10); circles or 'enclosures' (11) often pecked around natural depressions; circles with internal designs, or 'discs' (12).
Sites: the Early Man main shelter; St George River Shelters B, D and G; Emu Dreaming; Deighton River Shelter; Split Rock; Mounted Horse Gallery.

(2) *Later Nonfigurative Engravings*: basically the same range of motifs, but with less intense patination of figures and with the addition of some innovations of design.
Sites: Quinkan Gallery Sites B5 and B6; Early Man Collapsed Shelter, Early Man Shelter H; St George River Shelters B and I.

(3) *The Laura River Complex*: human figures (variable 13); other figurative designs (14); macropod tracks (15-17); human footprints (18); crescents or 'boomerangs' (19).
Sites: Laura River Crossing; Early Man Rock Platform; Possum Gallery; St George River Shelter C; Quinkan Gallery Site B6.

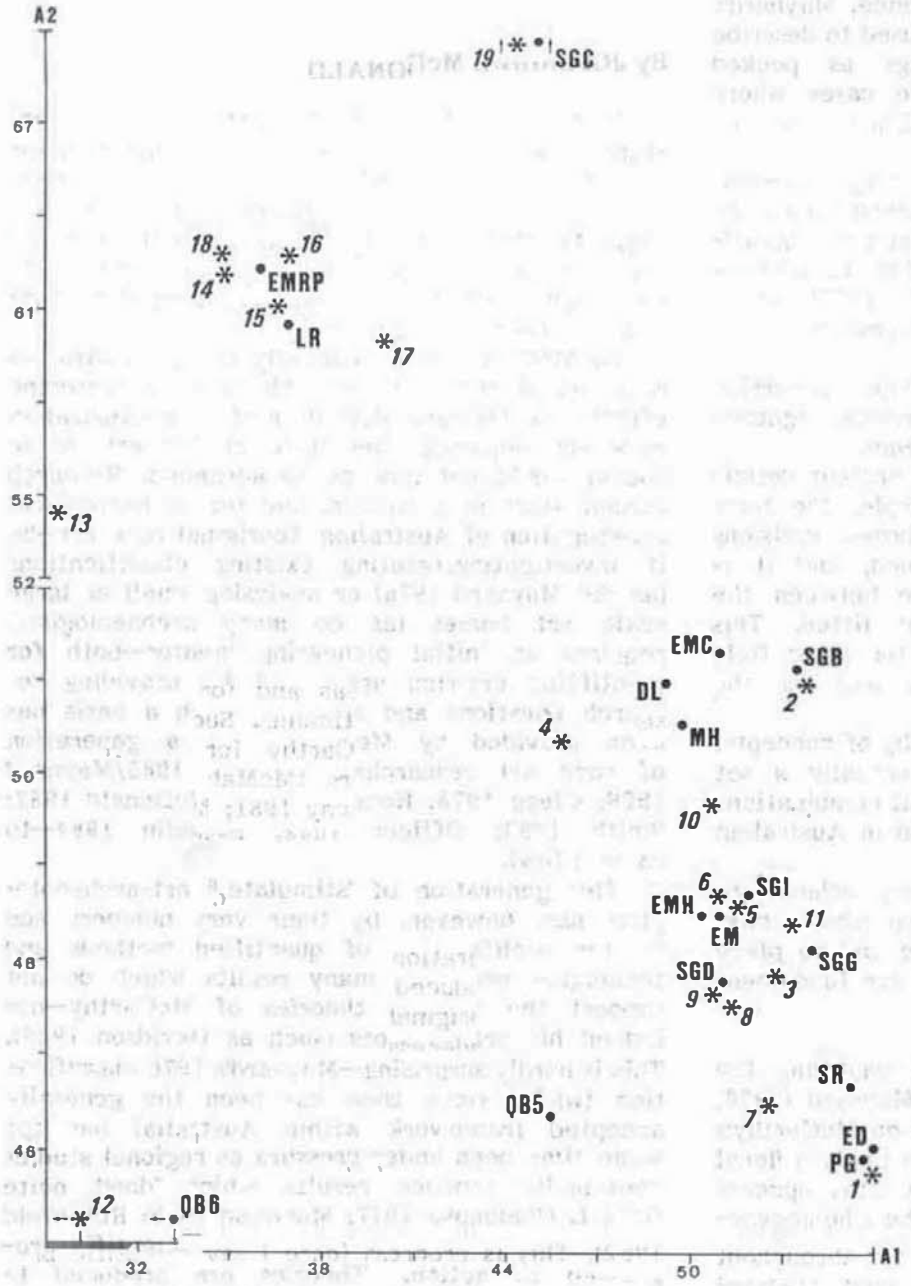
Only motifs which Rosenfeld holds are diagnostic of the engraving 'Complexes' have been used in the multivariate analysis, so that the whole corpus of motifs at sites is not always necessarily considered. Similarly, only sites which Rosenfeld (1981) has described have been used and other unpublished sites recorded by Trezise were not included.

A comparison between the sites belonging to Rosenfeld's three 'Engraving Complexes' and the results of the C.A. (Fig. 1) indicates some measure of agreement. Most of the sites on the left-hand side of the scatter diagram, that is, Quinkan Gallery Site B6 (QB6), St George River Shelter C (SGC), Laura River Crossing (LR) and the Early Man Rock Platform (EMRP), belong to the 'Laura River Complex', the latest phase of rock engravings in the Laura region (Rosenfeld 1981: 87). However, apart from the Early Man Rock Platform and the Laura River Crossing, not all of these sites are particularly close together. The C.A. has split the group into sites with crescents (SGC); those with macropod and human tracks, and other figurative motifs (EMRP and LR); and those with solid circles and anthropomorphous figures (QB6). Rosenfeld (1981: 87) has also separated out the former and latter sites, noting that Quinkan B6 has an engraving of an anthropomorphous figure and St George Shelter C 'boomerangs' or crescents. The former site has been classified as belonging to both the 'later nonfigurative engravings' and to the 'Laura River Complex' (Rosenfeld 1981: 86-7), and as such it cannot cluster distinctly into separate chronological groups. It is thus distinguished as 'mixed', with the occurrence of early nonfigurative engravings in the form of pecked 'discs' (variable 12) as well as a later figurative 'woman' (variable 13).

The sites on the right-hand side of the scatter diagram generally conform with those defined by Rosenfeld as part of the 'Early Man Complex' and 'later nonfigurative engravings', although there is no separation between these two broad groups.

A site which forms an exception to the apparent loose grouping of the 'Laura River Complex' in the C.A. is Possum Gallery, which clusters with sites on the opposite side of the scatter diagram, that is, with the 'Early Man Complex'. The majority of 'motifs' at Possum Gallery consists of pits (66.1% of the motif assemblage), a feature of the latter group. It appears that Rosenfeld's inclusion of the site in the 'Laura River Complex' is inconsistent and probably due to the occurrence of one pair of engraved macropod tracks in the shelter. Despite the separation of Possum Gallery from other sites of the 'Laura River Complex', it is encouraging that the Correspondence Analysis has supported Rosenfeld's contention that sites with macropod and human tracks are distinct and separate from other sites in the Laura region, and that '. . . macropod and human tracks are conspicuously absent . . .' (Rosenfeld 1981: 89) from the 'Early Man Complex'.

I have discussed this example at some length in order to demonstrate that a statistical analysis, deriving different clusters in a corpus of art, can be used to test chronological groupings derived from other means, in this case differential patina conditions, superimpositions and excavated evidence. It is possible that all the Correspondence Analysis has done is confirm Rosenfeld's classification in terms of the motif groupings, and not the chronological integrity which has been placed upon it, but at least some support has been provided and some means other than assertion that a sequence exists has been employed. The point is that, as with superimposition analysis, some independent evidence is required to test whether the clusters derived are the result of time, culture, function or whatever. As Morwood (1979: 281) has observed, to demonstrate whether or not any sequential trends in a body of art are time-dependent, other possibilities must be discounted. Otherwise there is no guarantee that the 'phases' resulting from a superimposition analysis are



KEY:

• *Sites* ✻ *Motifs*

Abbreviations for Sites:

EM - Early Man Main Shelter
EMC - Early Man Collapsed Shelter
EMH - Early Man Shelter H
EMRP - Early Man Rock Platform
SGB, SGC, SGD, SGG, SGI - St George River Shelters B, C, D, G and I
ED - Emu Dreaming
DL - Deighton River 'White Lady Shelter'
SR - Split Rock Shelter
MH - Mounted Horse Gallery
QB5, QB6 - Quinkan Gallery Sites B5 and B6
PG - Possum Gallery
LR - Laura River Crossing

Motifs:

(Motifs in quotation marks are defined and illustrated in Rosenfeld 1981: 53-4, 59)
1 - 'Pits', in clusters and in isolation
2 - 'Pits', conjoined and in a row
3 - 'Tridents', outer two lines curved
4 - 'Tridents', all lines straight
5 - 'Tridents', outer lines curved and a fourth line extends the central line beyond the convergence
6 - 'Tridents with spur'
7 - 'Joined tridents'
8 - 'Tridents joined back-to-back'
9 - 'Rectilinear mazes'
10 - 'Curvilinear mazes'
11 - 'Complete and incomplete rings'
12 - 'Discs'
13 - Anthropomorphous figures
14 - Other figurative motifs
15 - Paired macropod tracks
16 - Single macropod tracks
17 - Paired macropod tracks
18 - Human footprints
19 - Crescents

Figure 1.
Correspondence Analysis of 17 rock engraving sites in the Laura region. The first two dimensions (axes) account for 44.7% of the variability within the sample.

the result of time at all.

McCarthy's 'explanation' (diffusion) for the similarities observed between widely dispersed bodies of art, for instance, western New South Wales, central Australia and the Flinders Ranges, would benefit from greater precision and explication. While I agree that questions such as 'why did every group of artists use a similar range of motifs . . .?' (McCarthy p. 17) certainly need addressing, simply attributing a cultural similarity to diffusion '. . . is only a statement of results, not a definition of process. It is descriptive, not explanatory' (Barnett 1953: 10-1). McCarthy mentions nothing of the mechanisms involved in the diffusion of art styles across the continent. In future any such 'explanation' must develop a model taking into account such variables as the donors and recipients involved in diffusion; the units that are diffusing (for example, techniques, motifs, or whole associations of motifs?); the media of diffusion; and the social context in which diffusion occurs (Davis 1983). A number of hypotheses relating to the ways in which continent-wide diffusion of art styles might occur can then be formulated and tested on data indicating 'statistical' similarities between various bodies of art. In this way, contrary to McCarthy, statistical studies of rock art styles do not ignore the cultural and prehistoric data, but instead attempt to explain them.

McCarthy has considered the technique used in the engravings of the Sydney-Hawkesbury region at some length in this paper. The technical term he prefers is 'conjoined punctures', and it appears that in the past confusion has resulted due to a lack of precise definition on McCarthy's part. How, for example, does this description of technique relate to the nomenclature used elsewhere in McCarthy's work (McCarthy 1968, 1979)? The techniques of pecking and puncturing, which are distinguished as separate phenomena by McCarthy, appear to be in reality the same: some form of indirect percussion, with different implements and perhaps different amounts of force being used to make the tiny 'pits' and 'punctures' referred to in the two respective techniques.

It appears to me that in this instance, Maynard's (1977) clear terminology should be used to describe the Sydney-Hawkesbury engravings as pecked (indirect percussion), and in those cases where the pits have been obliterated by abrasion, pecked and abraded.

As far as general classificatory divisions for Australian rock art are concerned (discussed at the end of the paper under the heading Classification), McCarthy has again failed to address criticisms posed by Maynard (1976, 1977), which are summarised in the following paragraphs:

(1) The possibility of relationships occurring between paintings and engravings, ignored in McCarthy's classificatory scheme.
(2) The lack of definitions and the unclear definitions in the system. For example, the term 'linear', one of McCarthy's broad divisions for engravings, is never defined, and it is difficult to see the difference between the various 'petroglyph techniques' listed. This imprecision makes it difficult for other field workers in Australia to apply and use the system.
(3) The lack of a consistent hierarchy of concepts, so that the nomenclature is actually a set of pigeonholes or finite list of all combinations of different traits ever observed in Australian rock art.
(4) The failure of the classificatory scheme to include items in the same group which share a common design characteristic and to place items in different groups which are fundamentally dissimilar.

The statement in this section regarding the Panaramitee style as defined by Maynard (1976, 1977) indicates a misunderstanding on McCarthy's part. The term was not intended to imply a 'local variant' of a whole phase, as McCarthy appears to believe. It was intended to describe a homogeneous style of engravings, which occurs throughout the continent, but which reveals some regional variation in its more infrequent motifs. Maynard herself did not identify these regional variants. The use of a 'local name' for the style was merely conforming to the standard archaeological practice of naming a recognisable group of artefacts after a type site which contains a large and typical example of them. The Bondaian phase, for example, has been named according to this principle.

Finally, I applaud McCarthy's attempt to clarify one of the fundamental foundations upon which the analysis of rock art in Australia has been based—superimposition sequences of rock engravings and drawings. It is only to be considered all the more unfortunate that he has failed to address all the criticisms that have been levelled against him.

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By JOSEPHINE McDONALD

In this article Fred McCarthy reiterates his stance on rock art sequencing, classification and style analysis, and contends numerous points of criticism. As such, it raises many issues and suggests that the results of current research are not being disseminated quickly enough to keep pace with the rapidly expanding data base and our understanding of this.

Dr McCarthy is undoubtedly one of Australia's rock art pioneers. Without his massive recording efforts and his early definition of a pan-Australian rock art sequence, the state of the art (so to speak) would not now be so advanced. Research cannot start in a vacuum and the archaeological investigation of Australian Aboriginal rock art—be it investigating/refuting existing classifications (as did Maynard 1976) or analysing small or large scale art bodies (as do many archaeologists) requires an initial pioneering mentor—both for identifying art-rich areas and for providing research questions and stimulus. Such a basis has been provided by McCarthy for a generation of rock art researchers (McMah 1965/Maynard 1976; Clegg 1978; Konecny 1981; McDonald 1982; Smith 1983; Officer 1984; Franklin 1984—to name a few).

This generation of 'stimulated' art-archaeologists has, however, by their very numbers and by the proliferation of quantified methods and techniques produced many results which do not support the original theories of McCarthy—nor indeed his predecessors (such as Davidson 1936). This is hardly surprising—Maynard's 1976 classification (which since then has been the generally accepted framework within Australia) has for some time been under pressure as regional studies continually produce results which 'don't quite fit' (cf. Chaloupka 1977; Morwood 1979; Rosenfeld 1982). This is progress (dare I say scientific progress?!) in action. Theories are produced to be tested and, while no-one likes to be wrong, progress often results in earlier theories being modified or refuted.

For several reasons I am restricting my comments here to McCarthy's sequence for the shelter art component in the Sydney Basin. Firstly, this is a body of art which is still relatively unknown (particularly compared with the engraved component); and secondly, identifying the form and content of this art component represents a large part of my ongoing research.

I have been working on both the shelter art and engraved components in the Sydney Basin for over three years, both as a National Estate Project (McDonald 1985, 1986) and subsequently for a PhD program. During this time, I have analysed the assemblages of over 420 shelter art sites, recorded in detail the art in another 170 such sites, and visited (superficially) numerous more. I have also commenced an excavation program designed to approach (among other things) the question of aligning possible changes in the content of this art over time with changes

in site occupation.

Field-oriented research is still in progress, and so no large scale synthesis has as yet been undertaken. I have, however, formulated numerous ideas about the pigment art in this region. Many of these ideas are not in total accord with those of McCarthy and his model is one which is to be tested by subsequent analyses.

For instance, I think that attempts so far to distinguish any sequencing in the pigment art for this region have failed. With a much enlarged data base (almost 600 sites) exceptions are more numerous than the rule. This evidence tends to suggest that this art is all roughly contemporaneous and there are several other factors, which support this view.

(1) The medium (i.e. Hawkesbury Sandstone) is too unstable to sustain pigment art (in any recognisable form) for any great length of time.
(2) There is no appreciable change in *style* (i.e. as a combination of colour, form and technique) through time.
(3) There appear to be major and differing exceptions to 'the sequence' of colour and techniques across the Sydney Basin, particularly in crossing the posited cultural boundaries (see Capell 1970; Gunson 1974; Ross 1976).

As well as having had trouble testing McCarthy's model in the field—in terms of finding many sites which do not comply and others in which the superimposed sequence is uninterpretable—McCarthy's phases appear to be an injudicious splitting of the artistic elements present in this regional art body.

Take for instance the supposed presence and predominance of stencils both at the beginning and end of the sequence. How does one distinguish between an early white hand stencil and a late one? This distinction makes the model (both practically and theoretically) impossible to test. The fact that stencils are found throughout the sequence (i.e. at the bottom and the top of superimposition sequences) would tend to suggest that the technique was in use throughout the whole period of artistic activity in the region. The presence of this ubiquitous technique Australia-wide, in association with a range of different styles makes it seem dubious that it can be used as a temporal marker. It seems more likely (in the Sydney region) that the distribution of stencilling may have spatial (cultural ?) significance.

Within the Sydney region the distribution of stencils (and other artistic techniques) is uneven. Stencilling predominates (sometimes to the exclusion of drawn or painted motifs) towards the north of the region while at the southern end of the basin the incidence of the stencil technique decreases dramatically and the assemblages here are more restricted in terms of technical variation—i.e. the art consists predominantly of charcoal drawings (McDonald 1986). That McCarthy's model does not account for stylistic variability across the region is one of its failings.

Another problem with McCarthy's sequence is that it does not account for several artistic techniques which are quite common in the region. For instance, white paintings (often of complex nonfigurative designs) and engraved motifs (either incorporated with drawn motifs or discretely positioned) have been found to occur quite regularly in shelter art sites, particularly north of Port Jackson.

The presence of an engraved component in the Sydney shelter art sites is particularly interesting, especially since there are three distinguishable types of engravings. That an *engraved* sequence may exist within this region and be identifiable in the shelter art component is a possibility previously unrecognised—although Maynard did identify a site in the Blue Mountains as being of the Panaramitee style (Maynard 1976). This issue may be (at least partially) solved by a recent excavation completed in the north of the basin near Mt Yengo (McDonald in prep.). At this site an engraved panel of circles and macropod tracks was covered to a depth of 35 cm by rich occupation deposit. The site was also extensively decorated in white, red, yellow, pink and black hand and weapon stencils and a few white drawings and paintings. Charcoal has been submitted for dating from several levels within the site, and C^{14} dates should soon be to hand.

The conflict between McCarthy's and Maynard's engraving sequences may well be clarified by the results of this excavation. It is my feeling that the engraved panel at Mt Yengo represents a regional variation of Maynard's Panaramitee/McCarthy's linear and that this is an earlier phase of engravings in the region than the classic open-platform form (Maynard's simple figurative/McCarthy's punctured outline). Certainly the engraving activity here predates the existing pigment art—which by McCarthy's shelter art sequence could be the earliest (or latest) art form in the region.

McCarthy's polychrome phase with its single Canoelands motif is also an unacceptable 'splitting' of the style. The interpretation of multicolour motifs has always been controversial (as indicated by Konecny 1981) since the application time of separate and subsequent colours cannot be proved. The addition of further colour in a later phase (or even just at another time) represents something quite different to an isolated event in which a motif of more than one colour is produced—although the significance of either has yet to be ascertained. For a whole phase to be assigned to a single motif creates questions relating to the temporal value of each phase.

Indeed, one must question the value of any sequence that has several phases 'probably contemporaneous'. The lack of a temporal alignment for the sequence (what is 'recent' [McCarthy this article, p. 18] ?) or of any recognisable form of theoretical construct (what is 'style'; or how are these phases thought to relate to the archaeology—or even to the Aboriginal culture which produced them), makes interpreting the overall usefulness of the model very difficult.

That one phase contains a single (unique)

motif and that 'due to the retention and wide use of red and white . . . inconsistencies may occur in the sequence' (McCarthy this article, p. 19) further obfuscates the problem. These factors, combined with those noted above—the lack of recognition by the model of several common technical aspects or of regional stylistic variability, and that the first and last phases consist of the same artistic technique—make the sequence outdated, unreliable and untestable.

Our recognition of the complexity of Sydney Basin rock art increases as more data is collected. As yet, the broader data base has defied neat compartmentalisation. While spatial patterning in the engraved and shelter art components is becoming clearer, a temporal sequence is as yet beyond our interpretative skills.

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By LESLEY MAYNARD

A colleague now too eminent to be named once suggested resolving the great Australian rock art problem by confining all the Australian rock art experts in a smallish room and anointing as Sole Expert the one who emerged alive. Might I suggest the substitution of a smallish limestone ridge south-west of Port Hedland, at low tide in the late afternoon. In my opinion, that bloody limestone is too soft for the entire development of Oz rock engravings to be manifest on its present surface.

Maynard (1979: 89-91), in which the word 'superficial' occurs, does not refer to the length of McCarthy's study, but to the question of superimposition as a method of relative dating. In my experience, the details of the junction between overlapping engravings are almost always obscured by patination and/or erosion. The few clear examples usually involve the least diagnostic motifs in the assemblage. Fine scratches are sometimes clearly the latest addition to a surface, but who can make an art style out of scratches, supposing they were not made by owls or yowies? [The yowie is Australia's equivalent of the sasquatch and yeti.] Solid forms (McCarthy's 'fully pecked') will appear (to superficial and close observation) to obliterate lines when both are patinated, but if the solid was there first, and had reverted to the colour of the surrounding surface, a line engraved over it would appear more recent only until it was patinated in turn.

It is interesting that the least superficial examination of rock engravings, i.e. petrological analysis (Trendall 1964; Clarke 1978; Dragovich 1984), tends to confirm that simple observation of relative degrees of weathering and patination is no guide to age or sequence. After contemplating 9244 engraved motifs on the Burrup Peninsula, Vinnicombe (1987: 29) dismissed Lorblanchet's 'superimposed sequences and stylistic chronologies . . . (as) . . . beset with problems', and endorsed Trendall's and Clarke's view that present colour gradations and even techniques of engraving relate mainly to the depth of the weathering crust on the original surface. Rock art has more than seven veils!

I am happy to bury 'Panaramitee style' (even though it is so easy to spell), but I do not think 'linear (nonfigurative)' is a great improvement when (figurative) tracks are numerically dominant at most of these sites, at least in the core area of South and central Australia. Perhaps AURA could offer an award for an appropriate descriptive term. I should have called it 'tracks and nonfigurative style' to match my other two boring titles. Edwards (1966, 1971) made the main contribution of illustrating and describing the range of motifs, environmental setting, archaeological associations, probable age and vital statistics, but Godfather Bob never christened his infant. An early session of the Great Rock Art Debate was convened by Bob at Panaramitee after an ANZAAS Congress in Adelaide. For a while it was referred to in conversations as 'the Bob Edwards Style', but everyone would have made indignant noises if I would put that in print, so I called it Panaramitee. *Mea culpa* for sentimentality.

When I wrote Maynard (1977) in 1974 I believed that consistency was all-important, and in its name did a proper hatchet job on McCarthy's classification system. I observe that he has not retaliated, as I Richly Deserve. Since then I have noticed that many people who get involved in this field seem to enjoy creating new classification systems to suit their own pet rock art, and their discussions thereof are so interesting and useful for understanding their material that it would be a pity to stifle these separate initiatives in the name of boring old consistency. Who can stifle a rock art nut, anyway? And what rock art nut can be persuaded to embrace another one's terminology? I think 'puncture' suggests a perforation in a membrane (skin, tyres, the holes around postage stamps) rather than a depression in a solid surface . . . hush ma mouf; I shall humbly await the 'complete reassessment . . . of Maynard's concepts' as promised by the Editor.

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By DAVID R. MOORE

It is easy in hindsight to criticise the pioneers in any field for postulating hypotheses which have been modified or disproved by later work. McCarthy's subjective and humanistic approach to rock art studies is admirable in this age when mechanistic and computer-based research is paramount, but such an approach must be tempered by scientific method. The scientific modus operandi is to hypothesise on the basis of current data, then modify or discard as new evidence comes to light.

Unfortunately our two major pioneers in prehistoric studies, McCarthy and Tindale, have both been obdurate in maintaining their original hypotheses regardless of all evidence subsequently accruing.

So far as rock art is concerned, we now have a large corpus of recordings and analyses from all parts of the continent and these have made it clear that there are wide regional variations in styles and techniques; on the other hand, statistics and the computer have shown that there are marked similarities in motifs and in groupings of motifs throughout Australia. We still have a long way to go in interpreting this evidence, but statistically it is indisputable.

In my opinion it is still premature to attempt to impose a set sequence of development on to the whole continent. Rock art typology is at a similar stage to that of stone implement typology prior to the 1960s, when everyone was extrapolating their own regional interpretations on to the whole continent and the consequent disagreement was intense.

The catalyst in stone implement research came in the 1960s when Mulvaney and others developed the two-stage hypothesis—that the old large core and scraper tradition was followed, around 5000 BP, by the development of the small-tool range of backed blades, microliths, and uniface and biface points. Though the time scale for the adoption of the latter stage has proved to vary greatly in different parts of the continent and there are marked regional variations in the actual implements, this two-part sequence has stood the test of time and has been of immeasurable help to prehistorians in planning and interpreting their fieldwork.

In rock art studies it seems that there is now general agreement that there are at least two definite stages in the development of both painting and engraving—the earlier widespread nonfigurative 'Panaramitee' style and the later figurative style with innumerable regional variants and developments. I would like to suggest that rock art researchers now adopt the two-stage hypothesis, but with the proviso that, just as elements of the old core and scraper toolkit often persisted alongside the new small tools, so the animal tracks and footprints of the old nonfigurative style continued in figurative rock engraving all over the continent. Similarly, hand and other stencils appear in all periods of rock paintings and drawings.

There seems also to be general agreement that finger lines on soft surfaces and simple scratched lines on hard surfaces are the earliest form of rock art in Australia, just as in Europe, and are therefore the precursor of the nonfigurative phase. This gives us a basic framework into which regional and temporal variations can gradually be fitted, as more data become available.

The question of techniques is quite a different matter. It seems likely that the use of pecking, abrading, puncturing, pounding, and so on is considerably a factor of the type of rock being worked. Soft sandstones, such as those of the Sydney-Hawkesbury region, obviously lend themselves to the puncturing and deep grooving technique, whereas the hard granites, basalts etc. in other parts of the continent are only amenable to surface abrading, pecking, and pounding. For this reason (in the absence of dating methods) style is more likely than technique to give us a realistic art sequence.

It is interesting that the two-part sequence in rock art seems to be paralleled in other aspects of Aboriginal prehistory: in the archaeological record by the change-over from core and scraper to small tools; in the introduction or invention of the boomerang and spearthrower, and probably the introduction of the dingo (all absent from Tasmania, as is figurative art); and in the two physical types present in the Aboriginal population, i.e. the massive 'archaic' and the gracile 'modern', who seem, miraculously, to have co-existed in Australia over many millennia. It is difficult to accept that all of these crucial facts of prehistory are totally unrelated.

Turning now to the Sydney-Hawkesbury region, with which I am well acquainted, I must state first that I have never been able to accept McCarthy's regional art sequence. Fortunately a multitude of both paintings and engravings survive in the area and are still available for study. The engravings are fairly homogeneous in both style and technique, but the paintings are so disparate as to provide a major conundrum. Certainly all the styles nominated by McCarthy exist, but I have never been able to detect the sequence of superimpositions he postulates in any of the shelters I have studied; nor has Sim, who has made intensive studies of both engraving and painting in the area (Sim 1966, 1969). I suspect that no two observers would ever detect the same sequence of superimpositions in a single shelter, let alone in such an array as is present in the Sydney-Hawkesbury region.

My particular stamping ground has been the rugged no-man's land between the Hawkesbury and the Hunter, along the line of the Macdonald valley, Mogo Creek, and Wollombi Brook. I have dealt with the art from an archaeological viewpoint in my Hunter survey report (Moore 1981) but would like to consider it in more detail here.

The transect mentioned above includes some of the finest painted rockshelters and engraving sites of the whole central coast of New South Wales. The former include Canoelands (McCarthy 1961), Sim's Macdonald River site (Sim 1966), Macintosh's Mount Manning Cave (Macintosh 1965), the many painted shelters around Wollombi and Laguna, and the Milbrodale 'Culture Hero' (Moore 1977, 1981). The engraving sites include the 'Devil's Rock' at Maroota, the Burragurra complex, and the Finchley's Trig. groups. McCarthy includes the whole of this area in his postulated sequence for the Sydney-Hawkesbury region, but in my experience even within this limited area there are several quite distinct styles, which tend to be localised, though there is some overlap. They can be itemised as follows:

(1) Large anthropomorphs outlined in white and infilled solid red or striped (present at Canoe-

lands, Sim's Macdonald River, Mt Manning, Milbrodale).
(2) Smaller animals outlined in black and sometimes striped or hatched in black (found at Canoelands, Macdonald River, Mt Manning).
(3) Arrangements of small animated stick men in black or white (in many shelters intermediate between Wollombi and St Albans).
(4) Sites consisting almost entirely of stencils, mainly white, of hands, weapons, occasionally small silhouetted human figures and sometimes associated with white 'tally marks' and radiate symbols (confined mainly to the Wollombi and Jerry's Plains area, but also encountered in the Divide and on the western slopes of the Great Dividing Range).

The hand stencils occur everywhere and in all superimposition sequences, just as the footprints (*mundoes*) do in the engravings. I have found no confirmation for McCarthy's supposition that there was a period when stencils went out of use.

Apart from the hand stencils, the only style that seems to extend throughout this area is the first—the large animals or humans outlined in white and infilled with red—and these figures are closely paralleled in the rock engravings. It could therefore be argued that this is the basic style of the area and in my archaeological report (Moore 1981) I have equated it with the tribal territory of the Darginung. The other styles would then be local variants made by other groups outside the Darginung territory.

If one excepts the 'tally marks' and radiate signs of the Wollombi area, all of these styles, both engraved and painted, fall within the figurative class. Are we to assume, then, that the older nonfigurative style did not reach the Sydney area, or that there were no Aboriginal inhabitants of the region until after the figurative style became general?

Fortunately the complexity of the Sydney rock paintings and drawings is not typical of the whole of Australia and elsewhere regional styles tend to be more uniform. So what is required now is a more intensive and scientific study of regional variations in both painting and engraving, so that all pieces of the jigsaw puzzle can ultimately be fitted together to provide an overall picture of trends and movements of art styles. The computer is a valuable tool in rock art analysis, in that it can sort great masses of data and provide information on variations and similarities, but the humanistic approach exemplified by McCarthy, which incorporates intuition, psychology, ethnography and archaeology, must continue to play its part in generating fruitful hypotheses.

I will therefore conclude my remarks on a humanistic note and fly an intuitive kite. The essential factor in all Aboriginal art is that it tells a story (or rather *repeats* a story). In the spoken or chanted myths there are varying degrees, from the simple 'fairy tale' versions allowed to women and children to the highly stylised and symbolic versions (often in archaic language) passed on to the fully initiated. It is not unrealistic to expect the same range in rock art, and we know that it does, in fact, occur in Arnhem Land painted sites.

On this basis one would expect the simple figurative style to represent the 'outside' general aspect and the complex symbolic (i.e. Panaramitee) style to be the esoteric version for the fully initiated. Is it not possible that both styles are different manifestations of the one phenomenon and are not necessarily sequential in time? It must always be remembered that the Aboriginal people have inhabited this land *continuously* (and this is the key word) for a vast period of time. Can one doubt the corresponding antiquity of the Dreamtime beliefs, considering how universal were the basics of Aboriginal cosmogeny?

If this antiquity is accepted, then one would surely expect this system of belief to be reflected in the art in all periods, however ancient? Might this not explain the similar groupings of motifs discerned by the computer in engraved sites all over the continent?

Like McCarthy, I have no doubt that there is continuity in Aboriginal art, as well as change due to diffusion, just as there is in stone technology and all other manifestations of Aboriginal life. The factor that has always linked all aspects of Aboriginal existence is the Dreaming, and this must never be forgotten in Aboriginal studies, despite all typological complexities and arguments.

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By M. J. MORWOOD

A summation of current directions in Australian rock art research would be useful at this stage—especially if themes such as general and regional patterns of artistic change and their implications for prehistory were examined. McCarthy's paper attempts to overview the Australian engraving and Sydney-Hawkesbury shelter art sequences, but seems more concerned with gnawing old bones of contention rather than providing an informative and informed update. In fact, he does not really counter the criticisms of his approach to classification and chronology made so clearly by Maynard (1977, 1979), nor is there any revision of his Australia-wide engraving sequence in the light of subsequent discoveries and research. I am not trying here to belittle McCarthy's substantial contribution towards Australian rock art studies, but argue that his most lasting influence is in the extensive documentation of regional art bodies (e.g. McCarthy 1960, 1962, 1976), rather than general schemes for classification and ordering which tend to be idiosyncratic.

The real test of a rock art chronology is how useful (and used) it is as an explanatory mechanism, and most researchers on Australian rock art now take Maynard's (1979) three-part sequence

as a useful baseline in overviewing geographical and chronological change (e.g. Clegg 1987; Forbes 1982; Franklin 1984; McDonald 1982). Her model is based on the same continental patterns of distribution which led Davidson (1937), Lommel (1970), Mountford (1959) and Edwards (1971) to speculate on an Australian rock art sequence, but also uses evidence for relative and absolute dates from Tasmania, western New South Wales and south-east Cape York. It is also well articulated and the general (but differential) progress of areas along a 'Panaramitee' to 'simple figurative' to 'complex figurative' sequence does appear to describe much of the variation evident in eastern and central Australian sites. McCarthy cannot expect to promote or clarify his rock art sequences by ignoring these points.

This is not to say that Maynard's scheme does not have 'problems': for instance, some eastern regions such as the central Queensland highlands and south-east Queensland do not fit comfortably into the scheme (Maynard 1979: 109; pers. obs.), while *none* of the complex figurative art regions of north-west Australia appears to have earlier Panaramitee-type or simple figurative art (e.g. Brandl 1973; Chaloupka 1985; Crawford 1968; Lewis 1983). In addition, Maynard offers no real explanation as to why the changes occurred other than to note that there are some parallels between the Australian rock art and stone artefact sequences—namely, a change from 'early', relatively homogeneous and widespread traditions (e.g. Panaramitee, Core Tool and Scraper) to later, more localised and regional traditions. She makes little attempt to examine artistic trends in the context of the general patterns of economic, technological and demographic changes indicated by 'mainstream' archaeology (e.g. Beaton 1985; Lourandos 1984; Ross 1985; Smith 1986).

However, rather than being a basis for rejection, these inadequacies offer a useful starting point for future work. For instance, the relative homogeneity of Pleistocene and early Holocene rock art and technologies is consistent with the 'open' social networks required by low density populations to maintain social and biological viability in harsh environments (Gamble 1982; Yellen and Harpending 1972: 251), while an emphasis upon nonfigurative motifs, which are ambiguous, esoteric and multivalent (e.g. Gould 1969: 150; Spencer and Gillen 1938: 614), provides evidence for the contexts in which social knowledge was shared or restricted. The fact that some regions have more regionally specific traits at this time (e.g. Mimi art; edge-ground axes, head binding) represents a 'problem' if the aim of the exercise is simply to categorise, but an opportunity for comparative assessment if the aim is to relate art to its systemic context. In ethnographic times both artistic and linguistic differentiation served a social bounding function and it is significant that the areas of greatest linguistic diversity in Australia are those with long-standing, regionally distinctive, complex figurative rock art bodies such as Arnhem Land and the Kimberley (Wurm 1972: 106-51).

Similarly, evidence from south-east Cape York and central Queensland suggests that the development of many regional rock art styles and ideologies may have coincided with significant increases in population, more intensive resource exploitation and an increase in the scale of ceremonies (e.g. Beaton 1977; Morwood 1984; Rosenfeld et al. 1981). Many (but not all) such regional art traditions placed greater emphasis upon 'simple' figurative motifs, which are more specific in reference, less ambiguous and generally for 'public' rather than 'restricted' contexts in recent Aboriginal art systems (e.g. Morphy 1977: 330; Mountford 1976). Mid-Holocene changes in the distribution, context and content of Australian rock art are likely to reflect such factors as the development of more 'closed', social networks corresponding to increases in population densities and/or changes in social relations (Beaton 1983; cf. Lourandos 1983).

In conclusion, Maynard's approach to chronology and research methodology has provided a framework for subsequent developments in the archaeology of Australian rock art. McCarthy's present paper does not challenge this.

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By ANDRÉE ROSENFELD

McCarthy's schema for the sequences of rock art developments in Australia was the first important step in providing a framework for the study of this large and heterogeneous corpus of art. The importance of this pioneering work should not be underrated. It has served subsequent workers as a base from which to examine both regional and pan-continental issues more closely. That it has been superseded by the new perspectives brought by Maynard in the mid-1970s (Maynard 1976, 1979) in no way diminishes the original significance of the first edifice. The latter, now more than a decade later, is also showing signs of a need for reassessment.

In a fairly short paper McCarthy raises a large number of issues. Essentially he restates his own methods of rock art analysis but without examining the theoretical critique that led Maynard to develop her own approach. I will restrict my comments to the major methodological problems which arise from his analysis of Aboriginal rock engravings. Some of these also apply to his analysis of the painted art of the Sydney region which is discussed in the paper, but others have much more detailed knowledge of this art than I do and may comment more appropriately.

McCarthy's developmental sequence for rock engravings in Australia was based on his very extensive experience of this material, and on more detailed work at opposite ends of the continent, viz the Sydney-Hawkesbury area and at Port Hedland. The very fact that he emphasises that his developmental schema holds for engravings

and not the pigmented art serves to demonstrate the first significant difference between his and most recent authors' approaches to the study of art. McCarthy states that he considers style and technique to be the primary characteristics that define a tradition but in his published works he clearly gives primacy to technique in his classifications. Maynard quite correctly emphasised that the primary characteristics of art—that which make it culturally meaningful—are content/motifs and style (I would add cultural context but this often eludes us in archaeological material). The same artistic tradition can be meaningfully expressed in more than one medium, though for a variety of reasons people may restrict themselves to one, or a limited range, of technical means of making pictures. The choice between pigmented rock art and extractive rock art is in part constrained by the nature of rock surfaces available, and further the particular technology employed for marking the rock in extractive art is influenced by its physical properties. Thus the shallow pounding which removes a thin dark patina to leave a clearly visible image on the dolerites and basalts of the arid Pilbara would not lead to lasting images on the soft oolites of Port Hedland or even the sandstone exposures of the Sydney-Hawkesbury ridges. These environmental factors, however, impose only broad constraints. Cultural choices do serve to determine the technique(s) selected from among those suitable. Thus to an extent technique is a marker of cultural tradition and has a place in the definition of an artistic tradition, but not the unqualified and primary one that McCarthy gives it.

A more fundamental difference between McCarthy and most recent workers lies in his concept of 'style' as applied to the classification of rock art. This is not the place to raise the contentious debate on style. McCarthy's use of this term is clearly illustrated in his—by no means superficial—publication of the Port Hedland engravings (McCarthy 1962). His stylistic classification of motifs is based solely on one aspect of artistic convention—viz. whether designs are linear schema or in silhouette outline. In the latter category he adds patterns of infill for further differentiation, i.e. whether infill is striped, gridded, curvilinear etc. or total infill (*intaglio*). His 'linear style' comprises wavy and meandering lines ('snakes and sacred string'), barbed lines ('spearheads'), rake-shaped motifs ('pubic apron'), feathered designs ('plume ornament'), spirals and linear schema of tracks. It does not—*cannot*—include the fish, turtles, stingrays, lizards etc., which characterise both the first and third 'outline styles' of his Port Hedland sequence; and these naturally do not include the range of motifs in the 'linear style'. Nor do these three 'styles', which are really motif categories, separate out clearly on technique or on the infill pattern of the silhouette designs. *Punctured lines* and *intaglio* (McCarthy's technical terms) overlap both motif categories. Indeed on some individual figures a combination of *intaglio* (a band of overlapping marks in the rock) and *punctured lines* (a linear arrangement of marks, sometimes wider than those on grouped *intaglio* marks) combine within the same figure. This is particularly common on *Minjiburu* figures and on turtles. As Maynard has already pointed out, a concept of style which considers form as a primary criterion and infill elaboration and technique as secondary reveals the remarkable stylistic and technical homogeneity of the Port Hedland art sites.

My own—avowedly brief—examination of these sites also led me to conclude that it is essentially a homogeneous assemblage. On the basis of relative preservation, it appears there may have been a general trend towards greater internal infill and elaboration over time. Confirmation of this would require a closer analysis than I was able to undertake. The petrology and structure of the rock makes it very vulnerable to both corrosion and erosion. Photographs of some figures taken some 30 or so years apart show the effects of deterioration. Although erosion has clearly been accelerated in recent times by the presence of an iron ore depot and harbour, a very long temporal separation for the extant figures of the Port Hedland sites, such as must be envisaged if it were taken to represent the entire sequence of Aboriginal rock engraving development, is highly improbable.

With this critique of McCarthy's analysis of the Port Hedland engravings, it must be clear that I cannot agree with him that they can form a basis for our understanding of any pan-continental developmental schema. However, two important methodological points are raised by McCarthy in attempting to trace such a development. These relate to the identification and explanation of similarities in bodies of rock art, and in the mechanisms by which ideas concerning rock art may be shared or borrowed by neighbouring groups of people.

McCarthy reiterates that he notes close similarities in the techniques used for making some of the Port Hedland engravings and some in the Sydney-Hawkesbury region: an alignment of close or overlapping pits. Given the different lithologies of the two sites, it seems probable that the physical means of making such pits differed. There are also other technical differences: notably the frequent use of pecked out areas (*intaglio*) in the west, and of smoothed grooves in the eastern sites. Differences of scale are marked.

Although there is some overlap in general subject matter, viz. macropods, emu with its eggs, anthropomorphous figures and various fish, their form and the overall motif range show important differences. Franklin's statistical analysis, to which McCarthy refers, was concerned with a comparison of the shape characteristics of similar images in a number of rock art assemblages which have a high level of iconicity (Maynard's simple figurative category). Franklin demonstrated the divergences in the formal conventions between art assemblages that share the general image characteristics of the Sydney-Hawkesbury art, i.e. stylistic differences. However, this method lacks conviction when discriminating

between the Sydney-Hawkesbury and Port Hedland art, since they share virtually no images. A contrastive descriptive approach is more pertinent here. The range of motifs depicted differ, but perhaps more significantly the visual conceptualisation for a whole category of motifs differs: in the Sydney region profile silhouette outlines are used for a range of animals and anthropomorphous figures, whereas in the Port Hedland art, a bird's-eye view of the world prevails. Fish, lizard shapes, and other flat subject matter are seen from on top as is common in much Aboriginal art, but taller animals and some human forms are suggested solely by their tracks. The anthropomorphous forms are totally different in the two areas. Thus, through a different approach I agree with Franklin that the Port Hedland art differs even more from the Sydney-Hawkesbury art than do the paintings of Laura or Cobar, etc.

Leaving aside the relationship—or lack thereof—between the arts of Port Hedland and the Sydney-Hawkesbury region, McCarthy's more general statement that there are continent-wide similarities at certain levels in Aboriginal rock art is generally agreed. It formed the core of Maynard's classification. He is also correct to emphasise that there was a high level of intergroup activity in the recent past, sometimes extending either directly, or in a 'chain of connection' over very great distances. The implications of this in terms of shared cultural developments—or diffusion—need closer scrutiny. Without elaborating further here, on what constitutes a 'significant' similarity between bodies of rock art, the main questions to consider are *what* has been borrowed and *how*, when two groups share similar systems of visual art. There is not room to examine the theories of diffusion, innovation, adoption, adaptation in detail here. The literature on this subject is vast. It suffices to point out that diffusion is not merely a matter of taking over a cultural activity wholesale without concomitant changes, both within that activity and in other spheres of activity. The cultural meaning of a borrowed trait can change significantly from its original context. Alternatively a borrowed cultural concept may find a new physical expression. Thus to evaluate the significance of shared traits in art (or anything else) requires closer analysis of the nature and degrees of similarities and an evaluation of the archaeological cultural context.

A number of pan-continental traits for Aboriginal art can be isolated, in technique, motif and general stylistic conventions. It permits a definition of the principal and recurring traits of Aboriginal rock art. Such a classification was at the core of Maynard's threefold schema for Aboriginal rock art. These classes, however, have proved to be too general for analytical purposes, since they conform neither to chronology nor very closely to regionalism or archaeological criteria. I doubt that further refinements of such a pan-continental schema are still useful at the present stage of Aboriginal rock art research. They must necessarily gloss the very aspects which might enable us to trace the processes of change in art either through time or across a cultural landscape. Regional developmental sequences are demonstrably non-uniform across the continent and may be very complex as is becoming clear in western Arnhem Land. To examine questions of diffusion—or more precisely of the role of art in group contact situations—the more narrowly focused regional studies, integrating art and archaeology such as are now being undertaken by a number of researchers are needed.

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By ROBERT G. BEDNARIK

Many readers of this debate between Dr McCarthy and his reviewers—particularly readers abroad—will be a little puzzled: while there seems to be general agreement that McCarthy is Australia's principal pioneer in rock art studies, and that his knowledge of the subject would be hard to match, there is an equal agreement evident that he is fundamentally wrong in his diachronic construct of Australian rock art. McCarthy has recorded and analysed our rock art for more than half a century, and has a long-standing preoccupation with its relative chronology. Would it not be judicious to ask whether a scholar of his experience could really be so much in error?

In examining this question we could first identify the main areas of disagreement between McCarthy and his critics. There are two, broadly speaking: the specific regional sequences McCarthy has proposed long ago; and a basic difference in research design. The former are not themselves of any major consequence but McCarthy's extrapolation to a pan-continental sequence requires their examination. The Port Hedland petroglyphs are unlikely to be of great age, having been executed on calcareous pavements that are, to make matters worse, located close to major mangrove swamps. Surprisingly, there are some parallels between their proposed relative sequence and that of the surrounding Pilbara as a whole: several writers, including myself, have confirmed that the early outline figures, often deeply repatinated, are succeeded by the nearly unpatinated fully pounded figures. But it is difficult to see how the Port Hedland 'naturalistic' outline figures could be contemporary with those at nearby sites on igneous rock.

The unbiased reader will see from the present debate that the chronology of the Sydney-Hawkesbury art, on the other end of the continent, remains unresolved: many researchers have examined the region, some disagree with McCarthy, others tend to confirm at least some of his findings. This illustrates again how difficult it really is to establish a regional rock art sequence and how wary we must be of any such model, particularly one that has not been thoroughly tested.

But the most fundamental disagreement between McCarthy and his opponents is in the area of identifying styles, phases or traditions. McCarthy worked towards a diachronic synthesis of Australian rock art, by trying to identify repetitive patterns in the regional superimposition sequences. There should be no fundamental objection against such an approach as an initial strategy. By about 1960 he apparently felt that he had identified a sufficient number of consistent traits, and I think that with the data available to him at that time he did the best anyone could have expected.

Since then a large body of new evidence has accumulated, and his critics today correctly say that he is failing to take recent findings fully into account. But what *they* fail to see is that most of the new data are not relevant to McCarthy's model, *which is about chronology*. Most of the recent work on Australian rock art is written in terms of the tripartite model of Maynard, *which is about what she perceives are stylistic units*. For instance, how should McCarthy reconcile his dictum that linear is followed by fully pecked (one of the points where he is likely to be right, in a general sense), with Maynard's rule that the two occur together in the 'Panaramitee style'? What caused Maynard to lump the two together was simply that she saw them occurring at the same sites. Having sought long before Maynard's work to separate the chronological groups at sites that had been used by people with different art traditions, how is he expected to reconcile his concern for time depth with a model that has none, treating the art at a site as a single tradition unless there is clear evidence to the contrary.

The life blood of archaeological prehistory is chronology, which was also foremost in McCarthy's research design. Maynard's model divides the entire corpus of Australian rock art into three 'stylistic' groups: the 'Panaramitee style', which may have begun more than 30 000 years ago and in some form still survives in the ethnographic present (and in variant forms exists in other continents); the 'simple figurative style', which occurs in many parts of the world, and in Australia throughout the Holocene; and the 'complex figurative style', for which much the same can be said. The first-mentioned 'style' includes both figurative and nonfigurative elements, and since sites of the 'simple figurative style' are not free of nonfigurative motifs I am at a loss to see a fundamental stylistic difference between the first two 'styles'. Neither can I see a fundamental stylistic difference between the second and third 'style'. So we have three 'styles' which seem to be distinguished fairly arbitrarily, and which in no way reflect a chronological order. What they can reflect are patterns of site reuse.

In the same fashion we could group together all images produced, for instance, by the technique of pointillism, irrespective of whether they are from the late Magdalenian, 19th century Europe, or from contemporary Western Desert artists, and pronounce them a 'style'. As incredible as it may sound, this ahistorical classification is that which is preferred by the younger generation of Australian archaeologists, at least when dealing with Australian art, and it is considered to be an 'archaeological' approach. One would have thought that archaeologists, more than anyone, would appreciate the need for time depth, but many do not seem to extend this to rock art. The classical example is the 'Panaramitee style', named after a site where several different, and temporally very discrete traditions of rock art occur together (Bednarik 1985). These various traditions demonstrate the reuse of a site (and of some of its motif types) over a long time span, and while there is an underlying stylistic continuity in many of the motifs, there are also several abrupt changes, notably the introduction of iconicity and the appearance of new techniques, at different times. Nevertheless, Maynard has combined the assemblage into a single 'style'. This 'style' cannot have any chronological significance, which means that it lacks archaeological significance, it has no art historical significance, and I am not sure what other significance it could have. The present debate tends to depict McCarthy as being obstinate, but I think we have every reason to be grateful to him for his perseverance in the face of the overwhelming popular opinion rejecting much of his model. Most certainly there is a need for McCarthy to revise and update his ideas (especially his early outline phase cannot be upheld), but his opponents must first remove the obstacle that prevents him from benefiting from most work of the last 12 years: Maynard's pan-continental model which is so firmly entrenched in so much recent work that any attempt by McCarthy to relate that work to his own would seem futile. I can only reiterate what I stated three years ago: 'The division of the immense body of Australian rock art into three major units . . . is a retrograde step from the basic model proposed much earlier by McCarthy' (Bednarik 1985: 81-2). This in no way suggests that his model was satisfactory, merely that its intent, the establishment of a chronological framework, is preferable to a model of supposedly stylistic units that cut right across stylistic and technological boundaries, even across the most important discontinuity of all: the introduction of iconicity.

Actually the Maynard hypothesis has not been without opposition. Several authors (e.g. Chaloupka, Rosenfeld, Morwood, Flood, Nobbs, Taçon) have reported evidence that cannot be fully reconciled with it, and it is interesting to reflect that the model derives rather little support from outside of New South Wales. I propose that the use of the name 'Panaramitee style', in particular, be discontinued, for the following reasons:

(1) As McCarthy states, a local name is not ideal for such a pan-continental 'style', particularly when one considers that there are in fact no less than five sites on the Panaramitee property, which are quite diverse themselves.
(2) The type site is made up of several rock art traditions.

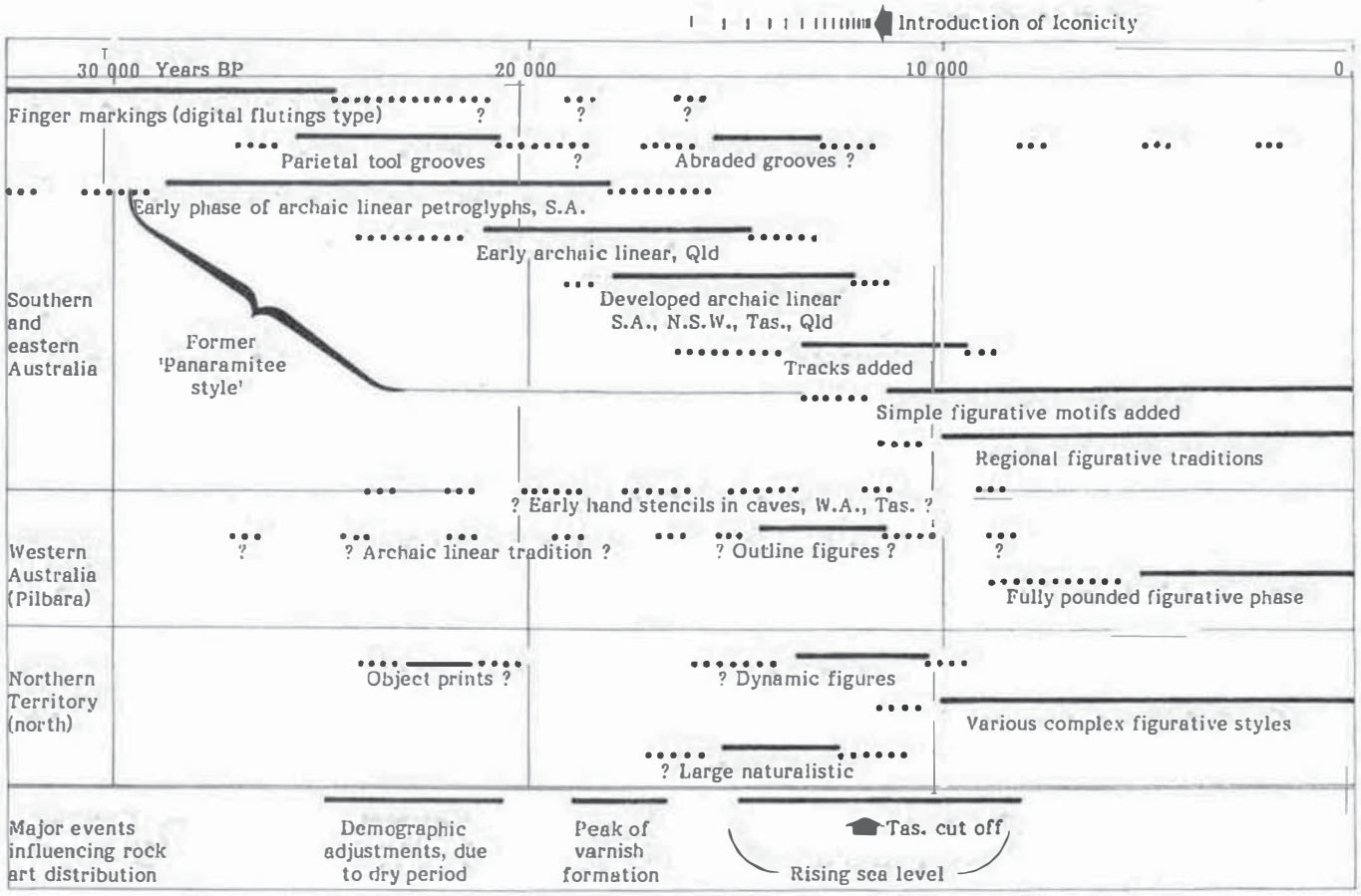

Figure 1. *Provisional synthesis of Australian rock art.*

(3) The Maynard thesis proposing the name has not been published, and has therefore never been debated openly.
(4) The 'style' is not the stylistic convention of a specific tradition, it consists of a cluster of attributes several such conventions have in common.
(5) In her present Comment Maynard herself expresses a desire to abandon the term.

The present debate offers a ray of hope, however: Moore's proposal to initially divide Australian rock art into just two basic phases. The early noniconic phase would be separated from the subsequent figurative phase by the advent of iconicity. The hypothesis that all archaic rock art in Australia is nonfigurative is not new, but it has been effectively suppressed by Maynard's model which postulated an early phase that included iconic motifs. As I have emphasised several times, all Australian rock art that can be convincingly attributed to the Pleistocene is noniconic, except tracks and possibly hand stencils that appeared in the final Pleistocene. Moreover, the earliest art in other continents also commences with nonfigurative traditions, and with basically similar, if not identical, motifs, design elements or marking strategies. Of course there are differences among world regions (for example zigzags/wave lines, while prominent in the Americas and occurring in Europe's Mousterian, are rare in Australia where circles and convergent lines motifs dominate), but the overall motif range is reasonably uniform. It is therefore extremely useful to install the advent of iconicity (or of the ability to abstract from a three-dimensional object to a two-dimensional depiction—which appeared surprisingly recently in comparison to the ability of recognising the resemblance of one object to another, which may date back to the Acheulian) as the major division between two main phases. In the younger phase, nonfigurative elements certainly exist alongside figurative ones, but in the older there cannot possibly be any figurative motifs. Naturally I use these terms in the accepted sense, but strictly speaking all graphic art is based on visual perception, be it externally derived or self generated. It is obvious that this massive cognition-based change in prehistoric art would constitute a chronological marker, but we must realise that it occurred at different times in the various world regions.

Somehow this debate leaves the impression that the chronology of Australian art is still as precarious as it may have been over 20 years ago, when in fact quite consistent dating evidence is now available for it. While the same remains limited to minimum ages I contend that a fairly plausible chronological framework can be assembled from the present data. Figure 1 is my version of such a framework, but I emphasise that this draft model is only concerned with broad developments, and new evidence may necessitate minor alterations to it. But I can see no value in pretending that we are still groping in the dark entirely. A realistic discussion model, with all its shortcomings, is better than the present vacuum—at least it can be tested.

My model reflects the two-phase concept, with a dividing line somewhere in the final Pleistocene. The absence of tracks in Rosenfeld's early petroglyphs (confirmed by Franklin's extremely valuable analysis of the Laura corpus) as well as in the cave art of Mount Gambier not only suggests their late introduction, it also underpins the concept of a widespread Pleistocene sequence. This early uniformity may be lacking throughout the Holocene, when various techniques or styles appeared at different times, perhaps in different order. It is fascinating here to observe similarities among continents. For example while the repertoires of archaic motifs in North and South America are so similar, the more recent traditions of these continents offer such a rich variety of styles, techniques and distributions. One of our greater aims, well beyond the establishment of regional and pan-continental sequences, is the analysis and explanation of global trends, where the notion of diffusion fades away as one probes into the very distant past. Fundamental similarities in early art evolution show us that the processes that produced art were not some random occurrences, but were the repeatable and 'predictable' outcome of a uniform intellectual development—occurring independently but through similar processes in several world regions. I suggest that rock art research will not make any progress in addressing questions of this magnitude if we continue to maintain that all rock art at a site belongs to a single style unless proven otherwise. Besides, in doing so we only perpetuate one of the most widespread errors of logic in archaeology. Rock art sites are often *focal sites* of prehistoric activity, where all types of human activity traces, including rock art, *should be considered as NOT contemporaneous* until they are shown to be so: the probability of two activity traces at a site being contemporaneous is statistically inverse to its popularity as a focal site.

Robert G. Bednarik
Editor

REPLY

By FREDERICK D. McCARTHY

My paper was written to clarify certain misinterpretations of my rock art sequences, and to provoke a discussion of terminology used to describe the engraving techniques. The response from the commentators is a mixed one—the rock engraving sequence and the terminology problems are unresolved, but there is a more general opposition to the shelter drawing sequence.

Rock engraving sequence. The commentators appear to agree that it is premature, in the light of our present knowledge, to establish a pan-Australian sequence in this art, and they have criticised my sequence, first published in 1962, in various ways. At Port Hedland there is a definite trend towards greater decorative infill over time in the figurative series than in the Sydney-Hawkesbury region, as Rosenfeld says, and the actual style of the principal human figures is different in both localities. It must be expected that the range of styles and subjects would vary in the two regions in keeping with the different beliefs of the people. The important fact, however, is that in both regions the simple outline silhouette is the basic style even though its decorative infill has been elaborated more highly at Port Hedland than in the Sydney-Hawkesbury region. In both bodies of art it is important to note that a similar range of human and 'spirit' figures, mammals, whales, birds and their sets of eggs, turtles, fish, sharks, human and animal tracks and weapons occurs in this style. At Port Hedland the big 'culture-hero' (McCarthy 1962: Fig. 29); some of the men (Figs 26, 43, 58, 62); whales (Figs 36, 44, 91); shark (Fig. 34); speared fish (Fig. 93); fish and weapons are very similar to those in the Sydney-Hawkesbury region. Similar simple decorative infill patterns also occur including barred and longitudinal stripes, and in some figures in the Sydney-Hawkesbury region more elaborate patterns decorate an emu (McCarthy 1949: Pl. D); turtle (McCarthy and Hansen 1960: Fig. 6-J); kangaroo (Sim 1963: sheet 2, I); and indeterminate figure (Sim 1965: sheet 2, DI). Thus even though the two bodies of art differ stylistically in many ways there is within them a range of identical outline and infill figures.

Bednarik believes that the simple figurative phase at Port Hedland cannot be upheld as an early phase and must be revised, mainly on the basis of the great antiquity of the nonfigurative phase in Australia and other countries. Several of the commentators state that recent work in Australia has thrown some doubt on the antiquity of the Port Hedland series. The fact that the linear phase is 30 000 years old in Australia appears to some critics to indicate that the Port Hedland series could not be that old, in the limestone in which it is engraved. Now I have never claimed that this series is an ancient one. It appears to me that both the linear and fully pecked phases spread into the Port Hedland region comparatively late and were then engraved over the existing simple figurative figures. I have also pointed out that the latter phase is a north, north-eastern and eastern Australian one which does not occur in the main region, the interior of Australia, where the linear and fully pecked phases are found. This is the main reason why we do not know of any other sequence, at present, like the Port Hedland one.

Objection has been raised by Franklin to my placing of the abraded grooves as the first phase at Port Hedland because they have been dated from 20 000 BP to recent in other parts of Australia; these occurrences merely indicate that their use continued over a long period of time and do not affect the Port Hedland situation. I will admit, however, that they might well belong to the linear phase and if this is so they do not form phase 1.

Franklin also mentions the difficulty of separating engraved superimposed figures in different techniques, especially those affected by patination and weathering, and suggests that a reverse order

in the sequence might have to be considered. Maynard in fact rejected my sequence for this reason. I based this sequence of linear under fully pecked figures on an examination of hundreds of engraved rocks bearing these two phases elsewhere in Australia, and there is no possible doubt that the latter phase overlies the former. Bednarik accepts it. It is only necessary for those who oppose it to visit Mootwingee, Sturts Meadows and the Flinders Ranges sites to verify this claim.

Moore asks are we to assume that the linear style did not reach the Sydney-Hawkesbury region, to which I would reply yes. Bird and mammal tracks, and ovals/circles form an integral part of the engravings in the latter region. In the bora ceremonies the men followed a bird or mammal track grooved in the sand or soil to a figure of the particular species concerned throughout south-eastern Australia. The tracks also occur along the bases of the walls inside the huge caves in the Blue Mountains. Tracks also form an integral part of the mythology and religious beliefs of tribes all over Australia. For this reason, I have my doubts about the engraving site at Yengo, of circles and kangaroo tracks, claimed by McDonald to belong to the linear phase. It is in the heart of the above bora religious complex and the simple figurative engravings to which I think it belongs, and the dates from her excavation will be of great interest in relation to the latter art.

David has cited the occurrence of linear engravings at Chillagoe and elsewhere in north-eastern Queensland, obviously a linear phase area into which the other phases have not spread. He believes that an initial possibly pan-Australian engraving tradition existed which was followed by specific regional sequences.

Few of the commentators have mentioned the importance of diffusion in relation to the spread of the different phases of engraving in Australia. Diffusion seems to have become unfashionable and local development has taken its place in the thinking of archaeologists today. I would again draw attention to my study of trade and gift exchange in Australia (1939) as a mechanism for the exchange of ideas between bands of Aborigines; similar exchanges took place at intertribal ceremonies and other gatherings. The men took their visitors to the ceremonial sites and any new techniques in engravings and paintings would have been discussed and borrowed just as we know the medicine men exchanged their magical practices. Rosenfeld agrees about these intergroup activities and thinks that they need to be further investigated to see what has been borrowed, and how. Clegg and Moore both agree that diffusion played its part in the development of Aboriginal culture but Bednarik says it fades away when very early global trends, the outcome of a uniform intellectual development occurring independently through similar processes in several world regions, are considered. This theory, of course, brings us back to local origins which I discussed in my paper.

From the comments on my rock engraving sequence it seems to me that there is some doubt about the placing of the abraded grooves as phase 1, and of the simple figurative figures as phase 2. The placing of the latter depends upon proving its antiquity and this may never be possible as the earliest figures have no doubt been weathered away. I cannot agree that it can be placed between phase 3, nonfigurative, and phase 4, fully pecked, because the latter two phases occur so consistently together in sites throughout the interior of the continent. Edwards (1966) has drawn attention to the similar range of motifs in sites 1200 km apart in South and central Australia but he did not separate the linear from the fully pecked phase. Regional variations are indicated in these two phases, as they also occur at Mootwingee and Sturts Meadows in western New South Wales. The ovals/circles occur commonly in sets in the interior sites but they are more scattered at Port Hedland where a number of them may occur around a waterhole.

Another alternative at Port Hedland is to regard my simple figurative and linear phases as comprising one highly elaborated complex figurative and nonfigurative phase, with one developing from the other, overlaid by the fully pecked phase, thus producing a two-phase sequence, but that is a problem for the future. The Port Hedland sequence is not as ancient as are some of its phases elsewhere in Australia, and Bednarik has pointed out that its chronology is unresolved, as have other commentators.

Shelter drawing sequence. Clegg is the only one who accepts this sequence though he admits that he cannot satisfactorily determine superimpositions in shelter art, as do several other critics, including McDonald who has had vast experience in the latter field. Her opposition to it is based on a number of factors including: (1) exceptions to it are more numerous than the rule; (2) there is no appreciable change in style through time; (3) stencils are too unreliable a trait, my sequence does not allow for their abundance in the north of the region and their decrease in the south, and stencilling was carried on throughout the shelter drawing period; (4) lack of a theoretical construct, e.g. style; (5) lack of a temporal alignment; (6) it does not provide for white paintings and engraved motifs; (7) identification of a four-colour figure at Canoelands, because we do not know when the colours were added.

Quite frankly, I cannot understand why these observers of Aboriginal art cannot identify the major phases in my sequence. Officer (1984) has shown that stencils are consistently done under the drawings in the sites of the upper Georges River, Smith (1983) and Sim (1969) that the sequence occurs in the Macdonald River valley where Sim mentions some points of difference. It is only in sites used over a long period in which most or all of the phases of the sequence will be seen. In the Canoelands 'hero cave' a whole frieze of red and white stencils is covered by the drawings, and there was obviously a period of time from the beginning of drawing in this site when stencilling was discontinued. This sequence is also clearly shown in the Bull Cave at Minto and in other sites. The doubters are obviously looking at the art with a different approach to mine, possibly imbued with the idea that the figures drawn in a site all belong to one art body unchanged over time. I would suggest that they revise this approach and look for the stratifi-

cation that exists in this shelter art in the way archaeologists look for phases in occupation deposits. The evidence on the shelter walls clearly supports my two major phases of early stencils and later black or charcoal drawings, and I have said that phase 2, red and white drawings, is elusive and needs further investigation.

The point raised that the four-colour 'hero' at Canoelands is a doubtful identification is rejected outright. The colours were obviously drawn at the one time, and I have discussed a series of figures, in my paper, especially Sim's Macdonald River series, in which different coloured outlines have been added over time. Are these critics implying that every figure drawn in more than one colour must be regarded in the latter way and that Aboriginal artists do not draw or paint in more than one colour? After all, they use up to four colours when decorating their bodies for corroborees and ceremonies. The only doubt about the Canoelands 'hero' is whether he belongs to phase 3 or to a separate phase.

Two stages in the rock art. Moore and Bednarik agree that a two-stage division of the rock art should be considered as an initial step—as Moore says, in line with a similar division in the archaeological sequence in occupation deposits, Aboriginal physical types and other aspects of Aboriginal culture. Maynard thinks there are parallels between early and widespread traditions, such as Panaramitee and the Core Tool one, and between later more localised regional traits in both art and prehistory. Bednarik proposed that they be called (1) 'noniconic', which includes the linear engravings, and (2) 'iconic', which includes the figurative styles, and he has discussed the evidence to support this division. This claim, it seems to me, really depends upon whether the simple figurative engravings are an early or late type, and whether they preceded the linear phase. In the shelter drawings in the Sydney-Hawkesbury region the earliest phase of stencils is iconic but we do not know which are the earliest phases elsewhere. Moore stated that the finger lines on soft rock surfaces and the scratched lines on hard surfaces are the earliest form of rock art in Europe and Australia, and the precursor of the linear phase, but I do not know of any chronological evidence in Australia to support this claim.

Terminology. Franklin supports the retention of Panaramitee for the linear phase, Clegg does not object to it, Bednarik rejects it, and its institutor, Maynard, is happy to bury it but does not think linear is a great improvement. Bednarik, too, proposes another terminology in his table. The problem is thus unresolved. There are both figurative and nonfigurative motifs drawn in linear style in this phase. In considering terminology we have to remember that the Sydney-Hawkesbury engravings and shelter drawings belong to the bora 'All-Father' religion and art also illustrated on the initiation grounds in sand and soil, and that the linear rock art of Australia's interior similarly illustrates religious beliefs concerning totems and clan ancestral heroes and spirits, illustrated on the *tjurunga*, ceremonial grounds, engravings and rock paintings. Should we therefore confine our terminology to the rock art itself or include the latter in a more significant broader part of Aboriginal culture? The Wandjina art in the Kimberleys is given that name, which is that of the religious beliefs of which it is an expression and there are similar examples in Arnhem Land. Could we use 'bora art' for the Sydney-Hawkesbury engravings and shelter drawings, and a cultural name for those in South and central Australia?

Maynard's scheme. It is supported by several of the commentators, Franklin and Morwood in particular, and Rosenfeld has pointed out that it is showing signs of reassessment. Bednarik views it as a grouping of stylistic units and not a chronological sequence in which I am interested. I refer readers to the above writers' comments.

Cave art and engravings. Several commentators have pointed out that I separate engravings from the drawings and paintings. I follow this policy at present because insufficient information is available about both arts, and it is therefore premature to combine them in an Australia-wide classification, especially about the relative ages of the different phases in both kinds of art. Intensive studies of sites all over the continent are needed before such a general classification can be established, and especially of such aspects as regional variation. There is, for example, a close relationship between the two arts in the Sydney-Hawkesbury region, especially in the large culture-heroes drawn in the shelters and engraved on the open rock surfaces. Moore regards those in the shelters as localised distinctive styles but they represent sacred ancestral spirits featured in the bora religious beliefs of the tribes throughout south-eastern Australia; they vary considerably in style according to what they are doing in the scenes depicted. This similarity applies also to the animals and weapons in both types of art. It appears to me that all we can do in the present state of our knowledge of the rock art is to identify the resemblances and differences in any one region. We cannot in most regions establish either a common classification for both arts, or a chronological order for them. They have been identified, however, by Chaloupka in Arnhem Land (1977), and by Woolston and Trezise (1969) in Cape York. Bednarik's table in which he places engravings and paintings chronologically is an invaluable guide for future researchers.

Population and art. Morwood has drawn attention to another interpretation of the development of rock art in stating, firstly, that nonfigurative motifs are consistent with low density populations with 'open' social networks required to maintain social and biological viability in harsh environments, and secondly, that a greater emphasis may be placed upon simple figurative motifs with significant increases in population, exploitation of resources and ceremonies; further, that no attempt has been made in Australia to relate artistic trends to general patterns of economic, technological and demographic changes indicated by mainstream archaeology. David also poses the problem of how his pan-Australian style of engraving is related to the people—was it followed by the development of widespread local styles, and what does such a development tell us about changes in the social life of the Aborigines? These problems certainly merit

investigation in the future.

I am pleased to see that my paper has stimulated a debate of a number of controversial problems and revised some fundamental issues relating to the rock art for consideration in the future.

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[This debate will be continued in the November 1988 issue, and readers wishing to contribute to it are invited to do so.]

Résumé. L'auteur essaie de clarifier certains points critiques posés par plusieurs chercheurs au sujet de sa séquence 'pan-australienne' de gravures rupestres, et de sa séquence de dessins rupestres dans la région de Sydney-Hawkesbury; il examine aussi quelques questions terminologiques en matière d'art rupestre. Il croit que les objections soulevées par les commentateurs n'infirment pas ces séquences, mais par contre démontrent que nous avons besoin de recherches plus détaillées sur d'autres gisements et sur les variations régionales en art rupestre dans d'autres parties de l'Australie. Les chercheurs devraient examiner l'art rupestre d'une façon archéologique, en essayant de trouver des indices de stratification dans les sites. Beaucoup d'autres questions sont soulevées qui concernent la chronologie et le développement de l'art rupestre australien.

Zusammenfassung. Der Verfasser versucht die Klärung gewisser kritischer Fragen mehrerer Autoren bezüglich seiner gesamtaustralischen Petroglyphenabfolge und seiner Sequenz der Sydney-Hawkesbury Abri-Zeichnungen, und erwägt Fragen von Felskunst-Terminologie. Er glaubt, dasz die Einwände der Rezensenten keine der beiden Abfolgen widerlegen, dasz sie aber die Notwendigkeit für mehr detaillierte Untersuchungen der Fundorte, und regionalen Abweichungen in australischer Felskunst allgemein, zeigen. Forschern wird anempfohlen, Felskunst von archäologischer Perspektive zu untersuchen, und Beweise von Stratifikation an den Fundstellen zu suchen. Viele weitere Fragen, die eine Beziehung zur Chronologie und Entwicklung von Felskunst in Australien haben, werden angeschnitten.

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KEYWORDS: Portable art – India – Ostrich – Eggshell beads – Upper Palaeolithic

ENGRAVED OSTRICH EGGSHELL OBJECTS: NEW EVIDENCE OF UPPER PALAEOLITHIC ART IN INDIA

GIRIRAJ KUMAR, GEETA NARVARE and RAMESH PANCHOLI

Abstract. Some 41 sites with ostrich eggshells have been discovered in India during the last decade. Together with stone implements of an Upper Palaeolithic industry occur fragments of sometimes perforated discs of ostrich eggshell, some of which bear engravings. Radiocarbon dates place their appearance approximately between 25 000 and 40 000 years BP, and they are therefore among the oldest known art objects of Asia. The specimens with traces of engraving are individually described. Their significance for the dating of early Indian rock art is discussed, as is the role of ostrich eggs in the Indian Palaeolithic.

India is one of the countries having the richest prehistoric rock art galleries in the world. Here the earliest figures of dynamic dancers and those of animals from Bhimbetka and Chambal valley are the result of creative genius of Upper Palaeolithic man (Wakankar 1975a: 18; Kumar 1983: 359-64).[1] It is one aspect of Upper Palaeolithic art in India —which seems to emerge abruptly in a refined form.

Recent archaeological explorations have brought out an entirely new medium in the form of ostrich eggshell on which Upper Palaeolithic man employed his creative powers and aesthetic sense, to produce beads and discs for ornaments and engraved figures and designs for decoration and other purposes.

Stratigraphical studies and C-14 dates for ostrich eggshells indicate that these art objects may be placed in a time bracket of 40 000 to 25 000 years BP. Thus they belong to the early phase of the Upper Palaeolithic period.

Ostrich eggshell beads and pieces decorated with engraved designs were discovered by Dr S. A. Sali from a late phase of Upper Palaeolithic deposits at Patne in Maharashtra (Sali 1978: 24-6). Two small ostrich eggshell tablet beads were found by Professor V. S. Wakankar at the neck of a skull exposed from the lowermost level of an Upper Palaeolithic deposit in a rockshelter (Bhim III A 28) at Bhimbetka (Wakankar 1976: 2). One more ostrich eggshell piece with engraved decoration was reported by him from Ravishankarnagar, Bhopal (Wakankar 1978: 5). These discoveries created a sensation among archaeologists and art historians as they opened a new field for the study of creative powers and aesthetic sense of Upper Palaeolithic man.

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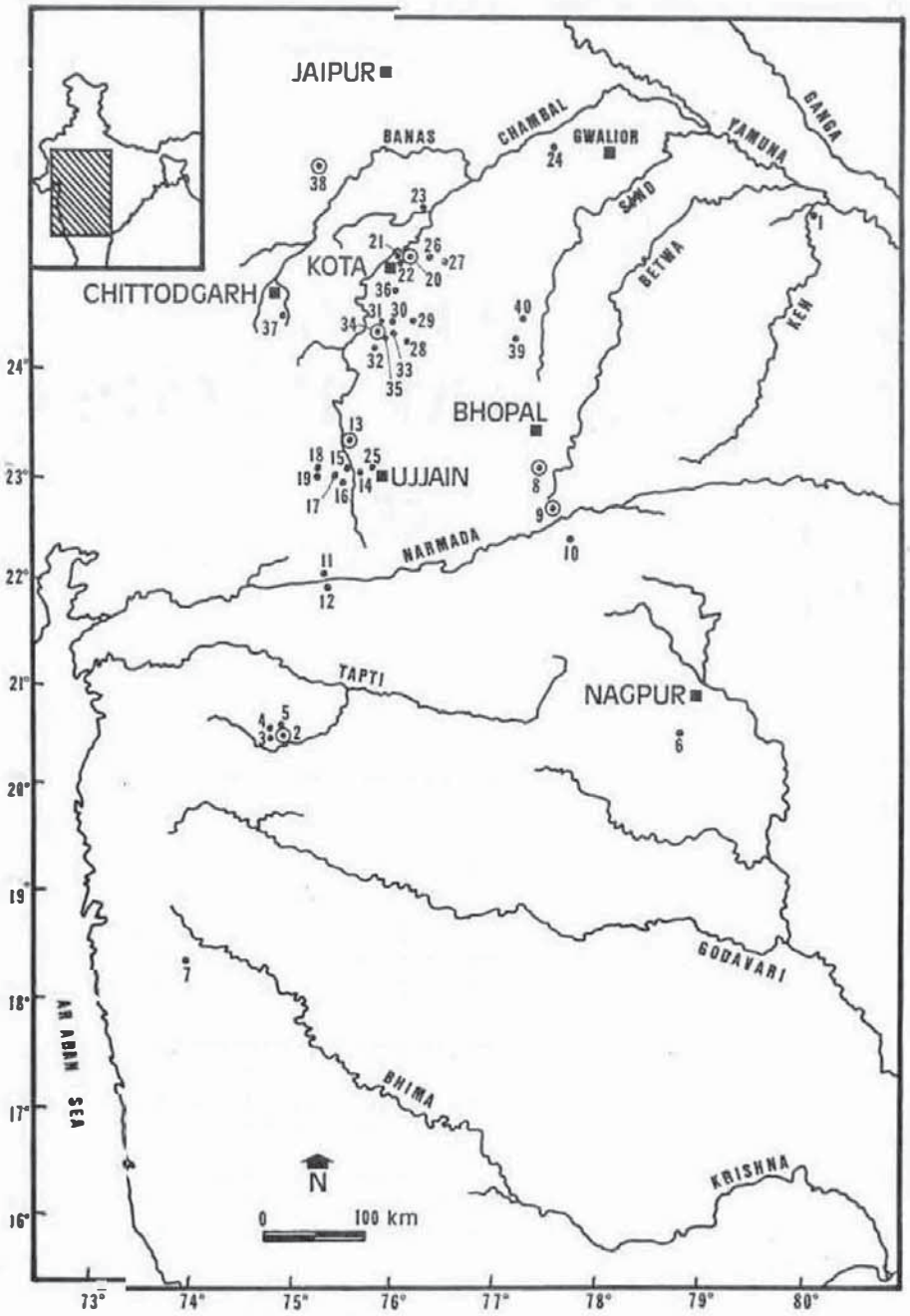
Wakankar and the authors of the present paper launched an expedition for finding Upper Palaeolithic occupation sites and ostrich eggshells in 1980 which is still continuing. So far 41 ostrich eggshell sites have been discovered in India which are distributed between 18°31' - 26°12.3'N and 71°45' - 80°20'E, in an area extending from Ken River site (Dist. Banda, Uttar Pradesh) in Yamuna valley in the north-east and Pahadgarh (Dist. Morena, Madhya Pradesh) in Chambal valley in the north to Poona on Mulamutha in Bhima valley in the south, Ruthiai (Dist. Guna, Madhya Pradesh) in Parvati valley in the east to Nimbaheda (Dist. Chittodgarh, Rajasthan) in Gambhiri valley in the west and Nanukchachnorana (Kunwargram) in the 'Run of Kutch' in the south-west. The distribution of these ostrich eggshell sites and their location has been shown in Figure 1 and Table 1. Out of these 41 ostrich eggshell sites 28 were found in the valley of Chambal and its tributaries, as these were extensively explored by the authors of this paper.

Mode of Occurrence

The earliest evidence of the existence of the ostrich in India comes in the form of ostrich bones from the Neogene deposits in the Siwaliks (Lydekkar 1886). But at all the 41 sites mentioned above, ostrich eggshells have been found from calcareous yellow silt deposits exposed by river floods or by any other agency. Calcareous yellow silt deposits as a whole are 8 to 10 m thick, and may be

[1] The human figures seem absorbed in the movement of dynamic dance with their limbs forcefully thrown in the air and the body twisted in the form of an 'S'. This style was never repeated in the succeeding periods. Animals (*Bos*) are executed in realistic outlines.

Generally green, sometimes red or a combination of green and yellow, pigment was used for making these figures.



1. Ken River Site
2. Patne ⊙
3. Ashta
4. Kakarda
5. Tisi
6. Shindi
7. Poona
8. Bhopal ⊙
9. Bhimbetka ⊙
10. Hoshangabad
11. Chotabarda
12. Ratikheda
13. Nagda ⊙
14. Dangawada
15. Rajota
16. Badanagar 1
17. Badanagar 2
18. Bherupachlana
19. Runija
20. Chandresal ⊙
21. Badikhedali
22. Chandresal-IV
23. Lakheri
24. Phadgarh
25. Banyakhedi
26. Palayatha
27. Khajuna
28. Pagaria-awar
29. Nandikheda
30. Osarna
31. Bhanpura
32. Garoth
33. Bhensoda
34. Ramnagar ⊙
35. Kherkhedi
36. Chechat
37. Kalyanpura
38. Kekadi ⊙
39. Janjalinaka
40. Ruthiai
41. Kunwargram-nanuk-chachnoma

• Ostrich eggshell sites

⊙ Ostrich eggshell beads, discs and engraved pieces

Figure 1.
The locations of the ostrich eggshell sites in India.

less (up to 1.0 m) where they have been eroded by floods. Generally they rest on a loose whitish calcareous horizon yielding Advanced Acheulian and Middle Palaeolithic implements, and are sealed by 1.0 to 1.5 m thick 'black cotton' soil deposit producing Mesolithic industry.

In Chambal valley lower and middle levels of calcareous yellow silt deposits yielded Upper Palaeolithic implements of jasper, chalcedony and chert. Retouched blades, points (small and tanged), lunates, burins, scrapers etc. prepared on thick irregular blades, and thin flakes predominantly of chert come from lower levels. As we proceed upwards flakes and flake implements decrease, thick blades become parallel sided, and are mostly of chalcedony and jasper.

Ostrich eggshells from calcareous yellow silt deposits are found sometimes freely, sometimes from camping sites in association with Upper Palaeolithic industry right from the beginning of occupation. Chandresal (Dist. Kota, Rajasthan), Nagada (Dist. Ujjain, Madhya Pradesh) and Ramnagar (Dist. Mandsaur, M.P.) in Chambal valley, Kekadi (Dist. Ajmer, Rajasthan) in Banas valley and Patne (Dist. Jalgaon, Maharashtra) in Tapti valley yielded hundreds of ostrich eggshell pieces. Hence they appear to have been breeding centres of ostrich.

Radiocarbon Dates

Ostrich eggshells from Phase II D belonging to the late Upper Palaeolithic period from Patne were dated by Laboratorium voor Algemene Naturkunde Rijksuniversiteit, Groningen, Netherlands. The date obtained for this sample, Grn. 7 200 Patne, is 25 000 ± 200 BP (Sali 1978: 26-7). Ostrich eggshells from two different levels of an early phase of the Upper Palaeolithic period from Chandresal were also dated by the same laboratory. The dates obtained for these samples are (Mook 1982):

Grn 10 638 Chandresal (lower level) 38 900 ± 700 BP

Grn 10 639 Chandresal (upper level) 36 550 ± 600 BP.

No.	Main Valley	River or Nala	Site	District, State	Location	Discoverer(s)
1	Yamuna valley	Ken River	Ken River Site	Banda (U.P.)	-	Carlyle (1880?)
2	Tapti	Nala joining Tittur	Patne	Jalagaon (Ma.)	20° 21.0' N, 74° 50.0' E	Sali (1972)
3	Tapti	Nala into Grna	Ashta	Jalagaon (Ma.)	-	Sali (1972)
4	Tapti	Nala into Grna	Kakarda	Jalagaon (Ma.)	-	Sali (1972)
5	Tapti	Nala feeder	Tisi	Jalagaon (Ma.)	-	Sali (1972)
6	Vardha valley	Shindi nala	Shindi	Nagpur (Ma.)	20° 46.0' N, 78° 53.0' E	Wakankar (1980)
7	Bhima valley	Mulamutha	Poona	Poona (Ma.)	18° 31.0' N, 73° 55.0' E	Ansari, Wakankar (1973)
8	Betwa valley	Nala joining Kaliasondh	Ravishankar-nagar, Bhopal	Bhopal (M.P.)	23° 15.0' N, 77° 25.0' E	Wakankar (1973)
9	Betwa valley	Choti-Jamunajhiri	Bhimbetka	Sahore (M.P.)	22° 57.0' N, 77° 36.0' E	Wakankar (1973)
10	Narmada valley	Narmada	Hoshangabad	Hoshangabad (M.P.)	22° 47.0' N, 77° 42.0' E	Wakankar (1982)
11	Narmada valley	Narmada	Chotabarda	Khargaon (M.P.)	22° 16.0' N, 75° 05.0' E	Wakankar (1984)
12	Narmada valley	Narmada	Ratikheda	Khargaon (M.P.)	22° 17.0' N, 75° 05.0' E	Wakankar (1984)
13	Chambal valley	Chambal	Nagda	Ujjain (M.P.)	23° 27.0' N, 75° 35.0' E	Kumar, Wakankar, Narvare (1981)
14	Chambal valley	Chambal	Dangawada	Ujjain (M.P.)	23° 25.0' N, 75° 35.0' E	Kumar, Neumayer, Wakankar (1980)
15	Chambal valley	Nala into Chambal	Rajota	Ujjain (M.P.)	23° 10.0' N, 75° 29.0' E	Wakankar (1980)
16	Chambal valley	Chamala	Badanagar 1	Ujjain (M.P.)	23° 03.3' N, 75° 23.0' E	Wakankar (1980)
17	Chambal valley	Utavali ka nala	Badanagar 2	Ujjain (M.P.)	23° 06.2' N, 75° 20.0' E	Wakankar, Kumar (1981)
18	Chambal valley	Nala into Chamala	Bherupachlana	Ujjain (M.P.)	23° 13.0' N, 75° 20.2' E	Wakankar, Jain (1981)
19	Chambal valley	Nala into Chamala	Runija	Ujjain (M.P.)	23° 09.0' N, 75° 16.2' E	Kumar, Jain (1981)
20	Chambal valley	Chandaloi	Chandresal	Kota (Ra.)	25° 12.0' N, 75° 57.0' E	Kumar, Narvare (1980)
21	Chambal valley	Chandaloi	Badikhedali	Kota (Ra.)	25° 12.5' N, 75° 58.2' E	Kumar, Narvare (1980)
22	Chambal valley	Chandaloi	Pipalda (Ch-IV)	Kota (Ra.)	25° 13.2' N, 75° 57.3' E	Kumar, Narvare (1980)
23	Chambal valley	Maze	Lakheri	Bundi (Ra.)	25° 37.0' N, 76° 10.0' E	Kumar (1980)
24	Chambal valley	Saun	Phadgarh	Morena (M.P.)	26° 12.3' N, 77° 40.0' E	Kumar, Neumayer, Shriram, Sharma (1980)
25	Gambhiri vall.	Nala into Gambhiri	Banyakhedi	Ujjain (M.P.)	23° 13.3' N, 75° 37.2' E	Kumar (1982)
26	Kalisindh vall.	Kalisindh	Palayatha	Kota (Ra.)	25° 11.5' N, 76° 15.0' E	Kumar (1980)
27	Kalisindh vall.	Nala into Kalisindh	Khajurna	Kota (Ra.)	25° 07.0' N, 76° 18.0' E	Kumar (1980)
28	Kalisindh vall.	Ahu	Pagaria-awar	Jhalawad (Ra.)	24° 12.0' N, 75° 52.0' E	Kumar (1980)
29	Kalisindh vall.	Ahu	Nandikheda	Jhalawad (Ra.)	24° 31.7' N, 76° 04.0' E	Pancholi (1986)
30	Kalisindh vall.	Nala joining Ahu	Osarna	Mandasor (M.P.)	24° 31.8' N, 75° 51.0' E	Pancholi (1986)
31	Kalisindh vall.	Rewa	Bhanpura	Mandasor (M.P.)	24° 31.0' N, 75° 45.0' E	Pancholi (1982)
32	Kalisindh vall.	Garoth nala	Garoth	Mandasor (M.P.)	24° 17.7' N, 75° 40.5' E	Wakankar, Pancholi (1981)
33	Kalisindh vall.	Nala joining Rewa	Bhansoda	Mandasor (M.P.)	24° 27.1' N, 75° 47.3' E	Pancholi, Kumar (1981)
34	Kalisindh vall.	Nala joining Rewa	Ramnagar	Mandasor (M.P.)	24° 27.4' N, 75° 46.8' E	Pancholi, Kumar (1981)
35	Kalisindh vall.	Nala joining Rewa	Kherkhedi	Mandasor (M.P.)	24° 28.0' N, 75° 45.8' E	Pancholi, Kumar (1981)
36	Kalisindh vall.	Nala joining Amjhar	Chechat	Jhalawar (Ra.)	24° 46.0' N, 75° 53.0' E	Mangi Lal Tharna (1987)
37	Gambhiri vall.	Kadmali	Kalyanpura	Chittodgarh (Ra.)	24° 37.0' N, 74° 42.0' E	Kumar (1980)
38	Banas valley	Nala joining Banas	Kekadi	Ajmer (Ra.)	26° 00.0' N, 75° 05.0' E	Kumar, Narvare (1981)
39	Parvati valley	Janjali nala	Janjalinaka	Guna (M.P.)	24° 22.0' N, 77° 08.0' E	Kumar (1982)
40	Parvati valley	Chepot	Ruthiai	Guna (M.P.)	24° 32.8' N, 77° 11.1' E	Kumar, Hridyashri (1986)
41	Run of Kutch	-	Kunwargram-nanuk-chachnorna	Guna (M.P.)	-	Wakankar (1985)

Key to abbreviations of states: U.P. = Uttar Pradesh; Ma. = Maharashtra; M.P. = Madhya Pradesh; Ra. = Rajasthan.

Table 1. Ostrich eggshell sites in India, September 1987.

Ostrich eggshells from Nagda and Ramnagar were dated by Physical Research Laboratory, Ahmedabad, India. Their dates are as follows (Agrawal 1987):

PRL - 854 Nagda (early Upper Palaeolithic) >31 000 BP

PRL - 1196 Ramnagar (early Upper Palaeolithic) >31 000 BP.

OSTRICH EGGSHELL OBJECTS

Ostrich Eggshell Beads and Discs

Ostrich eggshell was utilised by Upper Palaeolithic man for manufacturing beads and discs to make necklaces and other ornaments. Three pieces from Patne include one circular disc, with one side scored to receive a drill, and one is perforated

Figure 2.
Ostrich eggshell bead found at the neck of a human skeleton from Bhimbetka (Bhim III A 28), Madhya Pradesh. Early Upper Palaeolithic.

from both sides. All these are about 10 mm in diameter. Two small tablet beads from Bhimbetka (Bhim III A 28) are almost circular in shape and nearly of identical size. They are 6.0 mm in diameter with a thick hole in the centre. Both had been smoothened on the edges though not enough to polish them, and both faces of these beads are also smooth, either from constant use or as a result of their manufacture (Fig. 2).

These beads have been found at the neck of remains of an Upper Palaeolithic man. It appears that the individual might have been wearing a necklace, mostly of perishable beads, and two ostrich eggshell beads may have been precious additions to it.

A piece of an almost circular big disc of about 35 mm diameter with smoothened margin was discovered at Nagda (Kumar 1983: 5). Another disc piece found near Kekadi is about 21 mm in diameter and shows the marks of trimming at its circumference.

From the above evidences and ethnographic records (Forde 1934: 31) we may have an idea of the manufacturing process of ostrich eggshell beads. First, circular discs were prepared by carefully chipping the ostrich eggshell piece at its margins. The centres of these discs were scored to receive a drill point, and they were drilled through, generally from both sides. After many beads were drilled they were assembled on a stick and rubbed on a grooved stone to smooth and even polish them. Alternatively they could be strung on a tough fibre and rubbed on a flat stone. In either case, the result was a string of polished beads of the same size, that tended to fit snugly together (Francis 1983: 145).

Ostrich Eggshell Pieces decorated with engraved Designs

We now have a total of ten specimens of ostrich eggshell decorated with engraved designs. Ramnagar yielded five decorated pieces, Chandresal and Bhopal one each, and Patne three (Fig. 3). Their details are as follows:

Ramnagar-1: this ostrich eggshell piece is almost triangular in shape, 18.5 mm at its base and 15 mm in height. It bears a design of two pointed, petal-like forms of which the second one is comparatively smaller. It is overlapping the first one and is itself overlapped by an arc (part of a circle ?). Another line which looks like an arc of a bigger circle is crossing the first 'petal', but not the second one. In the first 'petal' there are two loops, forming a fish-like shape, the 'hind portion' of which is occupied by pittings. The lines are not smooth, but drawn by strokes.

Ramnagar-2: also a triangular piece, 16 mm at its base and 11 mm in height. There is an arcuate line overlapped by a fish-like figure, the 'fore part' of which is inside and the 'hind part' is outside the circle. There are three divergent lines going upward from the 'neck', probably indicating fins. Lines are not smooth, but drawn by strokes.

Ramnagar-3: again a small triangular piece, 8.5 mm at its base and 11 mm in height. When it is put with its apex downwards we can see a hind portion of some animal (a bovid ?) in profile. Sufficient vacant space has been left around the figure to emphasise it. The flow of the lines is powerful and

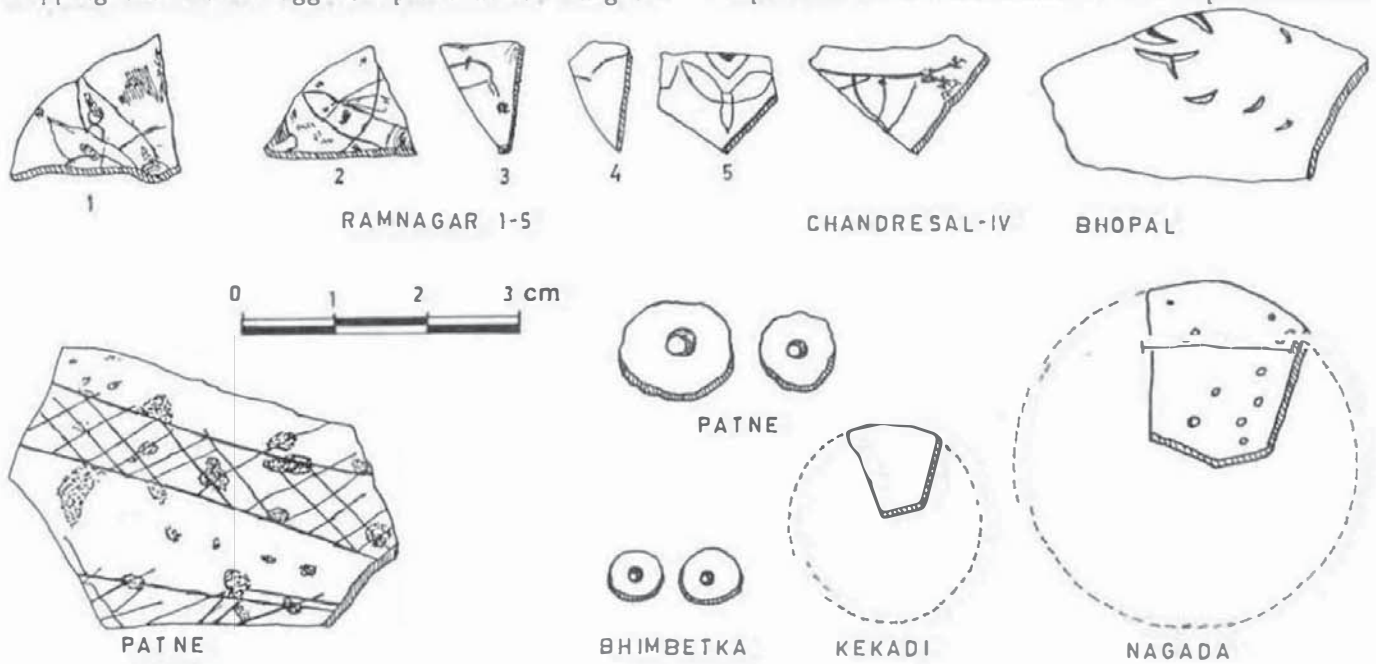


Figure 3. Beads, discs and engraved fragments of ostrich eggshell. Upper Palaeolithic.

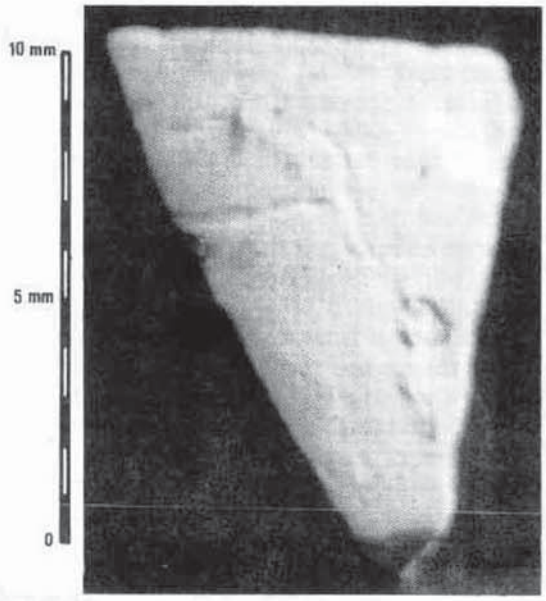


Figure 4.
Ramnagar-3. Ostrich eggshell fragment from Ramnagar (Madhya Pradesh), bearing marks resembling the hind portion of an animal. Early Upper Palaeolithic.

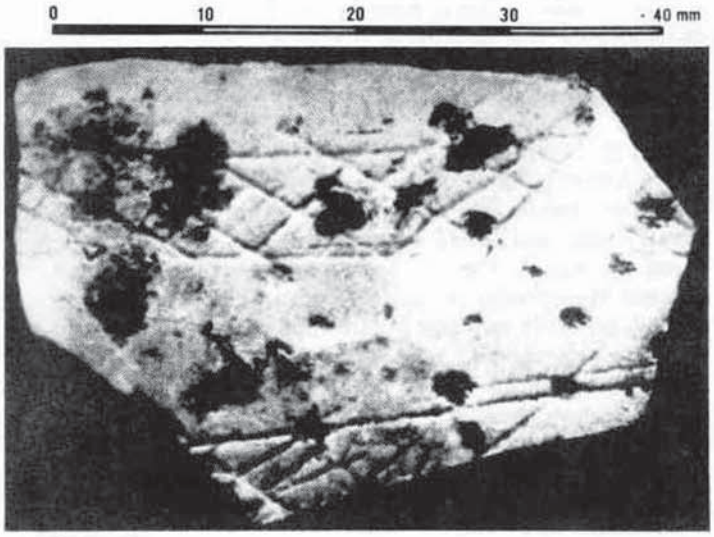


Figure 6.
Ostrich eggshell fragment, bearing engraved design. Upper Palaeolithic Phase II D. Patne (Maharashtra).

appearance is realistic (Fig. 4).

The figure is very small (6.2 mm), and judging from its size and principle of composition it appears that such animal figures might have been made either in a continuous row or in groups of a few distributed at regular intervals near the mouth of the vessel or bowl of ostrich eggshell.

Ramnagar-4: a longish fragment, 12 mm in length and 7 mm in breadth. It bears engraved lines.

Ramnagar-5: a pentagonal piece, 12 mm at its base and 10.5 mm in height. It bears two diagonal loops almost of equal size joined together at their lower ends with a small square to which a smaller loop is attached. Just above the larger loops is a triangular shape whose point faces the first design and which may be a part of another square. There is a pitting in its centre. Another angular line is present in the left side of the left loop. The design resembles a combination of floral and geometrical forms, i.e. a synthesis of elements from nature and geometry. The lines are smooth.

Chandresal-IV: vaguely pentagonal in shape, 15 mm at its base and 12 mm in height. It bears a horizontal line with bifurcated ends and two intersecting loops 'attached' to it. The piece is weathered and lines have been blurred, but the horizontal line is deep and thick, hence clearly visible. The lines of loops are regular and smooth, the second loop is broken.

Ravishankarnagar, Bhopal: roughly rectangular in shape, 35.5 mm in length and 18 mm in breadth. It bears a design executed in entirely different style by deep oblique nail-like curvatures like peacock's feathers (Fig. 5).

Patne: an irregular hexagonal piece, 43 mm in length and 30 mm in width, broad at one end and narrow at the other. It bears two sets of designs. In the upper set a design of cross-hatching was made between two straight deep lines running almost parallel to each other. In the lower set the design is also of cross-hatching but it is truncated. Lines forming the inner part of the second design are haphazard and hatching is only one way, towards right. Some of these lines are straight while some are irregular, and because of the uncontrolled strokes some of them extend outside the upper horizontal line. The spacing of the cross-hatching in both the sets is not regular. Though the design is based on geometrical pattern, it is not of rigidly calculated spacings, conveying the impression of spontaneity (Fig. 6).

Figure 5.
From left to right:
1 - Fragment of ostrich eggshell disc smoothened on periphery. Nagada (M.P.).
2 and 4 - Ostrich eggshell beads from neck of human skeleton. Bhimbetka (M.P.).
3 - Ramnagar-5, ostrich eggshell piece decorated with engraved design.
5 - Engraved ostrich eggshell fragment. Ravishankarnagar, Bhopal (M.P.).
All specimens are from the Upper Palaeolithic

Sufficient empty space has been left around each set of the design. If this was done intentionally it suggests the relevant intellectual concept in terms of present day compositional perspective.

Social and Family Life of Ostrich

In order to understand the availability of ostrich eggs for prehistoric man we have to understand the family and social life of ostrich and the environment in which the bird lives. The ostrich is the largest living bird in the world, popularly known as camel-bird. It may be about three metres high and weigh more than 150 kg. It cannot fly but may run at a speed of 50 to 70 km per hour. A horse with rider cannot overtake it. It forms the type of subclass Ratitae, and the genus *Struthio* of the order Struthioniformes and family Struthionidae. It is unique in possessing two toes (Grzimek 1972: 92).

Ostrich generally prefer the savannah type of grasslands such as in dry South African bushveld or the wide sandy plains of deserts which have hardly any vegetation. This adaptable grazer is at home even in dense bushes and steep rocky mountain country (Grzimek 1972: 92).

It occurs in small troops of five or six, of which one is a cock and the rest are hens. In the common grazing grounds at watering places they often form peaceful aggregations of up to 680 birds, but the individual flocks remain recognisable (Grzimek 1972: 92-3).

Females of one family hatch their eggs in a common clutch which is a fairly shallow pit about one metre across, dug in sand and dry soils. The clutch is surrounded by the material thrown out during the process, more rarely by edging of grass (Evans 1968: 29). More than 30 eggs were sometimes deposited within the pit in circular arrangement, and many more are dropped around probably to serve as food for the newly hatched young in the wild state (Evans 1968: 29). The yellowish-white eggs with smooth black pitted surface are quite big in size. They are spherical in shape with a slightly pointed end. Depending upon the hen's age their size ranges from 127 x 103 mm to 160 x 129 mm and they weigh 775 to 1618 g (Grzimek 1972: 92). The thickness of the shell averages 1.97 mm. They are edible and taste almost like chicken eggs (Sauer and Sauer 1972: 92-4).

INTERPRETATION OF DATA

Ostrich Eggs for Upper Palaeolithic Man

Ostrich eggs served various purposes for Upper Palaeolithic man. They were a rich source of protein food. The contents of an ostrich egg equal nearly those of two dozen hen's eggs (Evans 1968: 29). Empty eggshells, being quite big in size, might have been used as water containers, vessels and bowls, as the San of the Kalahari Desert in southern Africa do today (Starker et al. 1963: 153). The about 2 mm thick eggshell is quite strong.

Upper Palaeolithic people may well have been fascinated by the attractive ostrich eggshell and utilised it for manufacturing discs, beads and other ornaments, and they may have decorated bowls and vessels made from it by engraving designs and figures on them. From the present archaeological evidence and study of the family and social behaviour of ostrich it appears that Upper Palaeolithic man might have been able to obtain numerous ostrich eggs from ostrich breeding centres where sometimes nearly a hundred families of ostrich sharing the common grazing ground used to lay their eggs. However, it is not easy to procure the eggs as the parent birds are vicious and powerful fighters. Males guard the eggs most fiercely (W.B.E. 1949: 5990). However, the eggs may be obtained when they were sometimes left unattended, particularly when the adults leave to bathe, and isolated eggs outside the nest are ignored (Francis 1983: 143). Pieces of hatched-out eggs may be found in large numbers at ostrich breeding centres. These may be used for manufacturing discs, beads, pendants etc.

Skill of engraving Ostrich Eggshell

It is really a difficult task to make designs and figures by engraving on ostrich eggshell which is so hard that we have to employ a hammer and a saw to open an egg (Grzimek 1972: 94). Great skill of pressure and control are required while moving a stone burin to incise a smooth line on it's surface. Mastering this art medium would have been a most difficult task, but as the evidence proves, one that was successfully accomplished by Upper Palaeolithic people. In the initial stage lines were drawn in strokes, but later on smooth lines were made with powerful flow. This is clear from the study of the engraved ostrich eggshell pieces from Chandresal, Patne, Bhopal and Ramnagar. In the form of ostrich eggshell Upper Palaeolithic man found a durable medium on which he might give visual form to his ideas and feelings.

Conclusion

Ostrich eggshell beads and decorated pieces thus form a new evidence of creative art in India ranging in antiquity from about 40 000 years to 25 000 years BP. They show preconceived design and decoration, indicating the aesthetic sense of Upper Palaeolithic man on one hand, and on the other technical skill for successful utilisation of ostrich eggshell—rather a hard material—as a new medium for creative art, probably used for the first time in human history.

The forms and designs engraved on ostrich eggshells so far discovered are no doubt limited. Whether this is because of the limitations of the medium or of the creative ability of early Upper Palaeolithic man is a question which will only be answered by future research in this field. Such further work will also help in deciding the problem of dating and development of early rock art in India, which seems to emerge abruptly in a highly expressive and refined form.

Acknowledgments

We express our gratitude to Professor V. S. Wakankar, Director of the Rock Art Institute, Ujjain; Professor V. N. Misra of Deccan College, Poona; Dr S. A. Sali of Archaeological Survey of India; and Sri Nirdeep Ray, fine artist in D.E.I., Agra, for their scholarly discussions and valuable suggestions. It is because of

their encouragement that we have been working on the project 'Ostrich in India and its relation to prehistoric man'. We are also thankful to Professor W. G. Mook of Laboratorium voor Algemene Naturkunde, Groningen, Netherlands and Professor D. P. Agrawal of Physical Research Laboratory, Ahmedabad, India, for C-14 dating of ostrich eggshells.

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COMMENTS

By B. D. NANDADEVA

It is amazing that Indian archaeologists have been able to identify such a large number of ostrich eggshell sites. The contribution of Dr Kumar and others in this connection is remarkable as they have discovered 23 sites, out of a total of 41 sites so far located within the short period since 1980. One has to admire the dedication shown by the authors for revealing to the specialist community this new genre of Indian prehistoric art. As this project of locating ostrich eggshell sites is still continuing we may expect more interesting evidence of this art form in the future.

While admiring the authors for their efforts I would also like to add a few observations.

Firstly, it would be much appreciated if the authors explained their method of identification. This is not because one has to be essentially sceptical about an archaeological discovery, but in scientific research one has to validate findings by reaching the highest degree of probability. Other scientists would require to know the extent of scientific method that has been followed. This is particularly so when the objects discovered are so small in size, as in the present case. Readers would appreciate to know through what method—surface observation, chemical analysis or otherwise—and with what degree of certainty the authors have ascertained that their finds are indeed ostrich eggshell fragments.

My second observation is that, to build theories such as 'Upper Palaeolithic man employed his creative powers and aesthetic sense to produce beads and discs for ornaments and engraved figures and designs for decoration', the data gathered by the authors is too scanty. Out of hundreds of ostrich eggshell pieces discovered, the authors claim only ten fragments to have been engraved with designs or figures. Except for those on the fragment from Patne the supposed engravings are obscure. Tiny lines of such nature are sometimes created by natural decay—these pieces are as old as 31 000 years—and no doubt such natural lines can resemble figures or motifs to the imaginative mind. Identification of these so-called engraved marks becomes even more difficult as these fragments are so tiny (most of them are hardly more than 1.5 cm in length). Both these factors lead to scepticism about the authenticity of the interpretation of engraved ostrich eggshell pieces.

Insufficient data to arrive at conclusions appear in a number of places in this paper. Regarding the two pieces of ostrich eggshell discovered from Bhimbetka it is concluded, firstly, that they are beads forming part of a necklace, and secondly, that the individual at whose remains they were found might have been wearing a necklace mostly of perishable beads, and two ostrich eggshell beads appear to have been precious additions to it. Merely finding two pieces of some material in the neck region of human remains, looking like beads, is not adequate data to come to this conclusion. They could very well be related to some funerary rite—they could be one of many other things.

One very curious aspect of the discovery is the small scale of the supposed engravings. What we learn from rock drawings of India is that Upper Palaeolithic man favoured pictures of large scale, whereas the Mesolithic artist chose small-scale figures. As to whether the Upper Palaeolithic man had the skill to carve such 'micro-scale' figures with the help of the type of tools he used to handle is doubtful, and a question worth further investigation. It is also worth studying why ostrich eggshell objects are not found in microlithic deposits.

Besides these few remarks I profoundly appreciate the efforts of the authors who brought to light a new form of Indian prehistoric art which is well worth further attention. I would suggest that Dr Kumar and others should try to find more data on ostrich eggshell art and also study the ethno-archaeological aspects of this technology.

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By GAJENDRA S. TYAGI

This article by Dr Kumar et al. deserves appreciation on two counts. Firstly, for reporting the discovery of a large number of ostrich eggshell specimens at over forty sites from a vast area comprising parts of the present states of Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, and Maharashtra. Secondly, there is an attempt to explain the sudden emergence of the rock art in India, 'abruptly in a highly expressive and refined form', by comparing it with the crude and simple engravings on the ostrich eggshells, supposedly of older antiquity. The authors' attempts towards forging the link between the two mediums of art is certainly laudable; however, they leave much to be desired in the way of establishing the assertion made.

No doubt, to this day the engraved ostrich eggshells are the oldest dated specimens of mobile art in India. But their use for the relative chronology of rock art is possible only when it could be unquestionably established that the latter has evolved from the crude engravings on the ostrich eggshells of well-dated antiquity. This could be achieved only by comparative stylistic study of the two. Unfortunately, despite the large

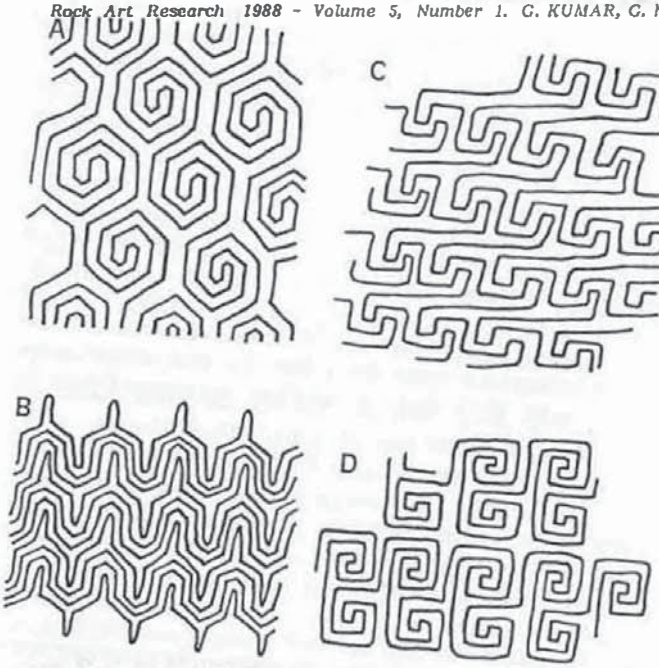

Figure 1. *(Tyagi)*
Painted 'intricate design patterns' from Indian rockshelters.

number of specimens of ostrich eggshells discovered so far, only a few bear signs of human workmanship. Owing to the susceptibility of the material to corrosion most of this art is lost to us. Except for the pieces from Patne, any identification of engravings, beyond accepting that they definitely bear the evidence of human workmanship, would be highly speculative.

Surprisingly the authors have not mentioned Dr Sali's discoveries of ostrich eggshell pieces at Ashta in Maharashtra, made as early as 1958 (Sali 1980: 133). Sali's finds of engraved ostrich eggshells and beads from Upper Palaeolithic levels at Patne are only too well known to have escaped the attention of the authors. These findings were published after the identification was confirmed by the Natural History Section of the British Museum, along with the radiocarbon dates for these objects (Sankalia 1974: 227). The finds of ostrich eggshell fragments bearing marks of human modification from a vast area of central India by Wakankar and Kumar et al. confirm that these were not brought from outside (Africa or western Asia), rather the bird certainly lived in the Indian subcontinent up to at least Mesolithic times.

I have strong reservations regarding the tentative figurative identifications of the engravings on the eggshell pieces from Ramnagar Nos 1 and 2 as 'designs of pointed, petal-like form or fish-like figure'. Similarly the engravings on the specimen No. 3 from the same site are identified as 'hind portion of some animal (a bovid?) in profile'. The most these engravings, badly disfigured due to the ravages of time, would allow to say at this stage of research is that unmistakably they are the products of human artistry.

The ostrich eggshell tablet beads from Bhimbetka III A28 Tr VII to which the authors have assigned Upper Palaeolithic antiquity were actually recovered from a child burial from Mesolithic levels and were identified as bone pendants (Wakankar 1975a: 26-7; Wakankar and Brooks 1976: 106).

It is not from the Bhimbetka and Chambal valleys alone that the figures of dynamic dancers and animals have been reported from the earliest phase. Some of the sites such as Jawera, Ladi-ki-Karar, Cheel Dant, Kathotia and Firangi, all in the vicinity of Bhimbetka, have paintings of greater number and superior quality.

During the course of exploration over the last five years I have discovered a number of 'intricate design patterns' at several rockshelters including Bhimbetka (Fig. 1). The so-called dancing figures are not superimposed over these designs. The 'designs' occur on the virgin surface, whereas 'S'-type dancing figures, even in green colour, were observed superimposed on the red paintings, not in identifiable state as they are poorly preserved. [The author has provided colour photographs to the Editor which confirm the superimposition relationship he describes here. The linear green figures are commonly claimed to be India's earliest rock art.] Thus, these designs may be either older than, or contemporary to, the dynamic dancing figures and animals. The intricate design patterns seem to have stylistically evolved from some simpler designs and an antecedent could well be traced in the design patterns on the ostrich eggshells, especially the specimen from Patne.

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By V. S. WAKANKAR

The paper by Kumar et al. is extremely significant as it throws new light on the earliest mobiliary art in India, produced by Upper Palaeolithic artists. During the six strict eggshell expeditions organised by Vikram University and the Institute of Rock Art, Ujjain, Dr Kumar and I worked together at many places and his writing gives a vivid picture of the discoveries. The radiocarbon dates of Chandresal (Rajasthan, Nagda and Ramnagar (M.P.) and Patne (Maharashtra) have not only pushed back the date of the Indian Upper Palaeolithic but also assisted in appraising the technological achievements of Stone Age man.

Kumar et al. refer to an engraving of an animal figure on a Ramanagar ostrich eggshell piece. A similar engraving of an Indian bison was observed by me on a stalagmitic pillar in Manpur Cave (M.P.), perhaps we can also place it in the Upper Palaeolithic period. There are several figures in Bhimbetka, engraved on the calcite encrustation over the rock shelter wall in BHM.IIF.6 and IIIF.24, where figures of bison, human torso and peacock have been observed. It seems the art of engraving was also an important achievement for the rock artist, be it for sheer enjoyment, or in response to a desire to work in a different medium than pigment. Perhaps

he has also utilised bone or soft stone which are available in the Jabalpur area (M.P.). We are planning to conduct an expedition to that area in 1989.

The article, though concise, brings to light the earliest works of art not only of India, but some of the oldest of the world in general and thus amply deserves publication in *RAR*.

I would like to add a few other relevant discoveries. The bone harpoon from an upper calcareous deposit of Lohangi Nala in Pralapagarh (U.P.), referred to by the late G. R. Sharma as Mother Goddess, and engraved bone pieces from Mesolithic deposits of BHM.IIIA.28, indicate a rich tradition of engraved bone ornaments (mostly beads). It seems bone, hardwood and antler were the materials used by the prehistoric artists. The decorated (engraved) Mesolithic core discovered at Chandravati Rajasthan by V. H. Sonavane is also an important addition to portable prehistoric art. He describes his discovery as a fluted chert core found in assemblage, showing evidence of engraving on its flat, semi-rectangular, patinated surface. This surface measures 30 x 20 mm. The design appears to have been cut into the thin cortex which is 1 mm thick. The whole design occupies the central portion of the patinated surface and measures 13 x 15 mm. The engraved design, the focus of Sonavane's paper (in *Archeology and History*, 1988, p. 54), consists of a rhomboid, involuted or spiralled arrangement, a pair of parallel lines moving clockwise from the centre. The design appears to be the result of two spiralling arms, one of which bears a series of short diagonal lines whereas the other is significantly plain. This evidently shows the engraver's intention that significance and visual effect of the engraved design should not go unnoticed. The engraver has throughout maintained a constant 1 mm distance between the two arms of the design.

The engraved design is partially damaged. This damage can be noticed especially towards the outer edge of the design near the flaked periphery, and seems to have been caused by subsequent flaking of the nodule to remove a few parallel-sided blade flakes.

Sonavane compared this design with the design infilling of Mesolithic animal figures from Bhimbetka II F.20 IIIC-13 C-21 Chikloda-1-9 Modi-6 Kathotia Karad Jaora Malkhar, Kota, Badami and other sites. I agree with Sonavane that

> it appears that the sense of proportion and designing, revealed by the works of engravers and painters of the Mesolithic period, was of a fairly high order. The present findings by Giriraj Kumar and Sonavane and others add significant new data to early Indian art and open a new line of investigation which may lead to search for new materials to help us in understanding the various facets of the life of prehistoric man and the basic reasons for such leisurely artistic activity (page 56).

My comment on this engraving is that the flaking was done during the Mesolithic period, damaging the already engraved surface. It follows that the design must have been produced either in the early Mesolithic or the Upper Palaeolithic period, and thus we have new data for the art activity of Stone Age man.

The contribution by Kumar and his colleagues is extremely significant and adds a new chapter to the studies of Indian art in particular, and world art in general.

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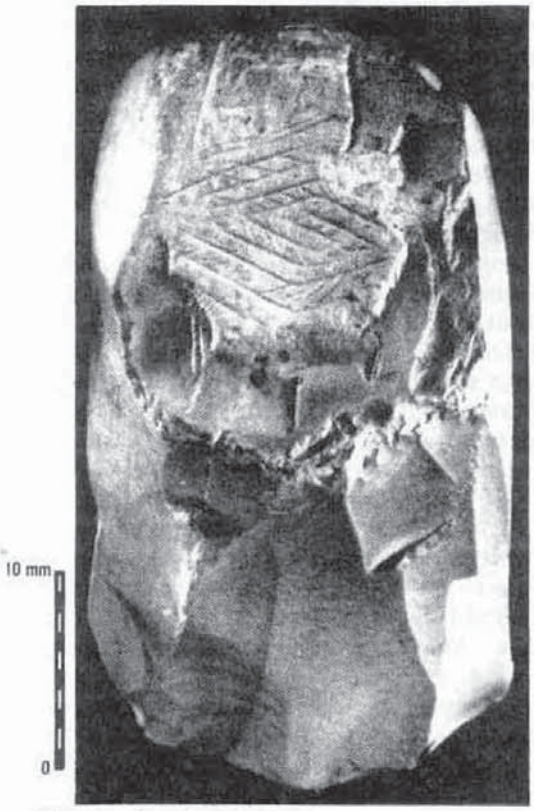

***Figure 1.** (Wakankar)*
The engraved Mesolithic chert core from Chandravati, India. The design has been damaged by subsequent flaking. (By courtesy of Dr V. H. Sonavane.)

REPLY

By GIRIRAJ KUMAR, GEETA NARVARE and RAMESH PANCHOLI

We thank Dr V. S. Wakankar, B. D. Nandadeva and G. S. Tyagi for their appreciation, valuable comments and suggestions on our research paper. Dr Wakankar gives additional information about the tradition of engraving on calcite encrustation in rockshelters, on bones and on a Mesolithic chert core. It indicates the enthusiasm and ability of Upper Palaeolithic and Mesolithic man to explore and utilise different types of surfaces and media for art activities.

The identification of ostrich eggshells in our collection has been done by comparative study. The authors have studied the ostrich eggshell fragments discovered by Dr S. A. Sali at Patne. These were identified by Dr C. J. O. Harrison of the British Natural History Museum, London (Sali 1978: 28-9).

Secondly, Dr Wakankar also had a complete, empty ostrich egg in his collection, though of modern age. By comparing our collection with the identified ostrich eggshells it appears to us that most of the pieces in our collection belong to *Struthio camelus*. They have black pittings on the smooth surface of thick eggshell. Not all the eggshell pieces are small, some are up to 3 or 4 cm in length. We would be happy if somebody would identify them to species and subspecies level.

Nandadeva is right that the data gathered by us is scanty and more evidence through further research is needed. But we have tried to present what has been discovered so far. The finds' small size and scantiness is because most of the fragments have been collected from the surface where they were susceptible to damage. Secondly, all the ostrich eggshell pieces discovered by us do not come from Upper Palaeolithic habitational sites. The sites like Chandresal, Nagda, Ramnagar, Kekadi etc., where they occur in large numbers, appear to have been breeding centres of ostrich, and only some of the eggs and eggshell pieces might have been used by man. For obtaining larger fragments of ostrich eggshell with engravings we should have to excavate the prehistoric habitation sites.

Until now ostrich eggshells have not been found in Mesolithic deposits. In our view this may be attributable to the change in climate from subarid to monsoon type at the end of the Pleistocene. This could have led to the abandonment of grazing areas which had become less favourable to ostrich (Kumar 1980). Francis thinks that man was an important factor leading to the extinction of the bird from many areas. This does not rule out other factors such as climate (Francis 1983: 145).

Tyagi raises a number of questions. We are aware of the sites such as Jawera, Kathotia, Firangi, Ladi-ki-karar etc. referred to by him, from where earliest figures of dynamic dancers have been reported. All these sites are in the vicinity of Bhimbetka. Hence Bhimbetka region as a whole covers all these sites. In our paper we have mentioned Bhimbetka not as a site but as a region like Chambal valley. Regarding the discovery of ostrich eggshell sites by Sali: the relevant sites are included in the 41 listed by us (refer Figure 1 and Table 1).

We wonder how Tyagi could identify two ostrich eggshell small tablet beads with a 9.5 cm long bone pendant. The latter was discovered along with a child burial from Bhim-III A 28 Trench VII Layer (4) while ostrich eggshell beads were found with the skull of an adult person from Layer No. (5) in the same trench. Layer No. (5) was an Upper Palaeolithic habitational deposit. Wakankar reports the details as follows:

> An Upper Palaeolithic burial has been exposed at Bhimbetka in Bhim-III A 28 VII (5). It was sealed by an Upper Palaeolithic layer containing longer blades, bigger lunates, obliquely fluted cores but no triangles and trapezoids. Below this layer (in area A 5-A 4) a thick slab broken into several pieces with edges highly weathered was noticed. When these were removed one skull piece and few more bones were exposed. It seems the skull was badly disturbed, probably because of the rock fall.
>
> A stone was lying inclined near the temporal bone and two eye ridges. When this stone was removed the maxilla and the lower jaw were found intact. All the pieces except maxilla and lower jaw were highly encrusted by calcite. It was because the latter were lying under the stone.
>
> While clearing the skull bones two parts of the ear bone were found together. A part of the left lower jaw was not found. It must have been crushed or eaten away by animals. The lower jaw indicated the loss of a first molar quite a long time before the death of this elderly man of over 50, but the tooth was carefully preserved and buried with the dead.
>
> Below the lower jaw two whitish tablet beads of ostrich eggshell were recovered. They might have been a part of the necklace of beads, the rest of which could not survive because of being made of perishable material. (Because of their location below the lower jaw and finish, to us also they appear a part of a necklace. There may be other interpretations also.)
>
> A burial pit was dug in the lower layer producing Middle Palaeolithic scrapers and tortoise cores. No microlith was found in this layer, but they were obtained embedded in soil with bones. It seems the dead must have been buried in the early phase of the Upper Palaeolithic period (Wakankar 1975b: 76).

Morphological and metrical analysis of this specimen by Dr Kenneth A. R. Kennedy and Mr Burrow indicates that this specimen possesses a number of features found frequently in prehistoric populations of terminal or late Pleistocene times.

We agree with Tyagi that early intricate design patterns found in rockshelters seem to have stylistically evolved from some simpler designs and an antecedent could well be traced in the design patterns on ostrich eggshells. But while studying the engravings on ostrich eggshells we should always keep in mind that here Upper Palaeolithic man employed his creative ability on very limited space, and on a surface and medium quite different from the walls and ceilings of rockshelters (and caves), where he had comparatively more freedom and space to express his ideas, feelings and beliefs, generally in colour. It is not improbable that some of the engravings on ostrich eggshells, e.g. those on Ramnagar-3 and Ramnagar-5, may be contemporary with early rock art in India. C-14 dates for ostrich eggshells from Ramnagar are >31 000 years BP. Important is that engravings on ostrich eggshell pieces appear to have been done intentionally, probably to decorate the bowls or vessels made of ostrich eggshell, and these engravings show preconceptualised forms and aesthetic sense of Upper Palaeolithic man who synthesised realistic and non-realistic forms, which resulted in art galleries and bone objects elsewhere. Wakankar and Tyagi have given sufficient examples of this effect in their Comments. We thank them for additional information.

When evaluating the creative ability and aesthetic sense of Upper Palaeolithic man we should keep an open mind. There are reasons to believe that art activity might have begun in the Acheulian period, probably even earlier. The occurrence of red ochre pigment used for colouring, in association with an Acheulian assemblage at Hunsgi, Gulbarga District, Karnataka, India (Sankalia 1976: 3-4), and finely trimmed advanced Acheulian implements from so many sites indicate the creative ability and aesthetic sense of *Homo erectus*, the Acheulian man. Professor K. P. Oakley, former Head of the British Museum of Natural History, in a number of papers written over the last decade established that Palaeolithic man in the mid-Acheulian period had been a keen collector of fossils in the form of

'starry stones'. He carried them 190 km or more from their known geologically determinable find spots to his habitation sites at Swanscombe and in Portlandian beds (Oakley 1981: 205-11).

The motivation for this collecting activity was aesthetic, and unrelated to production. Hence 'art as a human behaviour had emerged before *Homo sapiens* when *Homo erectus* was still around, in other words thousands of years before the earliest known rock paintings hitherto regarded as marking the beginning of man's creativity' (Oakley: ibid.).

Besides, an aesthetic sense could also be attributed to Oldowan man. Discovery of a grooved and pecked phonolite cobble in Upper Bed I at FLK North in Olduvai Gorge, Northern Tanzania suggests this (Leakey 1971: 269). In the view of Professor M. D. Leakey it has unquestionably been artificially shaped, but it seems unlikely that it could have served as a tool or any practical purpose (Leakey: ibid.). [1])

So we should wait for more evidence of early Upper Palaeolithic art activities. At present the forms and designs engraved on ostrich eggshell are limited. Only future explorations and excavations of prehistoric habitation sites for ostrich eggshell objects will provide answers to many questions and doubts about the creative power and ability of early Upper Palaeolithic man. But the present findings add significant new data to early Upper Palaeolithic art in India and open a new line of investigation to appreciate the achievements of prehistoric man.

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[1]) Recent definitive evidence of the artistic capacity of at least some *Homo erectus* populations will be shortly published in this journal. Ed.

Résumé. Pendant la dernière décennie on a découvert 41 gisements aux Indes qui contiennent des coquilles d'oeuf d'autruche. Associés aux outils lithiques d'une industrie du Paléolithique Supérieur on trouve des fragments de disques, parfois perforés, de coquilles d'oeuf d'autruche, dont certains portent des gravures. Selon les datations au radiocarbone ils apparaissent entre 25 000 et 40 000 BP environ, et sont donc parmi les objets d'art les plus anciens de l'Asie. Les spécimens qui portent des traces de gravures sont décrits individuellement. Les auteurs discutent de leur signification pour la datation de l'ancien art rupestre indien, ainsi que du rôle des oeufs d'autruche dans le Paléolithique indien.

Zusammenfassung. Im Verlauf des letzten Jahrzehntes sind in Indien 41 Fundorte von Strauszen-Eierschalen entdeckt worden. Zusammen mit einer Steinwerkzeugindustrie des Oberen Paläolithikums kommen Fragmente von manchmal durchlöcherten Scheibchen von Eierschalen zum Vorschein, und einige davon tragen Gravierungen. Radiokarbon-Daten beweisen, dasz ihr Erscheinen ungefähr zwischen 25 000 und 40 000 Jahre BP fällt, und sie gehören somit zu den ältesten bekannten Kunstgegenständen Asiens. Die Exemplare mit Gravierungsspuren werden einzeln beschrieben. Ihre Bedeutung fur die Datierung früher indischer Felskunst wird besprochen, ebenso wie die Rolle der Strauszeneier im indischen Paläolithikum.

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KEYWORDS: Mobiliary art - Absolute dating - Pre-Incan periods - Southern Peru

ARTE MOBILIAR CON TRADICIÓN RUPESTRE EN EL SUR DEL PERÚ

ELOY LINARES MÁLAGA

Abstract. The author describes four types of mobiliary art resembling rock art traditions in southern Peru. He argues for a strong nexus between the two art forms and, by providing reliable dating for some of the portable objects, arrives at the conclusion that some of the rock art conventions existed for a much longer period than had been assumed. At least the portable art has been in use from about 7000 years BP to just before the Inca Empire. Paint brushes with pigment have been recovered at some of the sites. The available evidence is summarised and a synthesis of the region's rock art is offered.

Introduccion

En América - como se sabe - existen basicamente *cuatro modalidades de Arte Rupestre* a saber: *pictografías, petroglifos, arte mobiliar con tradición rupestre* y *geoglifos.*

En el Sur del Perú abundan los Sitios Tipo con estas modalidades; a guisa de ejemplo diremos: que las pictografías más importantes están en el 'Abrigo del Diablo' de Quebrada Cimarrona de Toquepala en el Departamento de Tacna o los abrigos de - Q'ollpa cerca al río Sumbay y de Mollepunco en el valle y Cañón más Profundo del - Mundo en el Departamento de Arequipa.

Petroglifos: los más famosos declarados como el 'repositorio más grande del mundo' - 5 km^2- y postulados en el 'Primer Simposium Mundial de Arte Rupestre' como - 'Patrimonio de la Humanidad', gestión que se viene haciendo ante la UNESCO. Se ubican en *Toro Muerto*, también en el Departamento de Arequipa; donde existen además 124 Sitios Tipo localizados con arte rupestre (Núñez y Linares 1986). De no menor importancia son los geoglifos ya famosos en el Mundo y que se ubican en Nazca del Depto. de Ica y los hay también en Arequipa, Moquegua y Tacna. Pero nos ocupamos ahora del *arte mobiliar con tradicion rupestre* cuya denominación fué aprobada por el IV-Simposium Internacional de Arte Rupestre Americano, realizado en Río de Janeiro (1973) en respuesta a nuestra propuesta y con la valiosa intervención de los especialistas, muy recordados Profesores Pedro Bosch Gimpera de México y Luis Pericot García de España. Terminología que además, permite diferenciarse del arte mueble de Europa. Hemos clasificado este arte en cuatro tipos a saber:

(A) *Lajas* - cuando se pinta sobre piedra;

(B) *Tejas* - cuando se pinta sobre arcilla;

(C) *'Sandwich'* - cuando son de piedra o de arcilla imitando a emparedados; unión de dos lajas pintadas y con láminas de metal entre ambas, además envueltas frecuentemente con hojas de achira.

(D) *Grabado* - en distintas modalidades del rayado simple al relieve.

A todos estos cuatro tipos, se les puede transportar manualmente. Todos ellos abundan en el Sur del Perú (Fig. 27).

En el Museo Universitario de la UNSA - Arequipa - tenemos material que venimos investigando desde años atrás. [1])

Del tipo B ultimamente en Kupara una Misión Peruana, dirigida por el arqueólogo Federico Kauffman Doig: y auspiciado por el Gobierno de Italia, localizó una cámara subterránea Cegada; de 12 mts. de profundidad; 2.50 mts. de ancho, y 3.00 mts. de alto, con centenares de 'tejas' muchas sin pintar ubicadas sobre una banqueta natural formada por una roca; como también otras pintadas. A este hallazgo situado a 3.200 mts. sobre el nivel del mar, se le ha hecho mucha publicidad en el país. Ultimamente (diciembre 1986 a marzo 1987) he brindado al descubridor - de cuya Misión soy Asesor junto con el actual Embajador de Perú en Colombia Dr. Javier Pulgar Vidal, le he brindado toda la información a mi alcance y se la seguiré brindado; a su pedido. [2]) (Figs. 6 y 7 Cortesía del Dr. Kauffman).

Escorzo Historico

En forma muy suscinta haremos un escorzo histórico y un análisis somero de lo que se conoce hasta hoy. Antes quisiseramos acotar los datos que

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[1]) 'A propósito de Arte Mobiliar con Tradición Rupestre de Chucu', Eloy Linares Málaga, 5-3-87 Pág. Editorial de Correo, Diario de Arequipa, Perú.

[2]) 'Informe Preliminar sobre rescate arqueológico de placas con pinturas mágicas realizado en Chuquibamba' (Arequipa) por encargo de la Comisión Nacional de Arqueología (Acuerdo No. 173) con auspicios de la Fundación Ligabue; Asesores Drs. E. Linares Málaga y Javier Pulgar Vidal. Dic. 1986.

desde 'El Frontón' la prisión para políticos diera el Dr. Pedro José Rada y Gamio en 1930. [3]) He aquí sus puntos de vista: acerca de esta - modalidad de arte que no es otra que el de Escomel; que expuso en La Plata (Argentina), el año 1932 y que describimos luego.

Parece que los primeros datos acerca de 'arte mobiliar con tradición rupestre', en la ciudad de Arequipa (Sur del Perú): fueron dados a conocer por los hermanos Eduardo y Alberto Belaunde de la Romaña, hacendados del valle de Majes, quienes en 1905 encontraron los primeros 'sandwich' con pinturas, a los que no - dieron mayor importancia. El padre de la arqueología andina, Profesor Dr. Friedrich Max Uhle, habla de los 'cantos pintados' o simplemente pintados que encontró en los Cementerios de Arica (Chile) y de Tacna (Perú), hacia 1915. Pero - ellos se refieren a geoglifos, positivos y negativos.

Uno de los hallazgos de mayor trascendencia en la zona de Arequipa fue denunciado por el Sacerdote de Chuquibamba. Don Francisco Febres, el que informó al cirujano arequipeño Edmundo Escomel, quién, como aficionado coleccionó las 'piedras pintadas' o 'emparedados' y con ellas pudo preparar un trabajo que lo presentó a consideración del XXV Congreso Internacional de Americanistas, realizado en 'La Plata', República de Argentina, en 1932, el mismo que se publicó en 1934, en el Tomo II de las Actas, con el título de 'Tejas Peruanas Precolombinas destinadas a fines arítméticos'. Figs. 1, 2, 3, 4 y 5. El resumen en referencia abarca seis páginas (45 á 50), y en él, se llega a las siguientes conclusiones, que se puede resumir asi:

Primera. La vida precolombina del departamento de Arequipa, se caracteriza por una civilización propia, diferente por sus artefactos y utensilios.

Segunda. En el mismo departamento, había diferencias apreciables, caracterizándose, por ejemplo, la región de Caylloma, por el número de cráneos trepanados y la del valle de Majes por las 'tejas aritmeticas'.

Tercera. En las tumbas de este último valle, y al lado de los esqueletos humanos, de las telas y los ceramios o de las huacas, existen 'tejas' que allí - se sepultaban, acondicionadas por parejas, mirándose entre sus caras diseñadas, entre las cuales existían a veces laminillas de oro, cuidadosamente envueltas en hojas y fibras de 'achira'.

Cuarta. Los diseños estaban indiscutiblemente destinados a fines aritméticos.

Quinta. La variedad de estos diseños y sus figuras hacen pensar que eran 'testamentos o inventarios' de los bienes que dejaba el difunto al morir.

De estas conclusiones ampliamos la primera, dado que hoy se habla de una cultura propia y del departamento más rico des país con arte rupestre y con las necesarias relaciones con el Altiplano Peruano-Boliviano y los valles Occidentales. La segunda hace referencia al valle de Majes, aunque nosotros no estamos de acuerdo con la calificación de 'tejas aritméticas', ya que no existen pruebas concluyentes, hasta hoy, en favor de esta teoría, a la que se refieren tangencialmente algunos cronistas y que la ha hecho suya el Profesor alemán de Tübingen, Thomas S. Barthel; creyendo dar un carácter escriturario a algunas representaciones como éstas u otras en tejidos, Q'eros, cerámicas, etc. Para ello, toma muy en cuenta los trabajos introductorios de la peruana Victoria de la Jara, aunque antes de éstos; están los del huanuqueño Javier Pungar Vidal, los del cajamarquino Horacio H. Urteaga, los del moqueguano Luis E. Valcárcel, los del trujillano Rafael Larco Hoyle - o los del mismo argentino Dick Edgar Ibarra Grasso; que - tanto se ha preocupado por este tema en la República Boliviana.

El alemán Fridolin Wais de Engen [4]) hoy cree avanzar mucho más en su trabajo sobre la 'Sistematización del Quipu' y su posible relación con la computación. En todo caso no se refiere a las 'tejas aritméticas' de Escomel; quién se atreve a tomar el tema del Colca que es otra cosa; por la riqueza arqueológica que tiene y por tres de las cuatro modalidades de arte rupestre, etc.

En relación con la tercera conclusión, es cierto que la mayoría de los 'Cantos rodados pintados y tejas chicas' se encuentran formando una especie de 'sandwich' o emparedados, a lo que podemos agregar, según hemos podido comprobar in situ - en Huancarqui y la Lapa o la Laja de la Provincia de Castilla 1951, que la mayoría de estas ofrendas, de hecho tienen un carácter ritual y se encuentran acompañando a tumbas de niños. Los descubrí cuando asesoraba a Hans Dietrich Disselhoff, ex-miembro de la 'Expedición del camino del Inca' y pronto a dedicarse como Director del Museo de Etnología de Berlín - Alemania. Descartamos la cuarta - conclusión, por los fundamentos que exponemos en la segunda y por encontrarse - en el terreno hipotético y sin base seria. Por último, dice en su quinta conclusión, el entusiasta cirujano, que eran 'testamentos o inventarios de los bienes que dejaba el difunto al morir'. ¿En qué quedamos, son 'tejas aritméticas' o son 'testamentos'? Esto significaría necesariamente un documento escrito o una 'Quilca o Quelka'. Si nos atenemos estrictamente al étimo quechua o al significado aymara, el asunto no queda esclarecido. A lo que quiero agregar como Cieza de León, 'Ni lo afirmo ni lo niego', aunque naturalmente hay laudables esfuerzos como el de 'Quipu y Quilca', Raúl Porras Barrenechea - en sus 'Fuentes Históricas' o los de Carlos Radicati Di Primeglio con su 'Introducción al estudio de los Quipus' o 'La seriación como posible clave para descifrar los quipus Extranumerales'. El mismo Escomel, en 1940 y como homenaje al Cuarto Centenario de la Fundación Española de la ciudad de Arequipa, reproduce el artículo publicado en Buenos Aires, con el título de 'Tejas Precolombinas destinadas probablemente a escrituras o a fines aritméticos' (Escomel 1940).

En conclusión, el arte rupestre y la arqueología se nexan intimamente; su relación con la escritura atraviesa por un momento de conjeturas, suposiciones e hipótesis que quizá en el futuro logre

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[3]) 'Mariano Melgar y Apuntes para la Historia de Arequipa' (obra póstuma) del Dr. Pedro José Rada y Camio (1950). Imprenta Casa Nacional de la Moneda. Págs. 28 y 29.

[4]) 'La Sistematización del Quipu y la integración del Gobierno y de la Administración Pública en el Sistema Matemático'. Engen, Alemania, 1987 (Cortesía del Dr. José Bernedo Paredes).

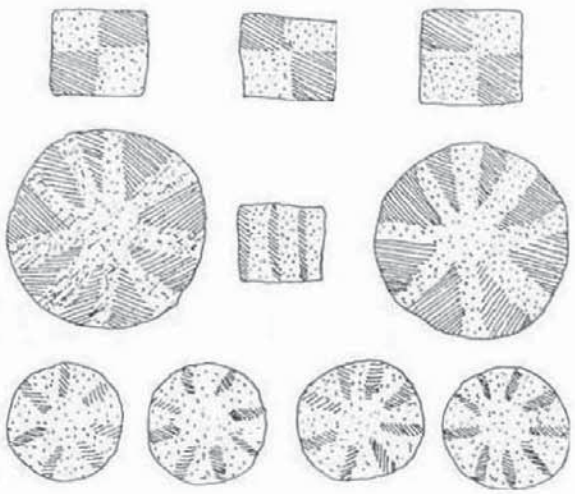

Figura 1.
Tipo C: 'Sandwich' con tejas de Chuquibamba Prov. Condesuyos (Escomel).

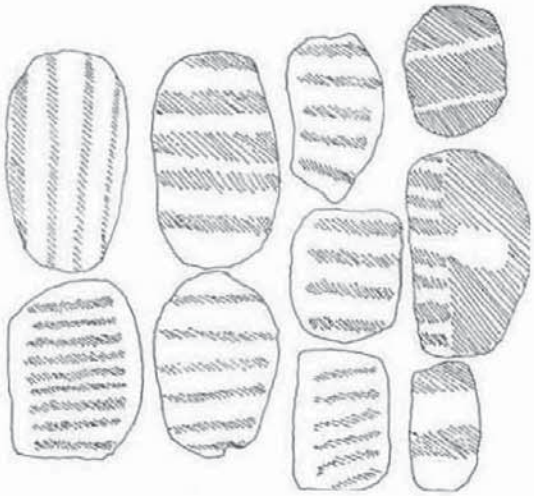

Figura 2.
Tipo C: 'Sandwich' de cantos rodados cortados para tal fin; del Valle de Majes, Provincia de Castilla (Escomel, tejas).

resolverse, porque como se sabe, escritura en el recto sentido del término NO LA TUVIERON LOS POBLADORES DEL ANDE, lo que no resta a su extraordinario desarrollo reconocido mundialmente por pensadores de la talla de Arnold J. Toynbee, el autor del *Estudio de la Historia.*

Por otro lado la simplicidad de los dibujos en las cinco láminas que muestra el trabajo, hacen sospechar rapidamente en el primitivismo de la concepción, a pesar de ser los dibujos tardíos, por que no solamente muestran pinturas sobre roca, sino sobre arcilla cosida especialmente y sobre trozos de vasijas rotas. A propósito, como en otros casos señalados por Tello, es el caso del sitio tipo de Kupara-Chucu en Chuquibamba (Arequipa 1970-87). Aquí hay que aludir claramente, al 'arte mobiliar con tradición rupestre' y no al 'arte mueble' simplemente; como creen algunos iniciados en este tipo de estudios en el Perú; y destacar sí; el carácter mágico-religioso de los Collawas, que es como en otras etnías en los andes.

Los motivos pintados, aunque por su temática son muy antiguos; por el material que emplean; pertenecen a épocas tardías agroalfareras. Y es que, como se sabe, desde tiempos atrás, los departamentos del Sur, sobre todo a partir de Acari, Moquegua y Tacna, forman y formaron una unidad oceanográfica, topográfica, ecológica y climatológica, la misma que permitió un determinado género de vida, dado su ecosistema específico y su a islamiento particular en ésta zona, considerada por muchos antropólogos como 'area marginal' (Comas y Park), a esta zona como se sabe hoy, se la nombra como 'Andes Centro Sur' o 'Circum Titicaca' o también la 'zona árida de los valles Occidentales del Sur del Perú'; cuya delimitación aún no ha sido precisada por el Norte, a pesar de los esfuerzos del Arqueólogo Lumbreras.

Tenemos conocimiento que este tipo de materiales abundan en el Norte de Chile, y Argentina y está asociado a la cerámica 'negro sobre rojo' y también a los petroglifos trabajados en materiales blandos como la traquita o cualquier otro tipo de tufo volcánico y también duros. Sabemos asimismo, que en Intihuasi, o sea al Nor-oeste de Argentina, son frecuentes, como en la región Atacameña. Hay la evidencia que la cerámica, que *llamo para Arequipa de estilo Juli*, por el sitio tipo o tricolor del Sur, que tiene sus relaciones con la cerámica Mollo, Huariquilla, etc. de Bolivia y Allita Amaya de Puno, es paralela a la cerámica 'negro sobre rojo' y pertenece al grupo étnico Lupaca o Collawa,

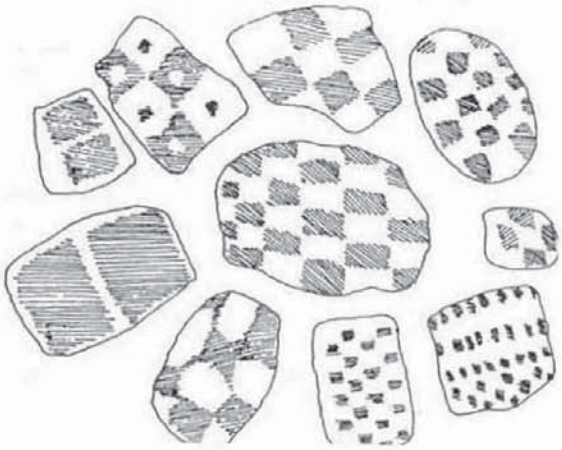

Figura 3.
Tipo C: 'Sandwich' semejante a la Fig. 2.

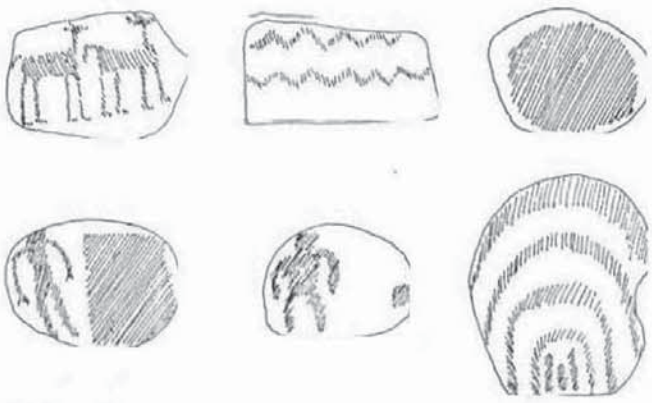

Figura 4.
Tipo C: 'Sandwich' en los materiales semejantes al 2 y 3 pero diferentes en los motivos antropomorfos, zoomorfos y geométricos (Escomel, tejas).

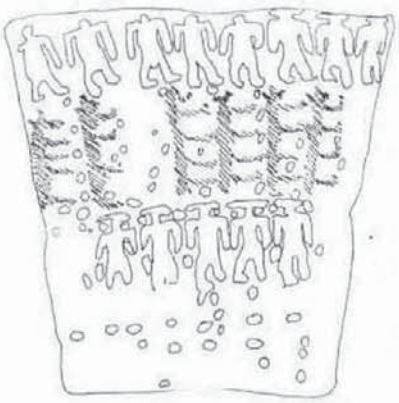

Figura 5.
Tipo B: Teja en arcilla de Chuquibamba, motivos antropomorfos, zoomorfos y geométricos (Escomel, gran teja).

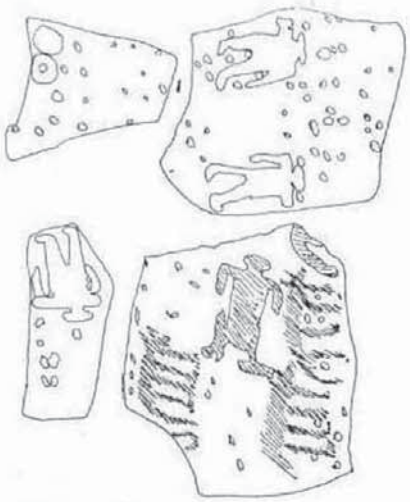

Figura 6.
Tipo B: Teja de Chucu Kupara fragmenteria (Kauffman).

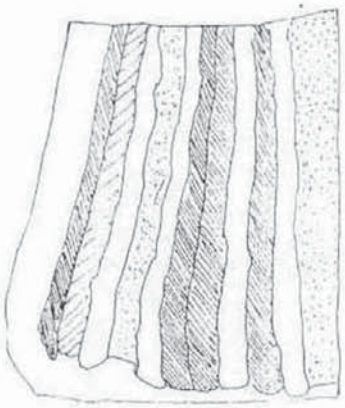

Figura 7.
Tipo B: Teja semejante a la 6 diferente en el motivo geométrico 'placa mágica' para Kauffman.

como ya dijimos y aparece asociada a este arte mobiliar con tradición rupestre.

Ahora bien, la mayor abundancia de este tipo de arte lo encontramos en el Sur, en las cuencas de los ríos Majes y sus dos afluentes principales, el Andamayo y el Colca, de identica forma en la cuenca del río Ocoña, y hasta en el Tambo existiendo varias muestras al sur del río Caplina en el Departamento de Tacna. Uno de los hallazgos más notables parece ser el de Monseñor Leonidas Bernedo Málaga (1938), quién nos informó que, siendo Párroco de la Iglesia de Chuquibamba, localizó, merced a su mayordomo Sr. Jorge Carpio, una rica veta de este arte en el lugar denominado Wamantambo. De allí dice procede la mayoría de los objetos que sobre esta especialidad atesora la Universidad Agustina. Otros son de Rinconada y de Itac.

En el viaje de exploración arqueológica para levantar el Mapa Arqueológico del Departamento de Arequipa que nos encomendó la Universidad en su primera etapa - segunda temporada - diciembre 1969 a enero de 1970 - logramos localizar *el verdadero centro de arte rupestre mobiliar con tradición rupestre*, el de la provincia de Condesuyos y descartar las versiones del Monseñor Bernedo Málaga y su mayordomo, en relación a Wamantambo, Rinconada e Itac. El trabajo realizado in-situ en Kupara-Chucu que es igual, ya que se trata de la misma colina, permitió observar:

(1) La enorme e irreparable destrucción practicada en Kupara-Chucu por los huaqueros, los mismos que han dejado al descubierto cientos de lajas, asi como tejas, ya sea en piedra como en arcilla.

(2) La identidad de materiales y motivos, comparando las que se guardan en el Museo de la Universidad Agustina y las localizadas en Kupara-Chucu, hoy en la Capital de la República.

(3) La testificación del guía Don Aniceto Huamaní Concha, quién entre 1938 a 1940 realizó el mismo viaje que nosotros y extrajó de las 'cuevas' las lajas que hoy atesora el Museo Universitario.

(4) El hallazgo en Kupara de tejas completas en

Figura 8.
Tipo A: Laja mide 28x14 cm largo y ancho maximo motivo geométrico. Actualmente se encuentra en el museo de la UNSA. Kupara, Chuquibamba.

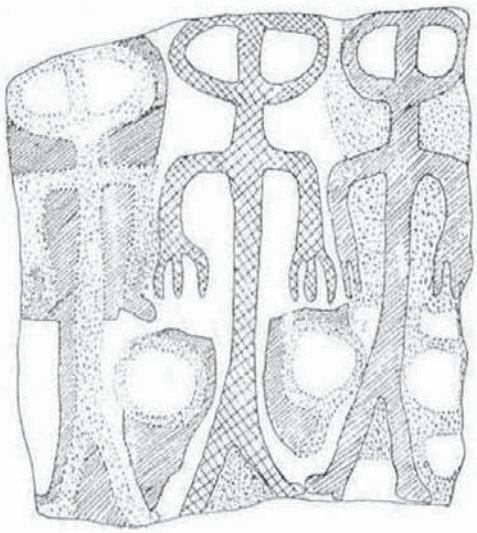

Figura 9.
Tipo A: Laja, procedencia de Machaguay.

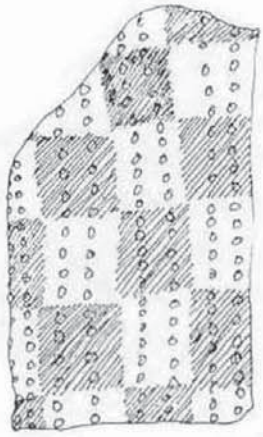

Figura 10.
Tipo A: Procedencia Kupara, motivo antropomorfo, zoomorfo y geométrico, en ajedresado con frecuencia punturas en colores rojo, amarillo en fondo negro.

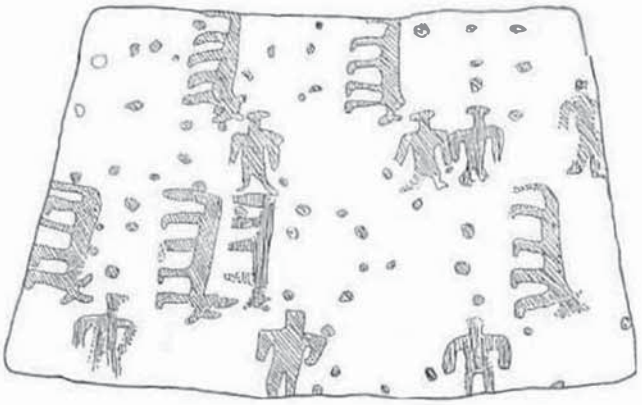

Figura 11.
Tipo B: Teja de Kupara, expedición 1979-80 Museo UNSA, Arequipa.

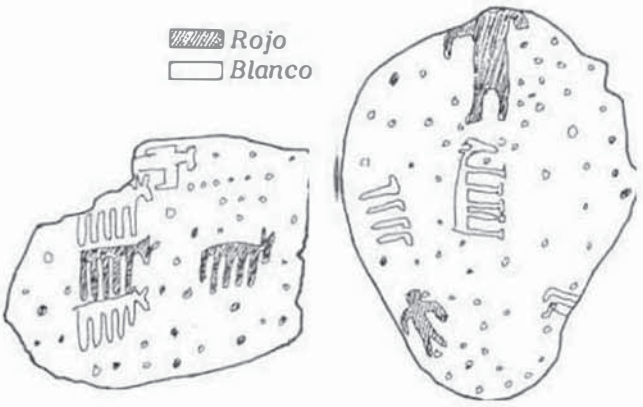

Figura 12.
Tipo B: Tejas en base de colores blanco y rojo en el interior de un cántaro.

'cuevas' no profanadas y que prueban la identidad entre las existentes en el Museo y las estudiadas en la última expedición de Kauffmann.

(5) La ausencia de estos materiales de trabajo en Itac y Rinconada, que por las evidencias son Inca y no Collawa.

(6) La confirmación del ex-profesor de 'Historia del Perú', del Colegio Nacional de Chuquibamba, Sr. Roberto Fernández, quién ayudó y guió en todas sus expediciones a Monseñor Bernedo y que confirma lo relacionado, nó con Wamantambo, sinó con Kupara, como centro importante de este arte rupestre.

(7) Tenemos que subrayar que los trabajos de investigación realizados en el Chullperío de Tampu Ayllu - o Tompullo - no solamente localizaron construcciones y chullpas cuadrangulares, sino también tumbas subterráneas, en las que ubicamos arte mobiliar con tradición rupestre, como lajas pintadas en rojo, amarillo, negro y blanco, con pinturas deleznables y mostrando motivos geométricos y de soles fundamentalmente. En las tumbas excavadas no apareció el clásico estilo 'emparedados'. Es posible que las hojas de achira se destruyeran con la humedad. Lo que sí es importante indicar, es que las tumbas que están bajo la superficie, son de forma cuadrangular, diseñadas a base de lajas plantadas y con una laja mayor como tapa. Sus dimensiones son de 1 x 0.80 x 0.60 mts., de alto, largo y ancho respectivamente y para encontrarlas hay que excavar hasta 90 cms. Este lugar pertenece también al distrito de Chuquibamba, provincia de Condesuyos [5]. Es particularmente importante indicar que en la provincia de Condesuyos existen los tipos A, B y C; es decir lajas, tejas y 'sandwich' en sus dos subtipos en arcillas y en cantos rodados (Linares Málaga 1970) (Figs. 8, 9 y 10, A; 11, 12, 13 y 14, B; 15, 16, 17, 18, C;).

Figura 13.
Tipo B: Teja de motivos antropomorfos y geométricos en colores blanco, rojo, azul y amarillo se trata de un fragmento de 1 cantaro ribeteado.

Figura 14.
Tipo A: Laja con motivos geométricos en zig-zag.

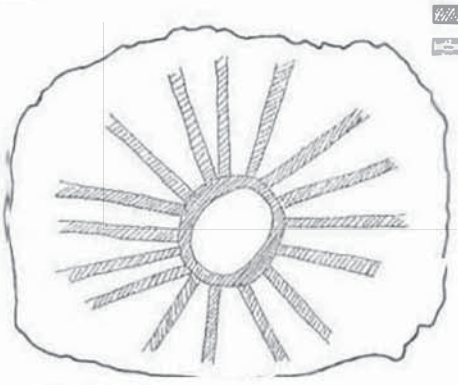

Figura 15.
Tipo C: 'Sandwich' encontrada en la excavación de Tampu Ayllu, Chuquibamba, 1970-71.

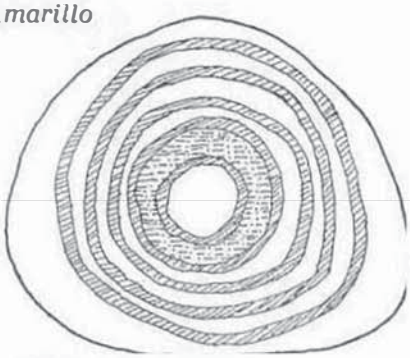

Figura 16.
Tipo C: 'Sandwich' encontrada en la excavación de Tampu Ayllu, 1970-71.

5) 'Introducción al estudio del Mapa Arqueológico del Depto. de Arequipa', Eloy Linares Málaga. Revista de investigación UNSA (1970-71) Arequipa, Perú, trabajo presentado al XXXIX-Congreso Internacional de Americanistas, Lima 1970.

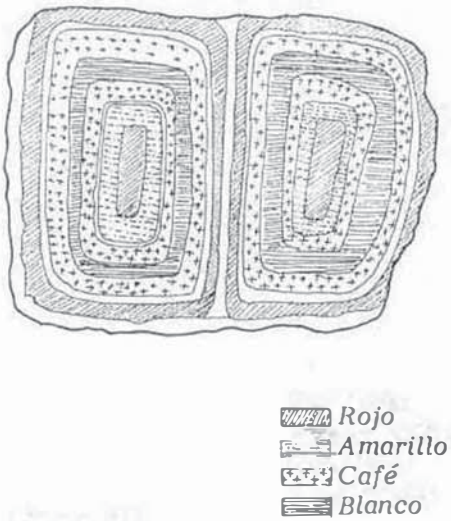

Figura 17.
Tipo C: 'Sandwich' procedencia ¿Chuquibamba? Museo UNSA.

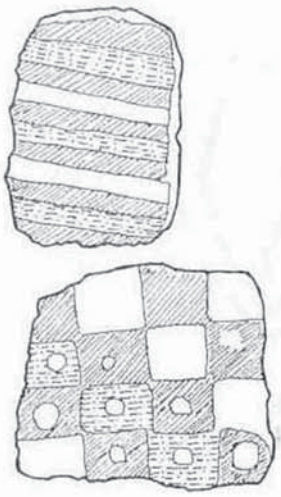

Figura 18.
Tipo C: 'Sandwich', Toquepala, excavaciones de R. Ravines. Museo Nacional de Antropología, Lima.

Figura 19.
Tipo C: 'Sandwich', Toquepala, excavaciones de R. Ravines. Hoy Museo Antropología de Lima.

Analisis de Algunos Materiales Estudiados

El petrólogo francés J. Placet, hizo el estudio de casi un centenar de 'lajas, tejas y sandwich' pernecientes al Museo de la Universidad Nacional de San Agustín de Arequipa. Su análisis de dichos materiales arrojó los siguientes resultados:

Fragmentos de rocas estudiados - 'lajas', Tipo A. Corresponde a los números de catálogo: 1, 3, 4, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 19, 20, 23, 27, 28, 30, 34, 37, 38, 39, 42, 43, 48, 56, 57, 58.

Areniscas: Se trata de materiales ligeramente calcáreos de color obscuro, negruzco, con tendencia al verde y pardo; de grano homogéneo muy fino, filones de calcita (48, 9, 16, 24, 32, 35, 36, 45, 47). A excepción del número 48, también son areniscas, un poco calcáreas, de color gris blanco, gris pardo y de grano muy fino.

Filita o esquisto arcilloso: Corresponde a la roca con pinturas que lleva el número 12.

Gabro: O sea una roca ígnea, de color verde claro, con grano bastante grueso que lleva el número 31.

Arenisca con mica: Es de arenisca gris, rica en micas blancas y negras, dispuestas en plaquetas y corresponde a los números de catálogo 21, 22, 25, 29, 33 y 54.

Caliza Negra: Con grano fino homogéneo - metamorfizado - números 40, 41 y 51.

Esquisto pizarroso: Son rocas de color gris claro, con debilidad en las plaquetas y grano muy fino, corresponde a los números del catálogo 52, 53, 55.

Rodados o cantos rodados 'sandwich', Tipo C. De arenisca silícica, los números 1, 17, 44. En este caso la arenisca silícica es gris con tendencia al marrón verdoso. De arenisca silícica, gris con grano fino son los números 2 y 5, que además tienen caliza, con grano mediano y arenisca calcárea; en color gris marrón y de grano mediano también.

Del estudio de los colorantes que se emplearon para pintar, ya sea en forma fija en la roca o sobre arcilla o sobre cantos rodados, el petrólogo francés deduce que dichos colores fueron el rojo, que no es otra cosa que un óxido de hierro o hematita; para el amarillo emplearon un derivado del óxido de hierro o sea la limonita; para el blanco la arcilla diatomácea; para el negro utilizaron el carbón grafito, quemado o manganeso; el azul y el verde provenían de la serpentina, rocas cupríferas o también de algunas plantas. En el caso del rojo utilizaron algunos insectos como la cochinilla; apreciaciones con las que coincidimos también nosotros junto con la Sra. Mary H. Armstrong de U.S.A. en el II-Simposium Internacional de Arte Rupestre Americano (1967, Huánuco, Perú).

Figura 20.
Pictografía de Toquepala escena de caza de camélidos.

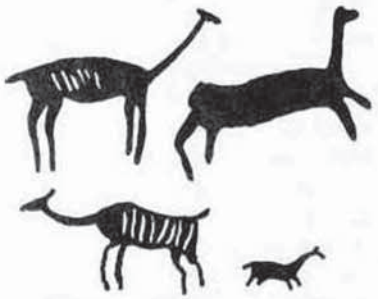

Figura 21.
Pictografía de Q'ollpa semejante al motivo en arte rupestre. Tipo C.

Figura 22.
Pictografía de Q'ollpa hombres míticos disfrazados con palos y venablos.

Figura 23.
Tipo C: 'Sandwich', 'cabezas achatadas' cultura Paracas, Nazca-Camaná.

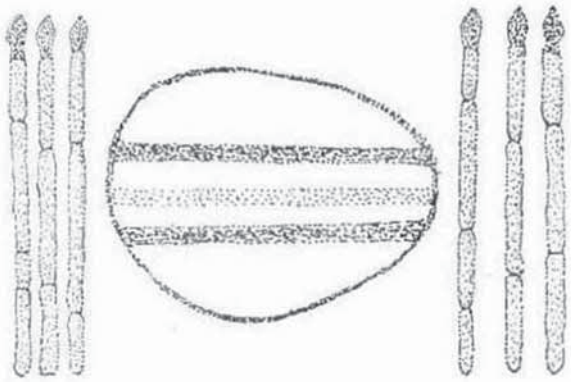

Figura 24.
Tipo C: 'Sandwich', 'cabezas achatadas', Camaná - Canto Redondo - Pinceles.

Motivos Empleados

Existe una gran variedad de motivos empleados, que podemos clasificar asi:

Geometricos: Líneas zig-zags, círculos, rombos, espirales, cuadrados concéntricos, rectángulos, ajedrezados, estrías, etc.

Zoomorfos: Camélidos, perros, venados, serpientes, felinos y aves principalmente. Es frecuente la presencia de guanacos, como los que hemos observado en los dibujos números 19, 20 y 21; ya sea en las lajas o ya sea en las paredes, en Toquepala o en Q'olca-Sumbay que, como se ha dicho, guardan extraordinaria semejanza.

Antropomorfos: Representaciones de figuras humanas esquemáticas, algunos armados de palos y garrotes o algunos objetos para la caza del guanaco o muy esquemáticos y simples - como dibujos de niños (Fig. 22).

Particularmente importante es el carácter mágico de estas representaciones. El hecho de disfrazarse, para conseguir mejor caza o sentirse superiores, es algo de lo más común en todos los pueblos del Viejo y Nuevo Continente que tienen arte rupestre. Naturalmente que aquí se hace la diferenciación entre si son motivos en los abrigos y cavernas, o si son motivos que se los puede llevar de un lugar a otro por su tamaño relativamente pequeño.

Simbolicos: Soles, estrellas, representaciones complejas y laberínticas, figuras míticas no identificadas. Resumiendo diremos que el simplicismo en el trazo de los motivos hace pensar claramente en la concepción teogónica tan variada y radicalmente diferente a la nuestra. Dicha concepción más se acerca a los contemporáneos primitivos o a la captación difusa del hombre en sus primeros años de vida.

Grabado Tipo D

Sobre el particular quisieramos hacer algunas disquisiciones. Max Uhle (1912) en su trabajo sobre relaciones prehistóricas entre Perú y Argentina - necesariamente se refiere a Bolivia, nos presenta una serie de motivos que bien pueden considerarse arte rupestre por ser *grabados en rocas* fáciles de transportar aunque claro está, su utilización es muy definida y acorde a las culturas Agro-alfareras a las que pertenecen (me refiero a la que en otrora llamó Ambrosettí como piedras 'de ofrenda', a manera de 'tablillas chatas', en forma rectangular). Uhle decía que de Tiahuanaco (Tiwanaku) se conocen sólo 8 piedras grises con mango ancho y chato grabado, al estilo de aquellas ruinas (Figs. 15 y 16, Págs. 25 y 26). En realidad se trata de una imitación de aquellas tabletas de madera para moler e inhalar narcóticos y que son comunes

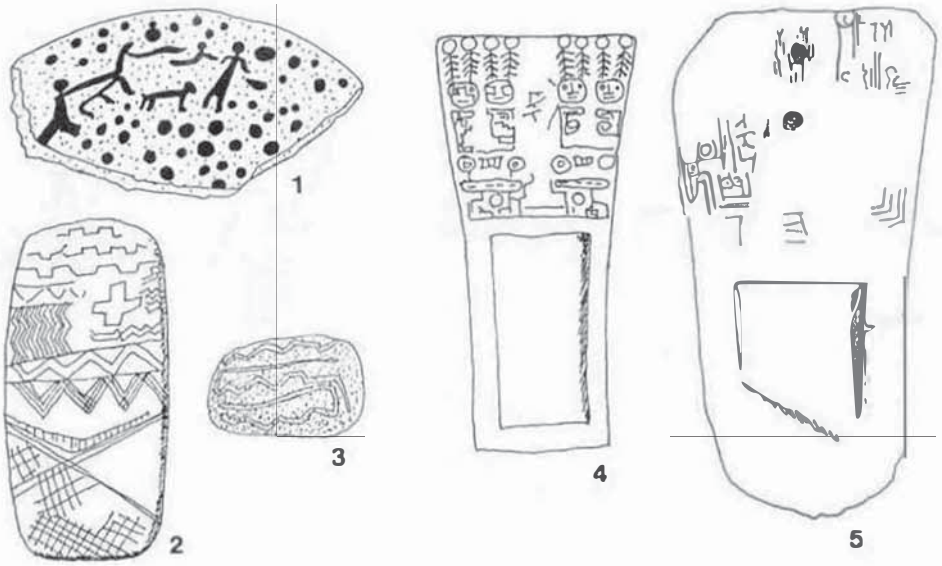

Figura 25.
1 - Teja o laja con motivos antropomorfos y geométricos.
2 - Laja de forma rectangular con motivos geométricos.
3 - Sandwich o emparedado con motivos geométricos.
4 - Laja de forma rectangular con motivos tiwanakoides y con cavidad rectangular.
5 - Laja casi rectangular con motivos geométricos.
Fuente: José Alcina Franch, Ambrosetti, y Max Uhle (1912).

FECHAS	PERIODOS	LUGARES	CULTURAS	TIPOS	MOTIVOS
1824 - 1988	República				
1532 - 1824	Colonia				
1450 - 1532	III Horizonte Inca			A - Lajas	
1000 - 1450	II Desarrollo regional	Kupara-Chucu Betancourt Caracharma	Collawa	B - Tejas	
				D - Grabado	
700 - 1000	Horizonte Wari				
200 - 700 D. de J.C.	Primer Desarrollo regional	Cabezas - Achatadas	Paracas-Nazca	C - Sandwich	
A. de J.C. 200	Formativo Superior				
1000	I Horizonte formativo Pan-Andino Chavin				
2000	Formativo Inferior				
2500	Agricultores Preceramicos Pastores				
6000 - 2500	Recolectores Horticultores				
8000 - 6000		Toquepala-Quebrada Cimarrona	Lítica	C - Emparedado	
20 000					

Figura 26.
Cuadro tentativo secuencial de arte mobiliar con tradición rupestre en el Sur del Perú.

en Atacama lo que prueba la permanente relación con valles Calchaquies y que fueron usados con fines mágico-religiosos. A éste mismo arte mobiliar con tradición rupestre (Bosch Gimpera 1973), antes de (1889) lo llamaría en el Museo de La Plata Lehmann-Nitsche como *'escarificadores'* o tablitas de ofrenda. Por su parte José Alcina Franch (1965) cuando trata de las areas Atacameña y de la cultura Humahuaca nos presenta una bonita 'teja' con una escena de camélidos y hombres en actitud de movimiento ornados con numerosos puntos como en Kupara Tipo B; y cuando se refiere a Neuquén y Mendoza, ilustra el trabajo con una 'placa grabada' y con una 'piedra de moler', también grabada con motivos geométricos simples que engarsan en los Tipos A y C respectivamente de nuestro esquema (Figs. 1, Pág. 669 y Figs. 8 y 14 de la Pág. 691 de la obra).

En el trabajo efectuado con estudiantes del curso de investigación arqueológica y del Museo que dirijo hace años, encontramos dos objetos trabajados en toba dasítica tufo volcánico en el valle de Siguas - donde abundan los petroglifos y el tipo 'sandwich'. Los grabados en referencia se ubicaron en Maucallacta - Ciudad Antigua - hoy llamada Betancourt, en una meseta que albergó una hermosa Ciudadela Collawa. Allí como cosas sin importancia y sobre el suelo desparramados estaban las dos piezas. Tanto la primera, como la segunda, no son grabados en sí, sino altos relieves. La No. 1 representa una cabeza de serpiente, mide 31 cms. de largo, ancho 27 cms., espesor 17 cms. y pesa 11 kg. La No. 2, en pronunciados relieves pareciera imitar a un bebé, con gruesos bordes en el vientre y el pecho. Mide de largo 26 cms., ancho 14 cms. de espesor 15 cms. y pesa 4 kg. Ambos objetos fueron ubicados próximos a tumbas, donde en 1965 trabajamos con la Deutsche Forschungsgemeinschaft de Alemania. A primera vista se trataría de pequeños ídolos de los Collawas por la abundancia de fragmentos de cerámica de esta cultura y que están desparramados sobre el suelo. No obstante que en el valle existen restos desde la época lítica - en Quebrada de Abrigos - 'bienes culturales' de la 'Expanción Huari' en Quilcapampa La Antigua y Gentiles de Quilcapampa - y restos Collawas en-Caracharma-Maucallacta y también influencia Inca en la zona de Pitay cerca a

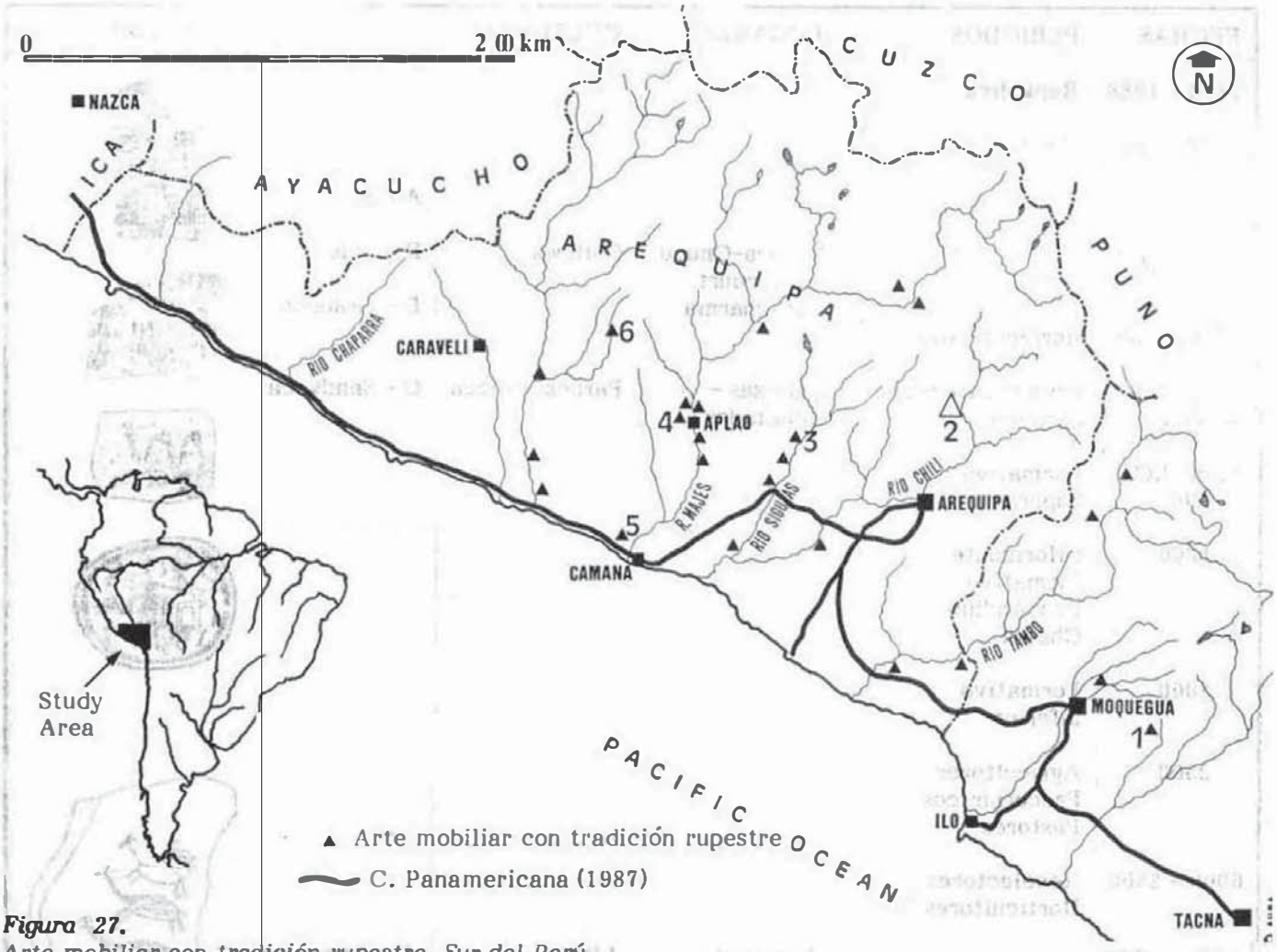

Figura 27.
Arte mobiliar con tradición rupestre, Sur del Perú.

1 - Toquepala
2 - Q'ollpa Sumbay
3 - Betancourt (Caracharma)
4 - Toro Muerto
5 - Cabezas Achatadas
6 - Kupara-Chucu

Betancourt. En resumen, en el indicado valle Siguas - hay abundancia de arte mobiliar con tradición rupestre de los tipos C 'sandwich' y D grabado mediante las dos muestras ya descritas.

Cronología

La mayoría de las versiones en esta zona indican que estos 'pintados' pertenecen a una étapa tardía y se asocian frecuentemente con lo que se viene llamando Estilo Chuquibamba o Collawa cerámicos - negro sobre rojo - principalmente. Se asocian también con cerámica tricolor o de 'estilo Juli' o de la expanción Lupaca de Puno o difusión Sierra Costa, llegando hasta la época Incaika aproximadamente de 1200 a 1400 después de Cristo.

Rogger Ravines, dedicado a la investigación arqueológica en el Museo Nacional de Antropología y Arqueología - según comunicación personal y ratificada en una publicación de 'El Mensajero' de Toquepala, habla del hallazgo de una veintena de lajas felsita porfídica y pintadas con motivos representados identicos a los que pintaron en el mismo color en las paredes del abrigo del Diablo de la Quebrada Cimarrona de Toquepala.

Por otro lado, afirma el Sr. Ravines que en la excavación realizada allí y a la profundidad de 2.20 mts. encontró este 'arte mobiliar' pintado sobre base de color rojo oscuro sobre el cual hay una mancha central uniforme y de color negro. En otra laja encontró cinco camélidos en actitud de movimiento (Figs. 19 y 20), muy semejantes a los de las paredes del riachuelo Q'ollpa de Sumbay, cerca de Arequipa, donde no solamente aparecen camélidos muy similares sino hombres míticos parecidos (Figs. 21 y 22).

Muchas de las piedras han perdido el dibujo, pero se notan claramente los rasgos. En otras, el color base rojo, presenta manchas, al parecer orgánicas.

De los estratos estudiados en el piso de la 'cueva', se deduce que la ubicación de las 'lajas' daría una antiguedad aproximada de 3,500 á 5,000 años A. de JC. Cabe observar que, a pesar de haber encontrado pinceles con óxido ferroso en el lugar, sin embargo, resta por investigar la coincidencia entre los materiales colorantes del pincel, el dibujo de la laja y el material con el que se pintó en las paredes. Asimismo, en el estrato 5º se encontraron las pinturas naturalistas y en el 3º se ubicó un ejemplar asociado con puntas líticas de tipo Viscachani (Bolivia).

Con los auspicios de la Deutsche Forschungsgemeinschaft (Comunidad para la Investigación y la Ciencia alemana) se recogieron muchas muestras de arte mobiliar con tradición rupestre en las excavaciones realizadas en Betancourt del valle Santa

No.	Sitio Tipo	Distrito	Tipo
1	Betancourt-Carucharma	Santa Isabel de Siguas	C, D
2	Cerro Blanco - Tintín	Santa Isabel de Siguas	C
3	Huacán	Santa Isabel de Siguas	C
4	Machoyurac	Yura	C
5	Socor	Santa Isabel de Siguas	C
6	Túnel 8 (Majes-Siguas)	Santa Isabel de Siguas	C
7	Cabezas Achatadas	José María Quimper	C
8	Cobalalto	Ocoña	C
9	Andagua	Andagua	C
10	Acomazac	Machaguay	C
11	La Laja	Huancarqui	C
12	Maucallacta	Pampacolca	C
13	Obraspampa	Pampacolca	A, B, C
14	Pitis - Mesana	Uraca	A, B, C
15	Querullpa Chico	Aplao-Uraca	C
16	Sarcas - Hacienda de Las Palmas	Uraca	C
17	San Francisco de Majes	Uraca	C
18	Toro Grande	Uraca	C
19	Toro Muerto	Uraca	C
20	Huambo	Huambo	C
21	Lluta	Lluta	C
22	Machullacta-Llactapata	Lluta	C
23	Waynacullo	Maca	C
24	Kupara	Chuquibamba	A, B
25	La Huaca - Iquiqui	Río Grande	C
26	Tampu Ayllu (Tampullo)	Chuquibamba	C
27	Wamantambo	Chuquibamba	A
28	Pampacolca	Pampacolca	A
29	Torete	Uraca	C
30	Achachigua-Trinchera	Cabanaconde	C
31	Chucu	Chuquibamba	B
32	Quebrada o Cimarrona	Ilabaya	C
33	Cuartel	Mariscal Nieto	C
34	Matalaque	Matalaque	C
35	Chojata	Chojata	C

Tabla 1.
Ubicación de los principales centros de arte mobiliar con tradición rupestre en el Sur del Perú.

Isabel de Siguas (Arequipa) y en Cabezas Achatadas, casi en la desembocadura del río Camaná. Nos referimos especialmente a dos lajas asociadas a una tumba transición Paracas Nazca (Fig. 23). Una de las lajas, pintada en un canto rodado plano muestra motivos geométricos y antropomorfos en colores rojo y amarillo. La simplicidad del motivo humano tiene una extraordinaria coincidencia con los hallados ultimamente en Kupara y Chucu (Chuquibamba) y en Machaguay (Castilla) (Figs. 9 y 11).

Se encontraron también en la excavación pinceles de caña o carrizo con brochas de algodón, algunas todavía con el óxido ferroso de color rojo. Estos pinceles fueron utilizados seguramente para pintar los cantos rodados (Fig. 24). Cabe observar que estas lajas bien pudieron corresponder a un estrato superior, pero en el lugar no se encontró resto alguno del estilo Chuquibamba o Collawa al que podrían pertenecer, más sí, cerámica negativa de un estilo diferente y raro en esta zona. Examinado el material orgánico de las Tumbas de Cabezas Achatadas en el laboratorio alemán de Niedersächsisches Landesamt für Bodenforschung de Hannover ha dado una antiguedad en las tres muestras remitidas para el trabajo con C-14 igual a 145 ± 85 años después de Cristo; 420 ± 70 años después de Cristo, y 95 ± 95 años después de Cristo. En fechas absolutas 1,805; 1,855 y 1,530 años respectivamente correspondientes a estera, madera y tejido (1965).

De lo expuesto de deduce claramente que las 'lajas pintadas' necionadas, bien pudieran tener una antiguedad que va desde el nacimiento de Cristo a los 100 ó 450 años después de Cristo. Ahora bien, faltaría hacer un análisis y cotejar los datos de los materiales con los cuales se pintó, con los encontrados en los pinceles y los restos orgánicos analizados en los laboratorios alemanes. En cualquier caso hay elementos diagnósticos que nos están diciendo claramente que el arte, en el extremo del litorial sur, abarca desde por lo menos 5,000 años antes de Cristo (Toquepala), a 100 después de Cristo (Cabezas Achatadas) y 1200 a 1500 años después de Cristo (Kupara y Chucu, Chuquibamba). Ver Cuadro Tentativo Secuencial.

Conclusiones

PRIMERA: Ha quedado demostrado que en América existen cuatro modalidades de arte rupestre: pictografías, petroglifos, geoglifos y arte mobiliar con tradición rupestre. De ésta última modalidad en el Sur del Perú se han detectado cuatro tipos a saber: (A) tejas, (B) lajas, (C) 'sandwich' o emparedados y (D) grabado (Bosch, Linares, Pericot, etc.).

SEGUNDA: Si es verdad que el área estudiada abarca los departamentos del Sur del Perú, podría considerarse también el área Atacameña de Chile; Tiwanacu de Bolivia y Calchaqui del Nor-Oeste de Argentina o en otros términos los 'Reinos Altipláni-cos', o los valles occidentales 'Circum Titicaca', basicamente en épocas tardías (Uhle, Lumbreras, Linares, Alcina).

TERCERA: Del estudio comparado entre las distintas modalidades de arte rupestre deducimos que existen una estrecha relación desde épocas muy tempranas a muy tardías entre las modalidades, tipos y sub-tipos que los hay y que demuestra la multivariedad de nexos y por lo tanto etnías. Así como el carácter mágico-religioso de los que trabajaron ese arte, es decir, que no fue 'arte por el arte', sino un arte práctico y funcional de acuerdo a la idiosincracia de cada grupo (Linares, Ravines).

CUARTA: El fechado de radiocarbono (C-14) arroja cifras como 5,000 años A. de JC. para el Abrigo de Quebrada Cimarrona, es decir *Epoca Lítica*, 100 años D. de JC. para la cultura *Paracas-Nazca* en Cabezas Achatadas; y 1300 años D. de JC. para la cultura *Collawa* y aún a épocas posteriores (Laboratorios alemanes de Hannover; Yale, U.S.A.; Ravines, Linares, etc.).

QUINTA: Dada la destrucción sistemática de ésta modalidad de arte rupestre y de las otras, la UNESCO debe considerar al Sur del Perú en emergencia, en especial Kupara y Chucu para evitar la permanente destrucción.

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Universidad Nacional de San Agustín
Casilla 23
Arequipa
Peru

*

AN ENGLISH SYNOPSIS OF THIS PAPER APPEARS ON PAGE 64.

English Synopsis

ROY QUEREJAZU LEWIS

In South America, four kinds of rock art are being distinguished: rock paintings, petroglyphs, geoglyphs and *arte mobiliar con tradición rupestre*, or 'movable art with rupestral tradition' (a term approved by the IVth International Symposium of American Rock Art). All these types of art abound in southern Peru.

The fourth type, movable art with rupestral tradition, is characterised by its mobility, for it can be carried about without difficulty. In the area that comprises southern Peru, this kind of art has four subdivisions, the first three of which refer to paintings:

(A) *Lajas* ('flagstones') when they are of stone.
(B) *Tejas* ('tiles') when they are of clay.
(C) 'Sandwich' when they are either of stone or clay, and consist of two painted *lajas* placed together, but separated by a metal sheet sandwiched between them. In some cases these 'sandwiches' are wrapped in achira leaves.
(D) *Grabados* or engravings, executed in different ways: grooved and in relief.

The area where these four types of 'movable art with rupestral tradition' abound comprises the departments (equivalent to provinces) of southern Peru. Professor Eloy Linares Málaga suggests that the Atacama area of Chile, the Tiahuanaco district of Bolivia and the Calchaqui region of north-west Argentina can also be included.

The author arrives at the conclusion (among others) that by a comparative study of the different kinds of rock art, a close relationship connecting very early times with late ones, and also between various types of rock art, can be detected, suggesting a great variety of nexus.

Linares Málaga observes that the 'sandwich' type, according to his own research, has been placed (in the majority of cases) in children's graves, as part of offerings with a strong ritual character.

During his research work in the *chullpería* (group of pre-Hispanic tombs) of Tampu Ayllu, he not only found quadrangular *chullpas* (tombs), but also underground graves where movable art with rupestral tradition was found: *lajas* painted in red, yellow, black and white. These fragile paintings have geometric motifs, especially 'suns'. While excavating these subterranean tombs no 'sandwich' type of movable art was detected. It is possible that the achira leaves had been destroyed by humidity.

The French petrologist J. Placet contends that the utilised pigments were derived from iron oxide and cochineal (the pulverised body of the insect *Dactylopius coccus*) for red; limonite for yellow; graphite carbon or manganese for black; and blue and green from serpentine, cupriferous rocks, or from some plants.

With relation to the motifs, Linares Málaga mentions a great variety of geometric, zoomorphous, anthropomorphous and 'abstract' representations, with special emphasis on their magic nature. Concerning the symbolic motifs (suns, stars and complex representations), and the mythical unidentified figures, the author claims that the simplicity of the lines in all these motifs induces us to think of a theogonic conception so different from ours that it has more in common with that of contemporary aboriginal people.

Referring to the painted motifs, Linares Málaga indicates that although their theme is of ancient origins, they belong (according to the utilised material) to later agricultural and ceramic periods.

Which leads us to the antiquity and chronology of movable art with rupestral tradition, and its relationship with similar motifs in rock art, synthesised by the author in the following way:

5000 years B.C. for the Abrigo de Quebrada Cimarrona in Toquepala (Figs 18, 19 and 20), belonging to the lithic industry period.

A.D. 100 to 450 for the 'Paracas-Nazca' period in Cabezas Achatadas (Figs 23 and 24).

A.D. 1200 to 1500 for the 'Collawa Culture', in Kupara, Chucu, Betancourt and Caracharma (Figs 1, 6, 8, 10, 11, 15 and 16).

Although the majority of researchers agree that most of the movable art with rupestral tradition pertains to a late period preceding the Inca Empire, about A.D. 1200 to 1400, this type of art also has a more ancient origin.

Rogger Ravines (National Museum of Anthropology and Archaeology) has reported the discovery of about 20 *lajas* painted with very similar motifs and colours as the figures painted in the 'Devil's Rockshelter' of the Quebrada Cimarrona in Toquepala. Whilst excavating at a depth of 2.2 m he found movable art painted in black over a dark-red background. One of the flagstones depicted zoomorphous figures (of the llama family) in dynamic attitudes (Fig. 19), very similar to the rock paintings in Q'ollpa Sumbay near Arequipa (Figs 21 and 22). The various studied layers and the respective location of the flagstones in them suggest an approximate antiquity ranging from 3500 to 5000 years B.C. Considering that brushes containing ferrous oxide were discovered in this site, research remains to be done in order to determine the relationship between the pigment on the brushes, in the flagstone drawings, and the material with which the rock walls were painted. It is also worth mentioning that the fifth layer contained naturalist paintings, and in the third layer a lithic point, similar to those of Viscachani in Bolivia, was found.

On the other hand many specimens of movable art with rupestral tradition were collected in the excavations under the auspices of the Deutsche Forschungsgemeinschaft. These 'flagstones' were associated with a tomb belonging to the transition period Paracas-Nazca (Fig. 23). Here, too, the cane or common reed-grass brushes with cotton ends, some still with the red ferrous oxide presumably used for painting the movable art, were discovered (Fig. 24). The organic materials extracted from the tombs of the Cabezas Achatadas site, submitted for radiocarbon analysis in the Laboratory of the Niedersächsisches Landesamt für Bodenforschung of Hannover, gave antiquities for the three samples (matting, wood and textile) of A.D. 145 ± 85; A.D. 420 ± 70; and A.D. 95 ± 95, respectively.

Consequently these painted 'flagstones' most probably belong to a period ranging from A.D. 100 to 450. In this case, too, according to the author, research remains to be carried out, in order to correlate the data obtained from the materials with which the paintings were executed, the material in the brushes, and the organic remains analysed in the German laboratories.

Finally, Linares Málaga himself finds relationship evidence between the ceramics that he calls 'Juli' for the Arequipa region (that, according to him, also have their connections with the Mollo and Huruquilla ceramics in Bolivia, and with the Allita Amaya ceramics in the Puno district of Peru), and the 'black over red' ceramics of the Lupaca or Collawa ethnic group (A.D. 1200 - 1400) that appear to be associated with movable art with rupestral tradition.

COMMENT

By ROY QUEREJAZU LEWIS

Professor Eloy Linares Málaga's paper 'Movable art with rupestral tradition in southern Peru' presents a new concept in the study of rock art. Although he concentrates in his analysis on southern Peru it is of great interest to rock art researchers in other South American countries, and to those interested in this fascinating subject in other continents.

As a Bolivian rock art researcher I find Linares Málaga's work of great value, mainly from two points of view. In the first place, there is the proximity of the studied area in Peru which has the same climatic and topographical conditions as the Bolivian Andean zone, with the exception of the Peruvian coast. The author mentions obvious cultural relationships with the Mollo and Huruquilla cultures in Bolivia, and postulates an association between 'movable art with rupestral tradition' and the Lupaca ethnic group which he also calls 'Collawa', that inhabited the lacustrine zone (Lake Titicaca) of Collasuyo (name given later to the southern territory of the Inca Empire, which included the Bolivian highlands). Furthermore, he makes reference to eight grey stone 'tablets' mentioned by Uhle as originating from Tiahuanaco, that imitated wooden 'tablets' used for grinding and inhaling nar-

cotics with magic and religious purposes.

Which leads me to the second point of my comments on Linares' work. Through my own rock art research in Bolivia it has become evident that a great part of the pre-Hispanic rock art had been carried out with a ritual, ceremonial, religious and sacred end. I consider that the execution of rock art and the Andean cosmography in prehistoric times were very much connected with each other. This cosmography includes a cyclical process which, by integrating the Andean inhabitant as part of the earth and the entire cosmos makes him feel protected. Although this subject is quite complex and requires further explicative details, it is important to appreciate that with this philosophical conception the Andean people are an integral part of their environment. But at the same time they subconsciously 'maintain' and accept the fact that everything is subject to abnormal, 'superior forces' of a cosmic and terrestrial nature. Consequently, when faced with catastrophic events (floods, droughts etc.) interrupting the cyclical order, an offering or sacrifice is required. Through this the cosmic wrath is appeased and the life cycle can return to normal. Andean offerings and sacrifices therefore may be either of a sporadic, or a cyclic character, depending on the reason for their presentation: abnormal natural or supernatural disasters demand sporadic oblations or sacrifices, and regular offerings form part of cyclical traditions, mainly during seasonally-determined agriculture festivities.

Most of rock art sites in Bolivia are situated in places of difficult access, remote from pre-Hispanic settlements. It is obvious that they were utilised for specific purposes, in most cases with a ceremonial and sacred character.

As it appears the Andean cosmovision was intimately connected with the production of rock art. Prehistoric man, while searching for an equilibrium between himself and the cosmos with its supernatural forces, utilised rock art, with its symbolisms and the related rites and ceremonies. With these means he achieved a certain protection from cosmic and supernatural powers. In this sense I consider that man's impotence in respect to the immensity of the universe induced him to utilise rock art symbolism, as part of different ceremonies, to achieve his survival, protection and ultimately the continuance of his species.

Professor Linares' work informs us about the intimate relationship of 'movable art with rupestral tradition' with different kinds of burials. It is well known that many pre-Hispanic peoples buried their dead together with various kinds of goods and food, destined for their second or further life. It is also evident that 'movable art with rupestral tradition' had a ceremonial and religious character, which relates it, in my concept, to the Andean pre-Hispanic rock art. In this way Linares' work opens a very important and interesting chapter in the research of rock art in all its varieties. The uniformity of all these varieties of art in fact supports the concept of their ceremonial and sacred character.

Nevertheless, it is worth mentioning an important difference that might need to be considered. While Andean rock art was more related with the continuity of life (in spite of group burials found in a few cases in Bolivian rock art sites; their connection with the art has not been demonstrated), 'movable art with rupestral tradition' is connected more with death and burial activities, i.e. with the purpose of attaining well-being in a *second life*.

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Résumé. *L'auteur décrit quatre types d'art mobilier qui ressemblent aux traditions d'art rupestre au Pérou méridional. Il propose qu'il existait un lien étroit entre les deux formes d'art et, en fournissant des datations fiables pour certains des objets d'art, il arrive à conclure que quelques unes des conventions en art rupestre sont beaucoup plus anciennes que l'on ne le croyait auparavant. L'art mobilier au moins a été utilisé depuis environ 7000 BP jusqu'à juste avant l'Empire Inca. Des pinceaux avec des pigments ont été trouvés dans certains des gisements. L'auteur résume les indices disponibles et fournit une synthèse de l'art rupestre de la région.*

Zusammenfassung. *Der Verfasser beschreibt vier Formen von mobiliarer Kunst vom südlichen Peru, die Felskunsttraditionen ähneln. Er spricht sich für einen starken Nexus zwischen den beiden Kunstformen aus und gelangt durch zuverlässige Datierung mancher der portablen Gegenstände zu der Folgerung, dasz manche der Felskunsttraditionen wesentlich länger bestanden haben, als bisher angenommen wurde. Zumindest die portable Kunst war in Verwendung von etwa 7000 BP bis unmittelbar vor der Inka-Periode. An einigen der Fundstellen wurden Pinsel mit Farbe geborgen. Das vorliegende Fundmaterial wird zusammenfassend beschrieben und eine Synthese der Felskunst dieses Gebietes wird vorgelegt.*

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RAR-090

GRADUATE DIPLOMA COURSE ON THE CONSERVATION OF ROCK ART

CANBERRA COLLEGE OF ADVANCED EDUCATION

THE GETTY CONSERVATION INSTITUTE

A one-year Graduate Diploma in the conservation of Rock Art is offered at the Canberra College of Advanced Education, commencing in February 1989. This is a joint project of the Canberra College of Advanced Education and the Getty Conservation Institute.

The aim of the course is to draw on existing knowledge and experience to provide specialised training in the conservation of rock art. Its particular objectives are to:

- provide an understanding of rock art as material culture on a world-wide basis;
- provide an understanding of the methods of producing rock art and the causes of its deterioration;
- provide training in the theory and practice of recording and conserving rock art, taking into account conservation ethics and the concerns of traditional landowners and custodians;
- develop an awareness of the management requirements of rock art sites, and
- develop an ability to plan applied research in the field of rock art conservation.

Before the course commences in March there will be a month-long summer school in February which will provide an introduction to resource management. The other first semester studies consist of the semester-long units, Archaeology and Anthropology of Rock Art and Rock Weathering; and two units that are the first half of year-long units, namely, Heritage Recording and Conservation Procedures. In the year-long units, students are introduced to the identification and deterioration of rock forms, basic recording techniques, sample preparation techniques for analysis, and conservation and restoration processes. These will then be put into practice in the winter school, a field trip of three weeks duration in July.

In the second semester, the materials and techniques used in the field, and the samples collected there will be tested and evaluated, for example, by plotting measurements and photographs and by analysing rock and pigment samples. Conservation and restoration techniques, both those requiring intervention and those that do not, will be evaluated with the help of Aboriginal people. This is combined with the unit Research Planning leading to a research project on some aspect of the deterioration or conservation of rock art.

The graduate diploma is a one-year full-time course commencing in February 1989, and finishing at the end of November. As the course will not be offered on an annual basis, it is not available to part-time students. The student intake will be limited to fifteen.

Entry Requirements

For entrance into the graduate diploma applicants should possess a degree or equivalent in a relevant field such as earth sciences, prehistory, anthropology or social sciences, conservation, rock art studies, or cultural or natural heritage management. Since an understanding of materials science is basic to conservation, applicants should have passed chemistry at first-year university level or equivalent.

Applicants for admission to the course should include a covering letter giving the applicant's training and experience, and explaining the reasons for wishing to study rock art conservation. Two confidential recommendations must be provided, but these should be sent direct from the referee, independent of the application. If feasible, all applicants who meet the entry requirements will be interviewed for admission to the course.

The language of the course will be English; overseas students will have to show proficiency in English to be admitted.

Since the College is obliged to charge tuition fees for overseas students, special scholarships will be provided to cover these costs. However, it is not possible to guarantee additional financial support, and all students should therefore seek financial assistance to cover travel costs and living expenses. Additional grants are being sought and these will be announced if and when available.

Applications for the course should be submitted on the official College Application Form and sent to reach the College no later than 19 August 1988.

The GCI and CCAE

The Getty Conservation Institute and the Canberra College of Advanced Education have entered into an agreement to offer this Graduate Diploma in the Conservation of Rock Art.

The Getty Conservation Institute is based philosophically on the integration of scientific, art historical and practical restoration considerations when conserving works of art. The Institute aims to further scientific research, increase conservation training opportunities and strengthen communication among specialists. In support of these goals, three main programs have been established, in Scientific Research, Training, and Documentation. Special projects and publications are also undertaken in response to urgent needs of the field. The Training Program sponsors practical and theoretical training activities and professional seminars.

The Canberra College of Advanced Education was established in 1967 mainly to cater for the needs for applied technology training in the Australian Capital Territory, but has since established a reputation throughout Australia and the neighbouring countries for specialist training in a number of fields, one of these being the Conservation of Cultural Materials.

The majority of courses have a professional or vocational orientation. It was also recognised that one of the main purposes of higher education was to train students to think analytically and to be adaptable to change in a changing world. To this end, courses at the College are developed within an interdisciplinary framework.

For application forms and further information on the course please contact:
Cultural Heritage Science Division Secretary
Canberra College of Advanced Education
P.O. Box 1
Belconnen, A.C.T. 2616
Australia

BRIEF REPORTS

RATIONALES FOR THREE DARWIN SYMPOSIA

Rock Art and Prehistory

PAUL G. BAHN AND ANDRÉE ROSENFELD

Many prehistorians have considered rock art to be of little relevance to archaeology, and rock art studies have been branded as intuitive, subjective or merely descriptive. It must be admitted that over the last century subjectivity, unqualified assumptions and mythology have coloured writings on rock art—especially, though not exclusively, in Europe. Rock art has been used—and abused—to support particular views, and data have been cited selectively to reinforce existing preconceptions about the preoccupations of prehistoric people.

There has also been a trend to view rock art as a source of information about subsistence, zoology, ethology or environment in the past. There must be serious reservations about such studies. All too often they are based on a literal (and not always accurate!) reading of images. They are founded on assumptions about intended likeness in art which ignore conventions of artistic expression and the very essence of art as an evocative means of communication (e.g. as opposed to prose or scientific illustration).

In recent years, and particularly since the 1970s, scholars—mostly younger scholars—have begun to question earlier assumptions, to differentiate observation from inference and to examine the role of art as a social product. These processes need to be carried further; much dead wood remains to be cut out, old myths must be discarded and wishful thinking removed. Progress has been made in precision of observation and in technical procedures for recording rock art. More stringent requirements now exist in sampling rock art for formal and distributional analyses, and for the interpretation of results. More rigorous approaches to chronology and the experimental work with new dating techniques offer tantalising prospects. These three areas are central to the handling of archaeological material, and developments of all three are, therefore, crucial to the future of the archaeological study of rock art.

Proponents of the view that archaeological means and aims are the appropriate ones for the study of prehistoric art are developing sophisticated analyses to explore questions of past group boundaries, of periodic aggregation and dispersal, of settlement patterns, chronological continuities and discontinuities in art and its relation to other facets of social development. Where the judicious use of ethnographic data has been added—e.g. in Australia, in South Africa—questions about the social function of rock art in society have been broached with a measure of success, even for bodies of rock art which are no longer integral to present day cultural expression. The *Archaeology of Rock Art* is coming of age.

The 'Rock Art and Prehistory' section of the AURA Congress therefore hopes to focus on the following issues in an effort to bring to the fore the archaeological approaches to the subject:

(1) Problems of image or motif identification, classification and comparisons. The role of style in comparative studies of rock art. Can rock art be a source of technological, environmental or zoological information? What is the social meaning of diversity or boundaries in art complexes?
(2) Data collection and analysis, sampling, analytical techniques of data handling, dating.
(3) Art and archaeological contexts, interpretative studies—can we deduce *any* levels of meaning from prehistoric art?

Contributions are invited from anyone intending to attend the AURA Congress in Darwin who would like to help bury some of the old assumptions that still filter down to feed the public imagination, and build on the foundations of the newer archaeology of art.

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RAR 5-091

Darwin 1988

Rock Art and Ethnography

MIKE MORWOOD

Archaeology is a range of techniques used to reconstruct past behavioural systems using the material remains of these systems. The crucial problem in this exercise is the means by which links are established between the nature of the material evidence and the nature of the original cultural context (Gould 1986: 207). This basic problem remains the same regardless of whether the evidence being examined consists of stone artefacts, food remains, sediments, or rock art. Archaeology is based on the study of the hard bits, or 'bones', of past systems, which are used to say something about cultural anatomy. By itself archaeological evidence is mute unless there are established principles for interpreting its significance (i.e. for

bridging the gap between the data and its behavioural implications). Hence, the concept of 'Middle Range theory', which has been used in a number of scientific disciplines, to describe the range of assumptions, or principles, needed for the interpretation of data (e.g. Binford 1977; Raab and Goodyear 1984).

In archaeology, Middle Range theory has largely been concerned with establishing the principles of 'site-formation processes', for it is generally recognised that the nature and distribution of archaeological evidence is the end result of a range of natural and cultural processes (e.g. Schiffer 1976). Much research has been aimed at acquiring an understanding of these processes. For instance, replicative experimentation, ethnoarchaeology and taphonomic studies have all yielded information on the dynamics of specific economic, technological and ideological systems and the manner that material evidence will be produced and represented in the archaeological record (e.g. Binford 1981; Gould 1980; Hayden 1979; Meehan 1982; O'Connell 1977).

Such concerns have not been well articulated in studies concerned with the archaeology of rock art, where a working knowledge of its role in ethnographic contexts has not been seen as an essential prerequisite for the interpretation of prehistoric art assemblages. This was not always the case. At the end of the nineteenth century, European researchers concerned with the discovery and interpretation of Upper Palaeolithic art were heavily influenced by the publication of Tylor's *Primitive Culture* (1873), Frazer's *Golden Bough* (1890) and Spencer and Gillen's *The Native Tribes of Central Australia* (1899), all of which emphasised the importance of totemism in 'primitive' ideology. Spencer and Gillen's work also described the totemic context of rock art in central Australia. The result was that the concept of totemism was lifted directly out of the ethnographic literature and used to explain Upper Palaeolithic art as being concerned with sympathetic magic (e.g. Breuil 1952). Such crude use of analogy later led some researchers to reject totally the use of ethnographic parallels, or 'the comparative method', in interpreting Upper Palaeolithic art (e.g. Laming 1959; Leroi-Gourhan 1968: 109). Instead it was argued that interpretation must be based on the Palaeolithic evidence alone (e.g. Leroi-Gourhan 1965: 35).

Similar distinctions between 'ethnographic' and 'archaeological' approaches to the analysis of prehistoric art have been made more recently (e.g. Clegg 1985; Franklin 1986; Schaafsma 1985: 258). Such distinctions virtually ignore the extensive literature dealing with the relationship between ethnography and archaeology (e.g. Binford 1967; Morwood 1975; Schiffer 1978). In fact, with a few exceptions (e.g. Lewis-Williams 1983a, b), theoretical perspectives on rock art analysis are usually presented without recourse to the general literature on the nature of scientific theory (e.g. Feyerabend 1975; Lakatos 1970). This needs rectifying.

Ethnoarchaeological research on stone artefact technology and discard, faunal use and discard, and the use of style in material culture items such as adornments, pots, weapons, houses and stone points, have all yielded valuable information and insights, particularly when the items are considered within a broader demographic, economic and social context (e.g. Hodder 1982; Wiessner 1983, 1984). Until recently, ethnographic studies of art were not undertaken with such a contextual approach, even though it has long been argued that the 'meaning' of art is best considered in terms of its functional relationship with ideology, social organisation, rights to resources, and so on (e.g. Elkin 1961). In the archaeological study of art, specific information about what a 'design' indicates is beyond recall, but the functional relationships between art and other cultural components, *and their material manifestations*, are basic to the use of art in writing prehistory. In this light, contextual analyses of functioning art systems are especially valuable for the study of rock art by showing some of the ways in which art encodes and communicates social, ideological and economic information (e.g. Morphy 1977); reflects and reinforces relationships between and within groups (e.g. Blundell 1974: 223); is manipulated and negotiated depending upon social context (e.g. Gould 1969: 148-9); and so on.

The 'Rock Art and Ethnography' section of the AURA Congress therefore hopes to concentrate on the following issues:

(1) The general role of ethnography in rock art research.
(2) Specific ethnographic studies of (rock) art which examine relationships with other cultural components, the nature and significance of stylistic boundaries, factors involved in artistic change, and so on.
(3) Case studies in which ethnographic information has been used in the interpretation of rock art.

If you have ideas or data relevant to these issues and are prepared to give a paper at the AURA Congress in Darwin, we would like to hear from you.

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The symposium will be co-chaired by Dr Patricia Vinnicombe, Western Australian Museum.

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RAR 5-092

Darwin 1988

Retouch: An Option to Conservation?

GRAEME WARD

It is proposed to hold a symposium on the subject of 'Retouch: An Option to Conservation?' at the forthcoming AURA Congress. Such a symposium was discussed during the initial planning for the Congress in 1986 and included in early announcements. More recently, the controversy over repainting of the Gibb River sites (Kimberley) has confirmed the need for extended discussion of the practice.

The Gibb River repainting might well serve as a model for further Aboriginal-initiated rock art renovation projects elsewhere in Australia where Aboriginal custodians are maintaining, or wish to regain, an active conservational role in protection of these sites. The argument that Aboriginal custodians have the perfect right to do whatever they wish with their sites is being opposed with another: that a major element of the cultural heritage of all mankind is being jeopardised, or at least compromised, by such actions.

Contributions to the symposium are invited. It is proposed that the aim of the meeting will be to provide an avenue to a better understanding of the issues involved than has been manifested to the present. The objectives will be to give the opportunity for opposing viewpoints to be presented and to promote consideration of different perspectives, not to establish a policy.

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The symposium will be co-chaired by Robert J. Ware, Aboriginal Heritage Branch of South Australia.

RAR 5-093

First Rock Paintings in Amazon Basin

MARIO CONSENS

The middle and lower regions of the Amazon basin used to be one of the few areas all over the world—perhaps the only one—that seemed to have characteristics similar to those of central Africa, as stated in Binford's classic 'Alchin's Dilemma' (1972: 91): a big area almost devoid of rock art, surrounded by areas of other cultural activities which include broad and diverse expressions of rock art.

Up to now only isolated sites with petroglyphs were known in the entire Amazon basin. All of them have been carefully summarised by Dubelaar (1986a, 1986b). In that sense, the sites introduced here represent important new evidence, due to their number, their situation next to the main river, and because of their stylistic content.

In 1986 a multidisciplinary working group was organised, which located and registered six sites with rock paintings, containing 21 topographic units, with more than 1000 morphological units, distributed over 170 square metres. Members of the staff of the Museo Paraense Emilio Goeldi, Universidade Federal do Pará, Grupo Espeleológico do Pará and from the Municipio de Monte Alegre took part in this research, under the author's direction.

The sites are located about 1000 km from the mouth of the Amazon River, in the State of Pará, Brazil. The complex of painting sites was named Monte Alegre, because it is quite near a small town of the same name. It is located in a group of calcareous sierras that reach heights of scarcely 400 m above the level of the Amazon River, which is 8 km away.

It is very difficult to climb the sierras because of the ruggedness of the terrain and the dense vegetation. The paintings are situated on high walls, also at the entrance and in the interior of deep caves, discovered by the Speleological Group.

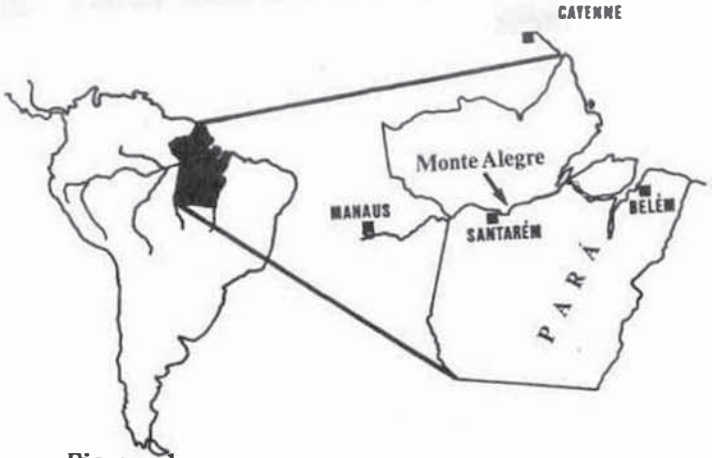

Figure 1.
Location of Monte Alegre in Pará, Brazil.

Working conditions in the depth of the caves were extremely severe. Breathing was difficult because of the high relative air humidity and the emanation of different kinds of gases. A substantial layer of bat guano covered the soil which seemed to move due to the enormous numbers of arthropods that live there together with the bats: cockroaches of more than 10 cm length, enormous white crickets, scorpions and several species of spiders are part of that fauna.

In such conditions we had to negotiate winding galleries and large amphitheatres, arranged over hundreds of metres horizontally or vertically. The use of protective masks was essential for the investigators, especially because of the danger of mycosis in the lungs. In spite of all these difficulties, paintings were found in narrow galleries, more than 80 m from the nearest source of light.

We want to point out the presence of superimpositions in most of the art panels. In saying so we do not assert that superimpositions (from an archaeological perspective) have automatically diachronic meaning. But in the case of Monte Alegre there are also obvious differences in the intensity of colours and in the themes depicted. A great number of motifs are under calcite layers, which raises a most interesting aspect of Amazonian prehistory.

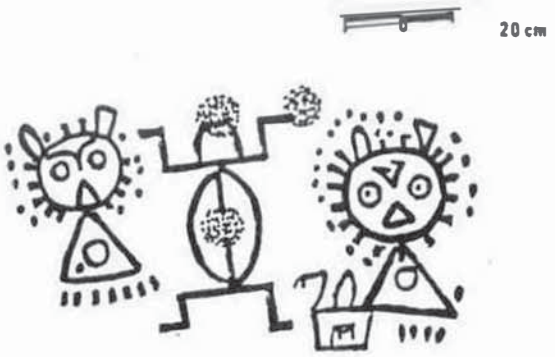

Figure 2.
Paintings in Serra da Lua ('Moon Range'), Monte Alegre, Amazon.

Up to now the lack of known sites with paintings in the area upheld the myth that the ambient conditions prevented the conservation of painting pigments. That myth was strengthened by the fact that anthropologists have no information suggesting that cultural activities of this kind were carried out by the contemporary indigenous communities.

Even a preliminary assessment of the newly discovered sites immediately brings to mind an old American problem: the existence of rock art in the arc of the Caribbean islands, which does not seem to possess a direct relation with that of Central or North America. This question, raised by Williams (1978), Poonai (1978), Núñez Jiménez (1986) and Dubelaar, seems to—according to this new data—resolve itself, as some kind of relationship can now be suggested between the northern Amazon basin and the Caribbean islands.

The archaeological data also agree with this proposition. The ceramics of the 'salaloid' and 'barrancoid' types, for instance, are considered to come from an area between the Amazon and the Orinoco (Rouse 1951).

It is very difficult with the available data to test our proposal. The archaeologists that worked in the Amazon region have concentrated their efforts in typological and morphological analysis of ceramics, and they have created cultural units wich express sequences based only on these artefacts. We want all the sites where rock art is found to be taken into consideration, to be integrated into

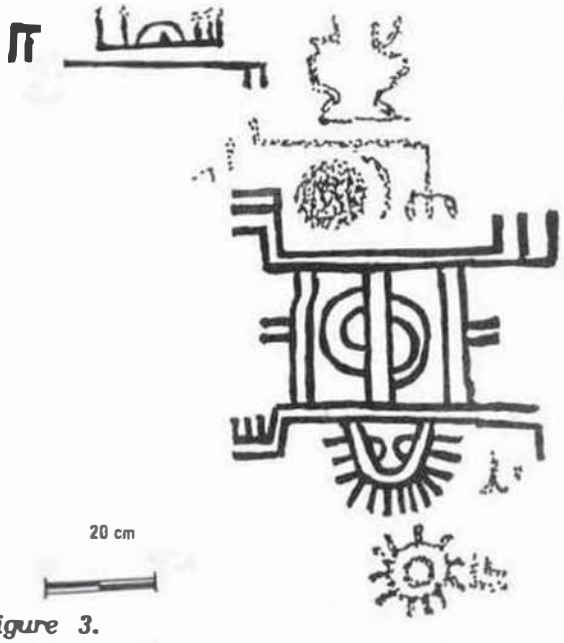

Figure 3.
Painted motifs deep inside Gruta da Pedra Pintada ('Painted Stone Cave'), Monte Alegre.

Figure 4.
Painted motifs on Serra da Lua walls, Monte Alegre.

future projects of investigation. We wish this to occur not only to save these sites, but to also give a contextual perspective to archaeology, and to facilitate an assessment of the archaeological information obtained up to now, avoiding in this way the formation of tautological hypotheses based on the variation of only one parameter: ceramics.

A geographical key area in considering any kind of important connection between the Caribbean Sea and the northern region of the Amazon basin is the one located among the Jari and Branco Rivers. This is so because of their extensive catchment areas and the interconnection of their basins which allows in many cases direct contacts between both areas. Consequently a second expedition is planned for this year. We plan to travel to the Trombetas River, together with Fernanda de Araujo Costa (MPEG), who possesses evidence about the existence of new paintings, situated between the Amazon and Guyana.

The idea of a close relationship between the northern section of the middle Amazon basin and the Caribbean seems to be reinforced by the works of Mentz Ribeiro et al. (1986, 1987) in Roraima, in the northern area of Brazil bordering Venezuela. His investigations have registered sites with paintings, and the latter publications do not present clear relations with the area of Monte Alegre, nor with the northern one. This matter is of considerable magnitude, and these first discoveries do not allow us to provide anything more than a proposal—not even a hypothesis. But we do not accept that relations of diffusion are established just because some isolated designs—'pilot motifs' (Dubelaar 1986b: 107) or *index rupestrema* (Consens 1986: 112)—are morphologically similar.

From our point of view these kinds of proposals are doubtful. It is the synchronous set of rock art units, with similar chronological distribution and similar morphology taken as a whole, that gives us the 'theme' of a style. And it is the theme, and not the isolated units, that allows us to establish sound relations between styles.

We must not imitate those investigators who have 'invented' styles that are paraded by them as the big units of synthesis of what they have learnt in the area where they worked (in the cases when they have really done so). For these investigators it is enough to give a name to a style and just because it has a name, it exists. It is just the same as what aboriginal groups they investigate do, when they give a name to something that is unknown to them: with this magical act, the object with a name is integrated into their world. In the case of these investigators, the term enters their own world, not necessarily the world of science.

These kinds of 'styles' are defined only by morphological similarity among isolated motifs, detailed by the sometimes culturally biased investigator who proposes them. There is no mention of the sets, nor any kind of reference to the synchrony or diachrony of the art. Often aesthetic concepts of our contemporary culture are used to describe motifs. This illustrates the total absence of anthropological concepts in that investigator—his ethnocentricity.

In South America, several researchers are making great efforts to unify criteria in the characterisation first, and defer description of the styles of indigenous art. From the meetings of these researchers we have concluded that, in this continent, it seems to be very difficult to accept that the similitudes among the rock arts of different areas necessarily reflect other common characteristics, or even similarity with other elements of their cultural context.

Regional differences in South American rock art are great. There are obviously important traditions that reach far back in time, which several researchers are examining (Gradin et al. 1977; Guidon 1981; Niemeyer 1978; Prous 1981; Gonzalez 1977). This is one of the problems to be solved by archaeologists, which was carefully evaluated in the 'Declaration of Santo Domingo' (voted on by *RAR* Editor R. G. Bednarik), in the 8th International Symposium of American Rock Art, which took place in 1987 in the Dominican Republic.

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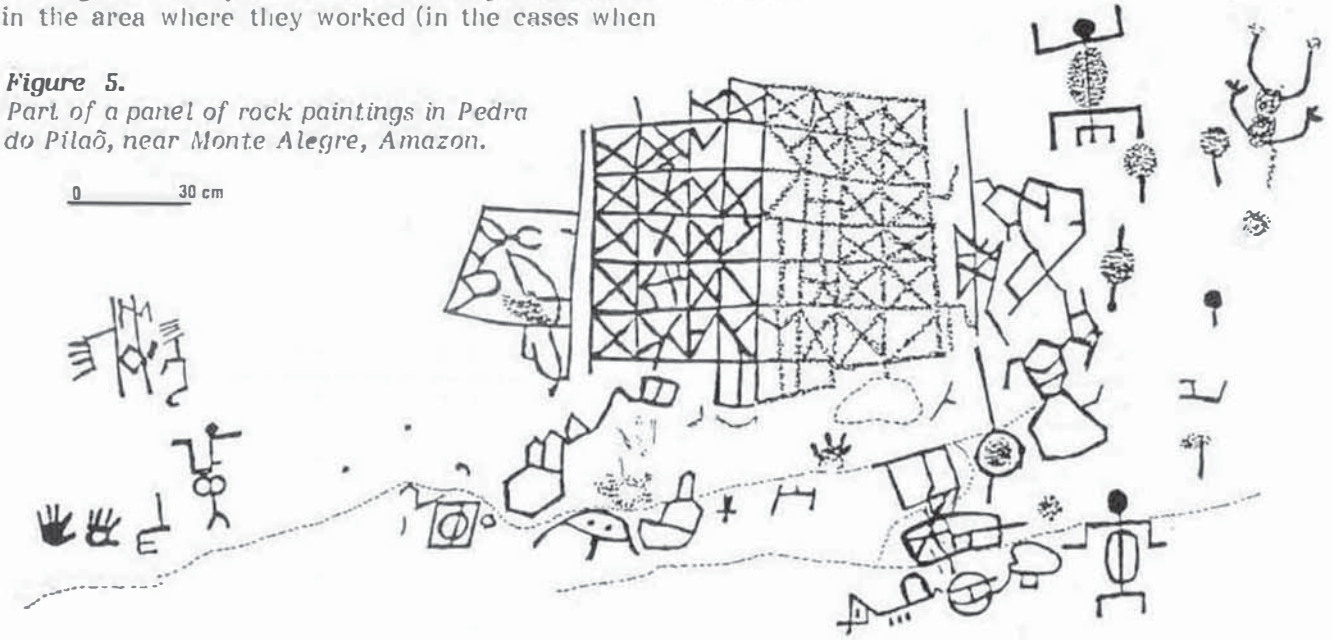

Figure 5.
Part of a panel of rock paintings in Pedra do Pilaõ, near Monte Alegre, Amazon.

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EDITOR'S RESPONSE

Dear Mario,

Let me, first of all, congratulate you to this truly sensational and important find. There was not adequate time left to invite comments after receiving your report, but I should like to briefly comment myself.

The small town of Monte Alegre lies on the north bank of the mighty Amazon, some 80 km north-east of Santarém. I was completely unaware of your discoveries when I passed through the settlement last year, but I saw the low sierras you explored. The hills of the area seem to be remnants of an ancient deposit, many being flat topped like the mesas of Arizona. And I distinctly remember wondering whether they would be worth investigating, in spite of the supposed complete absence of rock art in the region.

Though I have missed the chance of seeing your sites I can still comment on some specific points you raise. For instance I can corroborate your brief references to the very special joys of conducting research in the caves of northern Brazil. Cave scorpions seem to be rather common, and cave spiders can be the size of tarantulas. Speleoclimates are exceedingly oppressive, and the fungal growth in the lungs you mention, which one acquires by inhaling the dust in caves of tropical America, can add that special touch to the experience. Then there are the ubiquitous colonies of bees and wasps which often are very effective obstacles to research. (Professor Guidon, who was attacked by a swarm of hybrid bees in a vertical shaft, at 60 m depth, and stung by 200 of them, barely survived the ordeal.) Rattle snakes and coral snakes always succeed in stimulating one's adrenalin flow, and to slow it down there is nothing quite like the bite of the tiny *vinchuca* beetle, which can cause death by heart failure.

But I have a specific reason for writing to you. When I read your paper I could not help thinking that you could have been referring to researchers in other continents when you wrote: 'We must not imitate those investigators who have "invented" styles that are paraded by them as the big units of synthesis of what they have learnt in the area where they worked (in the cases when they have really done so). For these investigators it is enough to give a name to a style and just because it has a name, it exists.' You see, Mario, we have a classic case of this in Australia. Years ago a researcher proposed a name for a style, intending to describe a huge body of petroglyphs covering a vast time span, probably over 30 000 years. Even at the actual type site diachronic stylistic units, widely separated in time, can be discerned. The idea that rock art spanning the entire proven duration of artistic activity on rock surfaces could be described as a single style may not seem very plausible to you, particularly for Australia which has such a wealth of stylistic variety, but there are many archaeologists in Australia who not only accept this concept without questioning it, but whose commitment to it is such that they have so far ignored all objections. Seeing that you have diagnosed this type of problem so well, tell me: do you think there is a cure for it?

The style I am referring to is called 'Panaramitee style', but the report where it was proposed has never even been published. Nevertheless, hundreds of Australian (and many overseas) archaeologists have enthusiastically embraced the style name, so presumably they have all acquired copies of the initial report. The investigator who invented the style's name has not written anything on the subject for years, and when I asked her in 1984 how she would explain the stylistic variety and vastly differing ages of the rock art at her type site she declared candidly that she had spent so little time at that site that she could not really discuss it. In the following year I admitted that I have no idea how one is supposed to identify this 'style' (*RAR* 2: 80), yet to this day nobody has come forward to enlighten me.

In your paper you suggest that the phantasies of style inventors are integrated into their own worlds, not necessarily the world of science, but in the example I have cited the phantasy has indeed entered the world of science. A few researchers have suggested that their field evidence does not support the concept of a uniform style as described by Maynard (the investigator who originally proposed the 'style'), but their objections have had no effect so far (as you can see from the debate following the paper by Dr McCarthy, in this issue).

If the recent discussions between yourself, Professor Fuchs, Dr Dubelaar, Professor Pagán Perdomo, Professor Beltrán and myself are any indication, the old question of how the Caribbean islands were settled remains indeed unresolved. It is obvious to me that your work in the most likely 'catchment area' of Caribbean settlers, the north-east of South America, is the most promising strategy to bring about a resolution of the important questions involved. Dr Núñez Jiménez' recent expedition represents another, perhaps more pragmatic approach to it, and in view of this recent and continuing work we can expect some interesting developments in that general region. No longer are studies such as those of settlement patterns or cultural expressions based solely on the data available from ceramics, ethnography or physical anthropology, rock art is now promoted as a principal source of information. I enthusiastically applaud your pioneer work, which I feel is symptomatic of the current widespread upsurge or renaissance in South American rock art studies.

Con muchos recuerdos,
Robert G. Bednarik

RAR 5-094□

The Hupa Calendar Stones at Takimitlding and Medilding, North-western California

E. BRECK PARKMAN

At the Hupa Indian village of Takimitlding, located along the Trinity River in north-western California, there is a sacred structure in front of which are three decorated stone slabs (Fig. 1). The stones are marked with cupules and grooved petroglyphs, and were used by the Hupa as some kind of calendar (Goff 1982; Goldschmidt 1940). One of the three stones was stolen a few years ago, and has since been replaced by another of similar size and shape (Goff 1982: 36). At the nearby village of

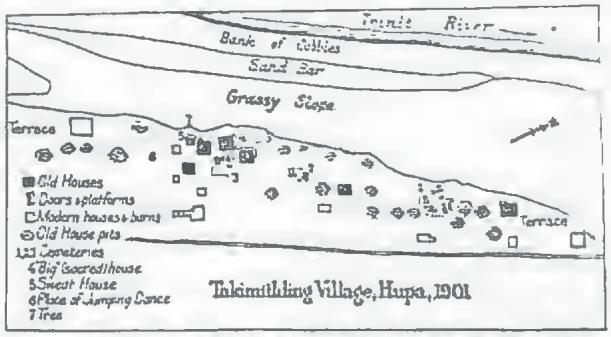

Figure 1.
Takimiltding village and the location of Xonta nikyau (4) (after Kroeber 1925).

Medilding, there is another calendar stone marked with cupules (Goff 1982: 38–9). This paper is a brief discussion of these Hupa calendar stones.

Takimiltding (also known by the name of 'Hostler') was and still is a religious centre of the Hupa (Kroeber 1925: 131). At this village, there is a structure named *Xonta nikyau* ('Great House') (Fig. 2), which is sometimes referred to as the 'Church' (Goldschmidt and Driver 1940: 105). *Xonta nikyau* served as the pivotal point for most of the Hupa ceremonials, with the heads of the house serving as the leaders of the dances. Both the Jump Dance and the White Deerskin Dance (Fig. 3) were begun in front of *Xonta nikyau*. These World Renewal ceremonies are still made by the Hupa today.

The three stone slabs that were placed in front of *Xonta nikyau* are examples of portable rock art (Fig. 4). The stone on the right (looking toward the doorway) has thirteen vertical grooves among which are located cupule petroglyphs at various locations. The middle stone has two parallel grooves running horizontally across its face, and there may also be a few cupules on this slab as well. The third stone, the one on the left, is the one stolen a few years ago. It was the most attractive of the three stones, being decorated with a grooved arc, along which were a number of cupules.

Like most north-west California tribes, the Hupa observed the winter solstice (Driver 1939: 342). In examining the calendar stones at Takimiltding, anthropologist Walter Goldschmidt noted that since the stones face north, they would not have been useful in creating shadows with which to follow the progression of the seasons (Goldschmidt 1940: 176). Instead, he felt that it was more probable that 'the stones simply served as a mnemonic device for keeping track of the months from the winter solstice to the dances' (ibid.).

In 1982 Colleen Goff, a local Native American student, interviewed thirteen Hupa informants in an attempt to better understand the calendar at

Figure 2.
A view of Takimiltding looking west. Xonta nikyau is the structure at the centre right of the photograph, which was taken by the author in 1986.

Figure 3.
The Hupa White Deerskin Dance. Photograph by A. W. Ericson, ca. 1897, courtesy of the California Department of Parks and Recreation.

Figure 4.
A view of the three calendar stones in front of Xonta nikyau. Note that this is an historic photograph showing the now missing third stone (on the left). Photograph courtesy of Peabody Museum, Harvard University.

Takimitlding. She found that among her informants there were only fragments of information surviving concerning the use of the stones. Some of the information was conflicting and overlapping. Some informants stated that there had originally been five calendar stones at Takimitlding, while others said there had only been the three. Of the three stones, the one on the right with the thirteen vertical grooves represents the thirteen lunar months. According to Goff,

> The thirteen lines represent the thirteen months or 'moons' of the year. The months were numbered, not named. This stone was read from right to left, the groove on the far right being the first month and the groove on the far left the thirteenth month. This count began with the winter solstice. The holes or pits between the verticle [sic] lines told the users of this calendar when certain things would take place. For instance, they told when the eels, salmon, or buzzards would come to the area (Goff 1982: 36).

According to Goff's informants, the middle stone might be interpreted at least three different ways. According to the people she interviewed, this stone with two parallel grooves running across its face might have been used in counting the years between the White Deerskin Dance, for dividing the year into summer and winter months, or for representing the duality of the Hupa world, with the two grooves standing for 'the natural and the supernatural, the known and the unknown, or the seen and the unseen' (Goff 1982: 36).

The third stone, the one now missing, is the stone that Goff's informants knew the least about. This was a rounded stone slab, decorated with a grooved arc concentric with the stone's outer edge. Between the grooved arc and the edge of the stone were seven cupule petroglyphs (Goldschmidt 1940: 176). Goff's informants were not certain as to how this stone had been used, but they felt that the seven cupules might have represented the seasons of the year, the phases of the moon, or seven stars (Ursa Major?) that can be seen in the night sky certain times of the year (Goff 1982: 38).

The calendric nature of the Takimitlding stones has been fairly well documented by Goldschmidt (1940) and Goff (1982). What has not been documented, however, are the actual mechanics of how the stones were utilised. Lee Davis, of the University of California at Berkeley, is currently completing her doctoral dissertation on the Hupa (Davis n.d.). Working with her own Hupa informants, Davis has been able to determine how the calendar stones were used, and this information will be presented as a part of her dissertation (Lee Davis, pers. comm. 1988).

In addition to the calendar stones at Takimitlding, Goff (1982) reports another calendar stone at the Hupa village of Medilding, located about 5 km further up the Trinity River. Hupa Valley was divided into two halves, each having its own religious centre; one was Takimitlding, the other Medilding, where various religious ceremonies were also held.

The Medilding calendar consists of a single stone with twelve cupule petroglyphs (Goff 1982: 38-9). The stone rests flat on the ground, and is beside an unmarked upright stone of similar size. The cupules are on the upper face of the flat stone. Their configuration of alignment has led Goff to suggest that the stone was used to mark both the winter and summer solstices (Goff 1982: 40). She

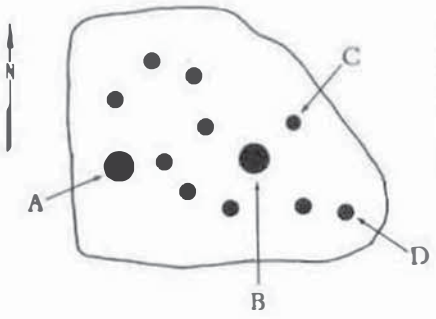

Figure 5. The calendar stone at Medilding (after Goff 1982).

has presented a rough sketch of the cupule rock (Fig. 5), noting that

> A line from point A to point B, extending to the horizon, would mark the point where the sun rises exactly east, thereby signaling the coming of the solstice. A line extended from point B to point C would correspond to the summer solstice and a line extended from point B to point D would correspond to the winter solstice (Goff 1982: 40).

To date, no other researcher has inspected the Medilding cupule rock to determine whether it was in fact some kind of archaeoastronomy observatory. Further research into the use of this rock could prove highly significant, especially since it is the only ethnographically suggested solstice observatory in north-western California.

As mentioned earlier, the villages of Takimitlding and Medilding were the two centres of Hupa religious life. Various ceremonial observances were sponsored by both villages, including World Renewal and First Fruit ceremonies requiring specific seasonal scheduling. Given the religious and ceremonial nature of the two villages, it is probably more than coincidental that calendar stones are found at both Takimitlding and Medilding. As suggested by Goff, perhaps the Medilding stone was used to mark the beginning of each year, while the Takimitlding stones were used to mark the passing of the months and the seasons within the year. If such were the case, then the Hupa would have had a very efficient calendar that would have served to keep the religious world in balance. As rock art sites, Takimitlding and Medilding are perhaps the most unique in north-western California.

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RAR 5-095

REVIEWS & ABSTRACTS

The attention of delegates of the First AURA Congress is drawn to the two following volumes. Both are in press, and deal with rock art regions that are among the field trip destinations of the Darwin congress.

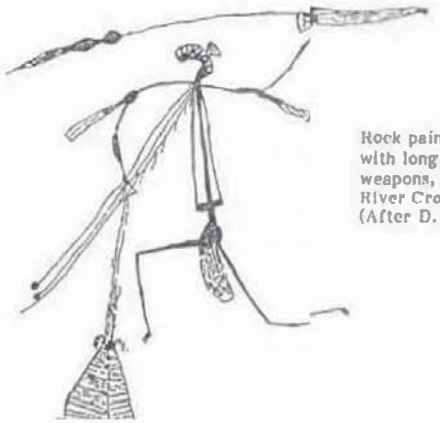
The Rock Paintings of Arnhem Land, Australia: Social, Ecological and Material Culture Change in the Post-Glacial Period, by DARRELL LEWIS. In press. British Archaeological Reports, Oxford. 425 pages, 271 line drawings, 48 plates, 5 maps, bibliography.

In part one of this study an assessment is made of the methodologies, chronologies and nomenclatures of the two principal researchers of Arnhem Land rock art, Brandl and Chaloupka. The more reliable of the two methodologies and chronologies is adopted and expanded. Changes in material culture items depicted in the art are the basis for dividing the expanded chronology into four periods. A fifth and possibly other periods are likely to be defined with further research. These periods are named in accordance with the most distinctive and commonly depicted material culture item in that period.

In part two, the only serious attempt at dating and analysing Arnhem Land rock art (by Chaloupka) is critically examined, and an alternative model of dating and analysis is proposed. The model presented here rejects Chaloupka's claim that the marked change of emphasis in subject matter, from predominantly land animals to predominantly aquatic animals, documents the appearance of estuarine conditions around 7000-9000 years ago. It also rejects the claim that the oldest art may be 20 000-35 000 years old. Instead, it is argued that the appearance of aquatic fauna documents the most recent phase of freshwater wetland evolution, within the last 1000-2000 years. In terms of maximum dating, there are no features in the art that allow an upper age limit to be defined or inferred. In the absence of reliable techniques for directly dating the art, the maximum age of the oldest paintings remains a matter of speculation. However, it is possible to argue that paintings in the oldest well-defined style postdate the glacial period and that some are probably as recent as about 9000 years. In spite of this comparatively recent dating, the oldest paintings may be seen as the product of societies that developed earlier, during conditions of extreme glacial aridity.

Changes evident in the material culture assemblages, art styles, and distribution of styles and motifs are interpreted as documenting social strategies developed during the postglacial period in response to ecological shifts. Alterations in long distance information networks, a shift in emphasis from regional identity to local identity, and the development of rituals of alliance, are the major social strategies discussed. The model of past social strategies developed in this monograph has implications for the study of glacial and postglacial prehistory throughout Australia.

Darrell Lewis
Canberra



Rock painting of anthropomorph with long spearthrower and other weapons, south of East Alligator River Crossing, Arnhem Land. (After D. Lewis.)

The Shape of the Dreaming: the Cultural Significance of Victoria River Rock Art, by DARRELL LEWIS and DEBORAH ROSE. Australian Institute of Aboriginal Studies Report Series. Aboriginal Studies Press, Canberra. 79 pages, 12 plates, 18 line drawings, map.

The aims of this report are a response to the Burra Charter (1981) which requires that 'any intervention (to protect a monument or site) should be constrained by the need to retain the cultural significance of the place'. The report is directed both to policy makers and to the general public. The description and analysis of Victoria River district rock art and its significance to its Aboriginal custodians are based on the authors' field research in the areas of prehistory, rock art, ethnohistory, and social and cultural anthropology.

The first part of the report describes the geography and history of the Victoria River district, and discusses the various types of rock art: engravings, paintings, and painted engravings. The art is placed in regional and temporal contexts. In the second part, the significance of the art within Aboriginal culture is discussed. Art is placed within the broader category of marks made by the Dreaming beings. The major point is that the art is of contemporary significance, most of it being identified by custodians as the living presence of Dreaming beings. Social analysis focuses on Aboriginal management of rights of access, knowledge and the dissemination of knowledge.

With aspects of cultural significance analysed, the report discusses issues of consultation with Aboriginal custodians, and physical protection of art sites. The most serious threat to the art is found to be social, and includes such factors as absence of consultation, and inadequate or improper consultation.

The final recommendations are based on the understanding that rock art of contemporary significance cannot be treated independently of the Aboriginal people to whom it is of primary significance. Recommendations therefore include: no physical intervention except at the express and voluntary request of the custodians; implementation of local Aboriginal task forces to protect art and other Dreaming sites; implementation of training programs to allow Aboriginal custodians to liaise more effectively with Europeans; and employment of suitably qualified consultants, where non-Aboriginal consultants are required.

Dr Deborah Rose
Canberra

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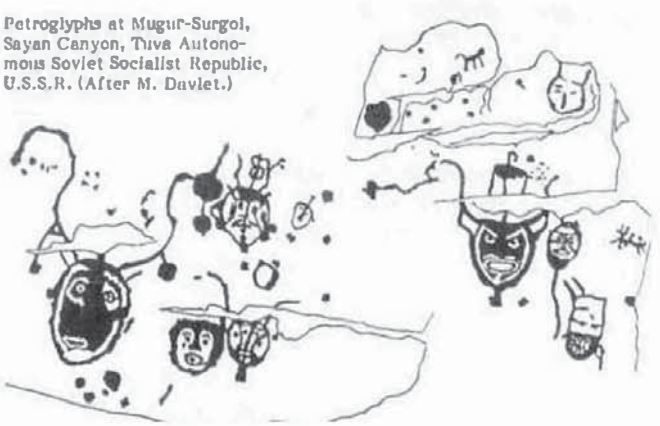
Petroglyphs of the Mugur-Surgol, by M. DAVLET. 1980. Publishers 'Nauka', Moscow. 272 pages, profusely illustrated, 6 pages of bibliography. The book is printed in Cyrillic.

The volume describes the petroglyphs of the site complex of Mugur-Surgol, in the southern part of the Sayan Canyon of the Yenissei River, Tuva Autonomous Soviet Socialist Republic. This is a mountainous region of central Asia, west of Lake Baykal, bordering Mongolia. The petroglyphs found on the outcrops and boulders of the river banks have been produced by both percussion and abrasion. During the annual floods they are completely submerged.

Petroglyphs at Mugur-Surgol, Sayan Canyon, Tuva Autonomous Soviet Socialist Republic, U.S.S.R. (After M. Davlet.)



The rock art dates from different periods from the Bronze Age to the modern time, and there is considerable variety among the motifs. Zoomorphs are common, as are 'hole-dents' (probably cupules) and 'enclosures'. Anthropomorphs occur and are often horned. The most notable component of the iconography are about 250 depictions of human masks. They are either partial or complete, revealing distinct facial features and details of decoration.

In the author's opinion the main complex of the Mugur-Surgol petroglyphs dates from the Bronze Age (first half of the second millennium B.C.), while the later drawings were associated with initiation rituals and the practices of men's secret societies well known from ethnographic literature.

The author further suggests that some traditions originating in the Bronze Age still survive in the Lamaist mystery *Tzam*, and considers the demonic masks as ancient prototypes of *dokshit* masks. When Buddhism spread into the inner regions of central Asia, the Buddhist missionaries treated the ancient local gods as evil forces or hostile demons, but the later Northern Buddhism (Lamaism) assimilated local cults. rgb

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Éléments de préhistoire de l'Afrique du Nord et du Sahara, by FRANÇOIS SOLEILHAVOUP. 1987. Edition Raids et Méharées, Paris. 95 pages, 97 figures and plates.

Professor Soleilhavoup's volume is clearly not intended to provide a comprehensive prehistory of North Africa, it merely sketches out crucial aspects of current knowledge, presents various hypotheses, and provides a wealth of information on the ecological background, chronology, typology, and most especially, on the region's rock art--in an interdisciplinary fashion. The rock art section occupies almost half the volume and represents its most important part. Here, the author compares the chronologies of Lhote, Cominardi and Hachid, and provides a large selection of his unique petroglyph recordings. In addition to a likeness of the engraving itself, Soleilhavoup also records geomorphological detail of the rock surface, using his own standardised symbols to depict areas of patination, exfoliation and so forth. This comprehensive recording method is very time consuming, but it has enormous research potential, particularly when an engraved surface has been subjected to a number of erosion or accretion phases. It is then usually possible to establish a relative chronology and since geomorphological processes are often related to climatic events this kind of work promises an absolute chronology via non-archaeological means. rgb

Petroglyphs of female rhinoceros with young.
Ti-n-Teghert, Tassili-n-Ajjer, Algeria. (After F. Soleilhavoup.)

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Felszeichnungen in den Alpen, by AUSILIO PRIULI. 1984. Benziger Verlag, Zürich - Köln. 104 pages, numerous maps, drawings, plates. (First published 1983 by Priuli and Verlucca, Ivrea, Italy.)

A survey of rock art in the Alps of central Europe with a catalogue of elements and maps showing the distribution of each type. The author describes the techniques of engravings which he determined by replicative experiments.

Arte Rupestre de Bolivia, by MATTHIAS STRECKER. 1987. Contribuciones al Estudio del Arte Rupestre Sudamericano, Volume 1. SIARB, La Paz. 72 pages, 17 figures, 9 maps.

The first monograph of the Bolivian Rock Art Research Society, most appropriately, deals with the rock art of Bolivia. A taxonomic model based on technique of execution includes petroglyphs (9 varieties), rock paintings (4 varieties), combined petroglyphs/paintings, geoglyphs and portable art (which may be painted or engraved). Although the investigation of Bolivian rock art dates back as far as the early 17th century there is a paucity of reliable published reports, and few scientific papers were produced even in recent years. Since 1985, however, there has been an intensification of research efforts. A tentative chronology of the art lists a 'formative period', regional pre-Inca cultures, and Inca, colonial and republican periods. Perhaps the most valuable aspects of this pioneer publication are its comprehensive bibliography on the country's rock art (23 pages) and its complete catalogue of known sites (almost 200).

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Arte rupestre en Nuevo León, by WILLIAM BREEN MURRAY. 1987. Numeración Prehistórica. Cuadernos del Archivo, Number 13. Gobierno del Estado de Nuevo León, Secretaría de Administración, Archivo General del Estado. Nuevo León, Mexico. 70 pages, ill.

This volume is a collection of treatises dealing with the mathematical analysis of petroglyphs of north Mexico. The author demonstrates that a number of counts relate to the ancient indigenous lunar calendar.

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Inventaire des sites Sud-Américains antérieurs a 12 000 ans, by NIÉDE GUIDON and GEORGETTE DELIBRIAS. *L'Anthropologie (Paris)*, 1985, Volume 89, Number 3, pp. 385-408.

During the last ten years samples from some South American archaeological sites have provided a series of Pleistocene dates. An analytical review of these old sites demonstrates that traces of South American prehistoric man are older than 15 000 years and can reach 27 000 or even 33 000 years. These first traces occur in widely dispersed regions such as the north-east of Brazil and the south of Chile. The earliest industries include choppers and chopping tools, drills, knives, side scrapers and retouched flakes. Sometimes, in kill-sites, the only marks of the human action are traces of cutting or breaking, or incisions on bones of the fossil fauna. These bones are often associated with natural flakes and pebbles chosen by prehistoric man because of their form and natural edges. Around 15 000-14 000 years ago projectile points, burins and unifacial scraper planes appeared. 12 000 years ago the lithic industry was very diversified. Bifacial work was common and technically advanced. At that time South America was entirely inhabited by man.

Rock art conservation in Petroglyphs Provincial Park, by IAN N. M. WAINWRIGHT. *Canadian Conservation Institute Newsletter*, 1987 (December), pp. 8-9.

To protect the Peterborough Petroglyph Site from frost weathering, algal growth and vandalism, a fully enclosed structure has been built over the site. The site measures 22 x 14 m and is located on an inclined pavement of coarse-grained marble. After recording it stereophotogrammetrically a seven-sided, 12 m high building was erected over the site. The walls of this structure are fully glazed, its roof is insulated, and it is of a column-free design. A mechanical system of motorised dampers and exhaust fan ensures visitor comfort on hot summer days. The structure has been designed to detract as little as possible from the appearance of the site and its relationship with the surroundings. A visitors' centre is still to be constructed, and experiments dealing with the removal of algal accretion and wax crayon are being continued.

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Naj Tunich: Entrance to the Maya Underworld, by JAMES E. BRADY and ANDREA STONE. *Archaeology*, 1986, Volume 39, Number 6, pp. 18-25.

An analysis of spectacular cave paintings of the Classic Maya culture in Guatemala.

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Art for art's sake in the Paleolithic, by JOHN HALVERSON. *Current Anthropology*, 1987, Volume 28, Number 1, pp. 63-89. With comments by Abrahamian, Adams, Bahn, Black, Davis, Frost, Layton, Lewis-Williams, Llamazares, P. Maynard and Stenhouse.

The question of the 'meaning' of Palaeolithic cave art has been much discussed since the last century. Of all the theories proposed, 'art for art's sake' has had the least acceptance, while various hunting-magic explanations have enjoyed the most success, but all theories, including recent structuralist ones, have been found seriously flawed, and the present state of the question is evidently one of despair. This may be an indication that we have been asking the wrong questions and making the wrong assumptions. Particularly tenuous and suspect is the approach by analogy with modern hunter-gatherers with their long cultural traditions, for when we are dealing with the Palaeolithic it is fundamental that we concern ourselves with beginnings. From this perspective, it is proposed that cave art has no 'meaning' in any ordinary sense of the word, no religious, mythic or metaphysical reference, no magical or practical purpose. It is to be understood, rather, as a reflection of an early stage of cognitive development, the beginnings of abstraction in the form of represented images. The activity would have been autotelic, a kind of play, specifically a free play of signifiers. Thus Palaeolithic art may well have been, in a fairly precise and instructive sense, art for art's sake.

The Northwestern Ontario Rock Art Project: the 1984 Results, by PETER J. LAMBERT. 1985. Conservation Archaeology Report, Northwestern Region. Report No. 8. Ministry of Citizenship and Culture, Ontario. 154 pages, 54 figures.

This report summarises the activities of the second Northwestern Ontario Rock Art Project and contains detailed description and analyses of certain aboriginal pictographs located in different areas of the Dryden and Kenora districts. Data for 18 sites with 140 figures identified to Ojibwa traditions supplement earlier data from the 1982 NORAP sites permitting some geographically widespread comparisons. Classified figures constitute samples that are used, in part, to distinguish between drainages and specific interpretations are made using available ethnohistoric and historic records. Regional (drainage-based) differences are indicated and imply regionally based divergences within the larger, essentially homogeneous, population defined on the basis of a shared tradition of painting on the rocks.

Rock paintings at Clay Lake III, northwestern Ontario. (After P. J. Lambert.)

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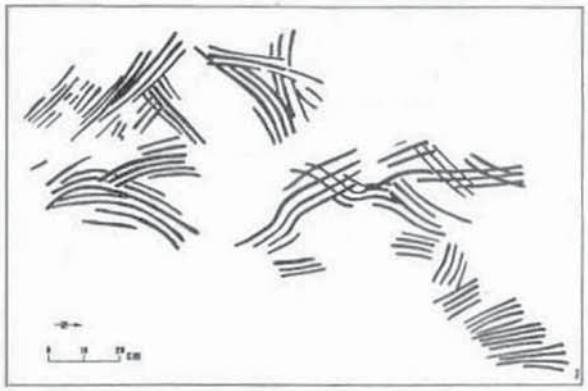
Inter- and intragroup aggression illustrated in the rock paintings of South Africa, by H. C. WOODHOUSE. *South African Journal of Ethnology*, 1987, Volume 10, Number 1, pp. 42-8.

In the light of recent renewed interest in the possible occurrence of aggression among hunter/gatherer peoples the author reviews the evidence in South African rock art which proves the early existence of such aggression. From a large number of documented rock paintings covering most of southern Africa only 20 scenes of inter-human aggression could be enumerated. Scenes of fighting between San groups (nine), between San and other groups (nine), and between groups of Blacks (two) were in evidence. From half of these paintings it is impossible to suggest or deduce the cause of the fighting. These are mostly the scenes of fighting between San groups. In seven of the remaining ten scenes the fighting is clearly the result of cattle-raiding. Eibl-Eibesfeldt's contention that most intergroup aggression is connected with either territorial acquisition or the competition for food or wealth is a self-evident conclusion from the examples enumerated in this article.

Fight between two groups of San. (After H. C. Woodhouse.)

Cave use by Australian Pleistocene man, by R. G. BEDNARIK. *Proceedings, University of Bristol Spelaeological Society*, 1986, Volume 17, Number 3, pp. 227-45.

It has long been assumed that the prehistoric inhabitants of Australia had always shunned caves, but recent evidence indicates that Pleistocene man made extensive use of deep limestone caves in that continent. Nearly all the Australian sites known to possess such evidence have only been discovered since 1980. The parietal traces of human use described in this paper include three different forms of rock art, the oldest of which is sometimes found together with extensive evidence of chert mining. This subterranean mining of sedimentary silica represents the world's oldest known traces of systematic mining, but it is claimed in this paper that similar evidence is also present in at least one French cave. The oldest of the described anthropic wall markings are identical to the earliest form of cave art in the Franco-Cantabrian region. Although absolute dating is not yet finalised for the Australian sites it has been established that the most archaic markings are more than 20 000 years old. Their discovery and investigation has prompted a hypothesis with which it is attempted to explain the origin of the anthropocentric world view shared by extant humans.



FINGER MARKINGS ON THE CEILING OF MALANGINE CAVE, SOUTH AUSTRALIA

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The cultural context of hunter-gatherer rock art, by ROBERT LAYTON. *Man*, 1985, Volume 20, Number 3, pp. 434-52.

A semiological interpretation of art and myth is defended against the criticisms of Sperber (1975) and Dubinskas and Traweek (1984). Following Ricoeur (1979) the creation of rock art and the telling of myths are treated as performances or texts through which the structure of the performer's culture may be reconstructed and understood. Contrasts in the distribution, style and the frequency with which representations appear in particular rock art traditions are interpreted as symptomatic of differences in the structure of the cultures that produced them. It is argued that within any tradition, variety in individual performances (the narration of myth or painting of rock art) are the result of the distinctive relationship between structure and process characteristic of cultural systems.

Excavations in the lower Southeast of South Australia: November 1985, by DAVID FRANKEL. *Australian Archaeology*, 1986, Number 22, pp. 75-87.

The results of an initial season of excavation are reported, demonstrating the potential of the sites in question for contributing chronological, economic, and ultimately behavioural information of significance. Excavations were conducted in three limestone caves near Mt Gambier, including two that contain cave art: Malangine and Koongine Caves. Occupation evidence occurs in all three sites, and charcoal dating from the beginning of the Holocene has been recovered in Koongine Cave.

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Portraetter af en verdensdel, by INGE DAMM. *Illustreret Videnskab*, 1987, Volume 19, Number 7, pp. 34-7, 78.

This article in a Danish popular science journal describes Australian rock art from two regions: the Quinkan paintings near Laura, north Queensland, and the finger markings in caves near Mt Gambier, South Australia. It describes the work of Trezise and includes several colour plates of Laura paintings. Of particular interest is the discussion of rock art dating and of the finger flutings, in a separate article entitled *Her er verdens aeldste kunst.*

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The writing on the wall, by HOWARD McNICKLE. *Landscope*, 1987, Volume 2, Number 3, pp. 22-7.

Landscope is published by the Western Australian Department of Conservation and Land Management. In this article, the author presents eight glorious colour plates of rock art from the Kimberley and Pilbara regions. Interpretation, preservation and public access are discussed in the text.

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Iconographie complémentaire de la grotte de Doña Trinidad à Ardales (Malaga), by LYA and MARCEL DAMS. *Bulletin de la Société Royale Belge d'Anthropologie et de Préhistoire*, 1983, Volume 94, pp. 107-25.

The parietal art of this cave was found by Breuil in 1918, at which time he also mentioned meandering finger paintings; these are almost invisible today due to recurrent vandalism. The authors found and recorded several new paintings and engravings in 1979 and 1980, complementing Breuil's original description. All the engravings are deep and very worn, while the paintings are either yellow or red and black, the latter being superimposed on the former; the most recent are drawn in brown clay. The art may be attributed to a Gravetto-Solutrean phase with a later Solutrean one, while the brown clay paintings may date from middle to late Magdalenian. In 1982 an upper gallery with paintings and stencilled hands was discovered by a speleological team. Though still unpublished, it reinforces the authors' assumption that the present cave, entered through a cleft and funnel in the ground, is only the bottom of a much larger cave system.

Panaramittee [sic] magic, by R. M. BERNDT. *Records of the South Australian Museum*. 1987. Volume 20, pp. 15-28.

This contribution concerns the well-known rock engraving identified by C. P. Mountford as the Panaramitee 'crocodile head', and often cited as evidence of the existence of that creature in southern Australia during prehistoric times. On the basis of Aboriginal information obtained in the early 1940s, its interpretation as a *yarida* magical object provides a different view of what Aborigines believed it to be. Discussion places this engraved design and what it signifies within its socio-cultural context, along with mythological accounts that substantiate the relevance of this object. The major focus is on a description of two Aboriginal drawings of the 'crocodile head' as a *yarida*, and the meaning of its various designs. In order to understand how the object was used, the theory and technique of relevant sorcery, particularly in so far as dead persons' fat is concerned, are outlined. While this paper does not refute any speculation on what the original intention of the engraving may have been, it makes clear that for the Ngadjuri, in whose territory the engraving was previously located, it was a representation of a magical object that has a history of human use and significance.

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Leroi-Gourhan au bestiaire de la préhistoire, by CLAUDE MEYLAN. *Préhistoire Ariégeoise*, 1986, Volume 41, pp. 31-62.

A useful summary of the development of Leroi-Gourhan's thinking about cave art; the author admires him greatly, but nevertheless provides a critical, 'warts and all' view of his work—including its weaknesses, which at times included factual errors, as in his sometimes imprecise or incorrect counts and percentages, and some plans of caves and the position of their figures. He rightly stresses that other people put far more emphasis on the sexual aspects of the theory than Leroi-Gourhan ever did. His sound conclusion is that Leroi-Gourhan's theories are too wrong to be fully accepted, but also too revealing to be abandoned altogether. PGB

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Cuevas Mayas en el Municipio de Oxkutzcab, Yucatan (1): Cuevas Mis y Petroglifos, by MATTHIAS STRECKER. *Boletín ECAUDY*, 1984, Volume 12, Number 68, pp. 21-8, and errata in Volume 12, Number 70, p. 33.

Cuevas Mayas en el Municipio de Oxkutzcab, Yucatan (2): Cuevas Ehbis, Xcosmil y Cahum, by MATTHIAS STRECKER. *Boletín ECAUDY*, 1985, Volume 12, Number 70, pp. 16-23.

The two articles present complete documentation of rock art in five caves and list six others with petroglyphs or rock paintings in the region of Oxkutzcab, Yucatan, Mexico. Artificial depressions on top of boulders in the interior of the caves are interpreted as receptacles of ritual offerings, skulls and skeleton figures point to religious cults that took place in the caves.

A la recherche de l'iconographie paléolithique hors d'Europe, by PAUL G. BAHN. *Travaux de l'Institut d'Art Préhistorique*. 1987. Volume 29, pp. 7-18.

Recent developments in the study of essentially Palaeolithic art outside of Europe are related, by citing finds from Mexico, Brazil, southern Africa, China, Japan and Australia. In particular, the cave art of Koonalda and Orchestra Shell Caves and of several of the Mt Gambier caves is discussed in some detail, and it is the subject of most of the accompanying illustrations.

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Grotte de Combarelles I. Les dessins de la galerie profonde, by C. BARRIÈRE. *Travaux de l'Institut d'Art Préhistorique*, 1987, Volume 29, pp. 81-107.

This paper consists almost entirely of Barrière's painstaking recordings of 38 groups of engraved marks or motifs from the cave of Combarelles, near Les Eyzies, Dordogne.

Figure of horse, painted in black, and engraved motifs, Les Combarelles. (After C. Barrière.)

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Aproximacion a la prehistoria de Vigo (España), by J. M. HIDALGO CUÑARRO. *Trabalhos de Antropologia e Etnologia*, 1985, Volume 25, pp. 253-74.

The various prehistoric stages which are found in Vigo, on the north-western coast of the Iberian peninsula and its surrounding areas are described briefly. The periods which are studied are those corresponding to the Palaeolithic, Mesolithic and Neolithic, the Megalithic Culture and Bronze Age. The region's rock art is emphasised, consisting often of deeply carved petroglyphs depicting animals and weapons, in addition to the common non-iconic arrangements.

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L'art rupestre saharien: conservation méthodologie et gestion, by S. A. KERZABI, M. HACHID and M. A. GARCIA. 1986. Volume 13 of 'Études et documents sur le patrimoine culturel', by UNESCO. 45 pages, 16 figures.

The third rock art publication in this series deals with the conservation of petroglyphs in the Sahara, notably in the Tassili National Park. Three separate papers address subjects ranging from management, guides, public education and visitor control, to inventorising and analytical work, and experimentation with the taking of casts from petroglyphs.

The Church Rock Petroglyph Site: Field Documentation and Preliminary Analysis, by JO ANNE VAN TILBERG, FRANK BOCK and A. J. BOCK (ed. ERIC RITTER). 1987. Redding Museum and Art Center, Occasional Paper No. 4. 112 pages, 52 figures, 11 plates, 2 maps. US$12.50 + $3.25 tax/postage.

In 1982, the authors and two associates conducted a field study of SHA-39, the Church Rock site, with the following objectives: determine the actual extent of the petroglyph complex and map it; document photographically a range of petroglyph clusters; and describe specific design elements to provide material for a preliminary quantitative analysis. Their findings resulted in this report which is augmented with 52 figures of scale drawings, 11 photographs, 2 maps and a bibliography of primary data. Not only will rock art enthusiasts be intrigued with this volume but the general public will also find it of interest since it deals with a sensitive site, unique to this area.

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Spirits of the Earth. Volume I: The North Desert. A study of earthen art in the North American deserts, by JAY VON WERLHOF. 1987. Imperial Valley College Museum, El Centro, California. 302 pages, 360 figures (mostly plates), maps, bibliography, index. Soft cover US$37.10, hard cover US$53.00.

This is the first of three volumes on geoglyphs in the deserts of the south-western United States and north-western Mexico. It describes the stone arrangements found along the north edge of the California deserts: Panamint Valley, Eureka Valley, Death Valley and Greenwater Valley. Volume II will cover Red Rock Canyon, Amargosa Valley, Mojave Basin and eastern Riverside County. The third volume is intended to include Imperial County, eastern San Diego County, western Arizona, north-western Mexico and northern Baja California, and it will contain synoptic charts, tables, comparative data and computerised analyses.

If the first volume is any indication, this will indeed be a most impressive series. Volume I will be reviewed in this journal shortly, Volume II is scheduled to appear in 1988, Volume III in 1989.

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Fiumi di pietra. Archivio dela preistoria sahariana, by ANGELO and ALFREDO CASTIGLIONI, GIANCARLO NEGRO. 1986. Edizioni Lativa, Varese. 338 pages, numerous plates, mostly colour, bibliography, index, superbly produced, large format. Cloth, approx. $A60.00.

L'art rupestre préhistorique des massifs centraux sahariens, by ALFRED MUZZOLINI. 1986. BAR International Series No. 318, Oxford. 355 pages, 71 figures, bibliography, index. Soft cover £21.00 post free, plus US$8.00 for payments in other currencies.

Arte preistorica del Sahara. 1986. De Luca Editore and Arnoldo Mondadori Editore, Rome/Milan. Essays on Sahara rock art, with a catalogue, bibliography and glossary.

These three volumes on the rich rock art of the Sahara will be shortly reviewed in *Rock Art Research*.

Les surfaces de l'art rupestre en plein air: relations avec le milieu biophysique et méthodes d'étude, by FRANÇOIS SOLEILHAVOUP. *L'Anthropologie (Paris)*, 1986, Volume 90, pp. 743-82.

Prehistoric and historic rock art occupies immense areas in the open air, all over the world. The methods utilised to study engraved and/or painted marks on rocks differ according to their location, depending on whether they occur in caves or at open air sites. The adaptation of the natural sciences (earth sciences, biology, physical sciences, chemistry etc.) for prehistoric archaeology is extremely fruitful in the specific field of rock art studies. Some methodological principles are proposed in a schematic way, progressing logically from the study of rock face environment to rock face, from macroscale to extreme microscale. The main objective is to analyse rock art according to objective criteria, to better understand the relationship between environment or rock (geomorphology, support rock lithology, palaeoclimatic evolution), and the different types of graphic expression (style and technique in the art).

In this paper the main aspects of a natural sciences approach to the art of open air sites are reviewed, giving some examples of such sites in the Algerian Sahara and the French Alps. Among other things, modifications of rock surfaces

Petroglyph on glacially worn rock in Valcamonica, Italy. (After Soleilhavoup.)

in the course of time are considered. They are a complex ensemble of processes that can be defined as a true ecomorphology occurring at the rock/atmosphere interface. The inorganic substances of the mineral or rock support constantly interact with the organic ones of microflora and microfauna, producing highly varied effects such as carbonate concretions, mangano-ferruginous patina, weathering cortex. One of the most promising avenues for future research is to find some criteria for the dating of rock art, after analysing the various types of surface modifications.

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Pictures of the Dreaming: Aboriginal rock art of Australia, by PAUL FAULSTICH. *Archaeology*, 1986, Volume 39, Number 7, pp. 18-25.

A summary of Australian rock art is presented, covering most of the major art regions. Very recent finds and concepts are considered, and the article includes several superb photographs by Howard P. McNickle.

SIARB Boletín. Number 1, May 1987. Annual journal of the Sociedad de Investigación del Arte Rupestre de Bolivia. Edited by MATTHIAS STRECKER. Number 1 has 37 pages and includes the following articles:

QUEREJAZU LEWIS, R.: Arte parietal y ofrendas en Jatun Potrero. A painting site in the Mizque valley in Bolivia is described where three kinds of recent ritual offerings were found—balls of coca leaves thrown or spat onto paintings, a non-local stone placed on them, and mud balls placed on paintings.

CLAURE CALLAÚ, O.: Pinturas rupestres de Peña Escrita. Description of a rockshelter with paintings and petroglyphs in the Santa Cruz province of Bolivia.

VENTURA, B. N.: Los grabados del Río Grande de Tarija (Sitio RGT 1), Depto. San Martin, Salta, Argentina. First report of rock art in this region of northern Argentina. Petroglyphs of human tracks and noniconic linear designs.

This volume also contains several notices, news items and a book review.

Enquiries to SIARB, Casilla 3091, La Paz, Bolivia.

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Pictogram. Quarterly newsletter of the Southern African Rock Art Research Association (SARARA). Edited by SHIRLEY-ANN PAGER.

The first issue of SARARA's periodical appeared in December 1987, and contained the following papers, on 11 pages:

PAGER, Shirley-Ann: To SARARA's members and friends.

BEDNARIK, Robert: A message from one rock art continent to another.

WILLCOX, A. R.: The black wildebeest in rock art.

THACKERAY, J. F.: Conceptual associations and southern African rock art.

MASSON, John: A note from Swaziland - rock art and S.A.R.A.

GENGE, Peter: Recurring symbols in rock paintings of the Matopos, Zimbabwe.

SANDELOWSKY, B.: Two more rock art sites discovered in the Rehoboth Gebiet, Namibia.

WOODHOUSE, H. C.: Penis additaments depicted in the rock paintings at the Maak (White Lady) Shelter in the Brandberg, South West Africa/Namibia.

Enquiries to Shirley-Ann Pager, P.O. Box 81292, Parkhurst 2120, South Africa.

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Rock Art Papers. Occasional monograph published by the San Diego Museum of Man. Edited by KEN HEDGES.

Volume 2 (1985) has 152 pages and includes the following well-illustrated articles:

EWING, Eve: Tinaja Yubay: preliminary report on an unrecorded rock art site in central Baja California.

MOORE, Elanie A.: A compositional analysis of two Baja California murals: an artist's point of view.

SMITH, Ron: Rock art of the Sierra de San Francisco: an interpretive analysis.

WORKMAN, James E.: The Los Cocos petroglyph site, Bahia el Coyote, Baja California.

BERTSCH, Hans: Two northern periphery Hohokam petroglyph sites: Stanton and Lomaki, Arizona.

MARTYNEC, Richard J.: An analysis of rock art at Petrified Forest National Park.

HEDGES, Ken: Rock art portrayals of shamanic transformation and magical flight.

RAFTER, John: Mockingbird Canyon study expanded.

BENTON, James S.: Seeing snakes.

TURNER, Wilson G.: A prehistoric sky chart.

VUNCANNON, Delcie H.: Fertility symbolism at the Chalfant Site, California.

RECTOR, Carol H.: Rock art as hunting magic: anthropological fact or fiction?

BENSON, Arlene and Floyd BUCKSKIN: Modoc 75.

HOSKINSON, Tom: Watching the equinox sun.

Volume 3 (1986) has 226 pages and consists of:

MUSCUTT, Keith: A preliminary report on a rock art site in the vicinity of San Ignacio, Baja California.

COVER, Del and Elanie A. MOORE: Mono Alto: a summer solstice site.

MOORE, Elanie A.: Recording Palmarito I: an aboriginal mural in Baja California.

SMITH, Ron: Serpent Cave.

EWING, Eve: Pintadita: a newly discovered painting complex in the Sierra de San Luis, Baja California.

CHRISTIAN, Charles Dennis and Alana CORDY-COLLINS: Aboriginal occupation of a west coast rock art site in Baja California.

HOSKINSON, Tom: Coyotes, rainbows, and power mountains.

MARTYNEC, Richard: A comparative analysis of rock art at *Trincheras* sites in the Tucson Basin.

HEDGES, Ken and Anita McDANIEL: A sampler of Hohokam rock art.

RAFTER, John: Archaeoastronomy of Agua Dulce Canyon.

DICKMAN, Jeffrey L.: Approaches to fieldwork in Homestead and Johnson Valleys.

JONES, Bernard M., Jr: Preliminary investigations into a southern California summer solstice site.

BENTON, James S.: Do I know what I am seeing?

HOTZ-STEENHOVEN, Virginia B.: Petroglyphs of the San Francisco Bay region and related areas.

NEWMAN, Evelyn and Robert MARK: Uvas Creek (CA-SCL-111): a unique petroglyph site in the San Francisco Bay area, California.

BERTSCH, Hans: Hollows and incised grooves in Chaco Canyon rock art.

STEINBRING, Jack and Gary GRANZBERG: Ideological and cosmological inferences from North American rock art: an exploratory discussion.

WEIDLER, John B.: Four levels of communication.

Volume 4 (also 1986) has 150 pages and comprises these articles:

WERLHOF, Jay von: The rock in rock art.

JONES, Bernard M., Jr: A Wanakik Cahuilla solstice site.

HEDGES, Ken: The sunwatcher of La Rumorosa.

RAFTER, John: Archaeoastronomy of Split Rock Shelter in Riverside County, California.

DICKMAN, Jeffrey L.: Hund Rock Shelter, Moro Canyon, Orange County, California.

BENTON, James S.: Circles of the past.

VUNCANNON, Delcie H.: Did Southern Fox pass this way?

CERUTTI, Richard: New rock art and old fossils from the Coyote Mountains.

HAMANN, Diane and Ken HEDGES: Topographical distribution of Hohokam petroglyph sites.

EWING, Eve: Beginning the search for relationships between the northern abstract and great mural art styles of central Baja California.

MOORE, Elanie A.: Solstice observations at Cuesta del Palmarito I.

SMITH, Ron: Male and female symbolism in the great mural paintings of the Sierra de San Francisco, Baja California.

BARABAS, Bryn Marie: Wrangell Island: rock art of the northwest coast.

STRANGE, William C.: 'Intention' and the tides of British Columbia: an issue in the poetics of rock art.

STEINBRING, Jack: The Mud Portage Petroglyph Site in northwest Ontario: a summary.

ROYLE, James W., Jr: The Bull Creek galleries of north Queensland, Australia.

Enquiries to Ken Hedges, San Diego Museum of Man, 1350 El Prado, Balboa Park, San Diego, CA 92101, U.S.A.

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Préhistoire Ariégeoise. Annual bulletin of the Société Préhistorique de l'Ariège. Volume 41 (1986) has 213 pages and includes the following relevant articles:

BÉGOUËN, R., J. CLOTTES, J.-P. GIRAUD and F. ROUZAUD: Le propulseur au saïga d'Enlène.

BEASLEY, B.: Les bisons d'argile de la grotte du Tuc d'Audoubert.

MEYLAN, C.: Leroi-Gourhan au bestiaire de la préhistoire.

NOVEL, Ph.: Los animaux raves dans l'art pariétal aquitain.

BAHN, P. G. and G. H. COLE: La préhistoire pyrénéenne aux États-Unis.

Enquiries to M. Marcel Blum, 26, rue Jacquard, 09300 Lavelanet, France.

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Marks in Place: Contemporary Responses to Rock Art. Photographs by LINDA CONNOR, RICK DINGUS, STEVE FITCH and CHARLES ROITZ. Forworded by LUCY LIPPARD, essays by POLLY SCHAAFSMA and KEITH DAVIS. 1988. University of New Mexico Press, Albuquerque. 144 pages, 87 plates. US$45.00 cloth, US$24.95 paper.

From an anthropological and archaeological perspective there is only one redeeming attribute in this bizarre collection of artistically interpreted examples of rock art. Many of the

87 photographs in this volume are superb. Done almost entirely with an 8 x 10 camera, the depth, detail and composition provide documentation (in such strategic locations as Barrier Canyon, Comanche Gap and Wind Rivers) which absolutely demands scholarly reflection. The excellence of the photography, however, is marred by aesthetic augmentations prompted by what might be viewed as a rather zealous emphasis on 'contemporary artistic response'. Thus Rick Dingus, an Assistant Professor of Photography at Texas Tech University in Lubbock found himself compelled, by the feelings he experienced in viewing the petroglyphs, to freely add numerous wavy lines ('as a spontaneous and gestural counterpoint') to the photos. The propriety of this will be amply questioned when (and if) any other reviews by science-minded people (and probably quite a few art-minded) come out. The least to be said at this point is that it was a marvel of ill-conception, and would appear to many (if not most) as childish 'chicken tracks' superposed upon an art deemed sacred by many North American Indians. Enough said on this.

Linda Connor in her 'Gestures of Faith' provides the first selection of photos. They are more global than the others. She feels that 'their open meaning allows me an access that would be denied if they were not muted in time and dislocated from their cultural matrix'. She appears to have carried this a bit too far. Figure 19 on page 31, entitled 'Lines, Nasca, Peru, 1984', is a panel of the Great Gallery in Horseshoe Canyon, Utah! It should be noted too that contact recording, to include rubbings as shown and discussed on pages 8 and 9, is no longer endorsed by rock art conservationists. The Conservation Guidelines of the American Rock Art Research Association, presently under final review, disallows such practices.

Another curiosity in this volume is a kind of memorial to lost rock art sites. This 'Elegy of the Drowned' by John Pfahl consists of several views of reservoirs, the waters of which have covered rock art sites. The site number is fixed upon the spot at which the site had been. Photos of three reservoirs are included in the seven selections, which each identify one lost site. This forms only a small percentage of those actually lost, since one reservoir alone, The Navaho, covered 12 sites. The photography is outstanding.

By far the most contentious issue in the evaluation of this collection is the ignorance of, or disregard for, not overly technical conservation matters. Steve Fitch, a Lecturer in the Visual Studies Program at Princeton University, found it necessary to build fires at the base of several World Heritage class petroglyph sites, including San Cristobal, Rochester Creek and Horseshoe Canyon. He did this in order to get the effect of firelight at night. A certain pride was attached to this, since one of the photos forms the cover illustration! There is evidence that Rick Dingus, of chicken track fame, was there too when some of this was done, since Dingus pictures one of these efforts (No. 40) and entitles it 'Fitch's Fire, northern New Mexico, 1984-86'. The chicken tracks are dutifully superposed. Further insight into the spirituality of the on-site experience may be gotten from what appears to be a liquor bottle next to the fire at Sego Canyon, Utah, on 4 C tober 1984 (p. 83).

There is nothing amusing about the application of heat to cooled rock panels in the desert night. Rapid thermal changes of the magnitude produced by these fires could immediately weaken the rock and produce spalling. The evidence for this is present at the remains of every evening desert campfire. It is not necessary to consult a geologist. If tests should prove that exfoliation has followed directly from this colossal breach of common conservation sense, the principals should be held accountable and punished—if not by their respective state governments, then nationally or internationally. Unfortunately this would probably only consist of reprimands by the rock art community.

Archaeologists, quite apart from rock art, should be concerned too, since the building of fires at these sites could spoil the chances of radiocarbon-dating the associated midden deposits. The fire at Rochester Creek (No. 59) appears to be very near the spot of some archaeological testing which has led to sharp international debate on radiocarbon dating at the site. The testing was done in September 1984 and the fire by Fitch dates 4 October 1984! Far too close for comfort. Rock art is notoriously difficult to fix chronologically because it is almost always superficial.

It may well be that the present reviewer was selected because of his distance from the sensitive issues involved. The internal diversity of the American Rock Art Research Association, premier organisational authority on North American rock art, encompasses both artists and scientists. Some of the contributors to the volume in question are probably members, and one of them, Polly Schaafsma, is also a member of the Advisory Board—a group regarded by ARARA as the elite in North American rock art studies. While the other contributors nearly all identify Schaafsma's role in their work, and regard her as the acknowledged authority on Southwestern rock art, there is no indication whatever that she played any part in the stupid decisions of this group. In fact it is quite unthinkable that a figure of Schaafsma's prominence would endorse, or in any way support, the procedures here criticised. Long after the fact, however, and without reference to it, Schaafsma provided an introductory essay, 'Rock Art, Ideas in Time and Space' to this volume. It would seem that a very strong disclaimer on her part would be in order.

In some parts of the world rock art has been sufficiently incorporated into heritage legislation to the extent that archaeological licences (with restrictions) are issued by state, provincial, or national governments for access to rock art sites, let alone doing anything on them. It seems quite in order to question the States of New Mexico, Utah and Wyoming (at least) about the control they have over access to, and activity at, Native rock art sites. The United States Archaeological Resources Protection Act of 1979 specifically includes rock art on public and Indian lands. This leaves private lands uncontrolled. The San Cristobal site is on private land, but access has been vigorously restricted for many years. One would wonder if the owners were fully aware of the practices undertaken there.

At the least, the states involved should be advised of what was done. In the case of New Mexico this will be easy. Curt Schaafsma (also cited in the text, and husband of Polly Schaafsma) is the New Mexico State Archaeologist.

One might well wonder how something so alien to the history of North American Indian rock art studies could even reach the light of day. Some of the answers may be gleaned from the biographical notes on the contributors. Four of the eight have published previously in the University of New Mexico Press, a fact which leads to a fairly clear fixing of ultimate authority. This press itself appears not to have consulted external authorities. The press has been subsequently contacted by the appropriate officers of the American Rock Art Research Association with special attention to the problem of allowing a precedent on fire-lit imagery to stand unremarked by the editors. Such an omission by a significant American university press should be brought to world attention, since the criticism has not been answered.

In the meagre text of this volume, there are a number of explicit rejections of 'science' and the 'objective'. At the same time there is much bemoaning of heritage loss. This points to the central contradiction of the volume. *It takes science, and objective processes, to protect the human heritage.* It points further to the dangers inherent in any extreme approach. The isolation of this tight little core of artists has made it immune to even the most common awareness of conservation practice. Keith Davis, Curator of Fine Arts Collections at Hallmark Cards, Inc. in Kansas City reinforces this in his 11-page conclusion to the volume entitled 'Modernism and the Quest for Primacy'. It is an essay on the history of interrelations between art, religion and philosophy with the intent of showing how 'the works illustrated in this book are important to understanding of the broadest currents of contemporary thought'. Like some of the other writings in this volume, it largely denies science, and suggests that 'while existing in physical and archaeological fact, these marks are most significant to us as self-created symbols functioning as mute vessels to be filled with our longings, dreams, and notions of artistic and personal value'. The rest of this essay constitutes a model of esoteric arrogance, well beyond the scope of most rock art enthusiasts. Philosophers from Rousseau to Jung, and beyond, are brought together in Davis's synthesis. Theoretical anthropologists like Fraser, Malraux, Eliade and Geertz are included, but it is doubtful if they would concur in the use of self as a paramount focus in the perception of non-Western art. In fact, the very acceptance of this symbolism as 'art' is not fully questioned in this volume.

The personal nature of art seems to preoccupy Davis, calling attention to the *Minimal Self* by Lasch who views 'our present disorientation and relativity of values as a result of the free market system'. Following this up with a quote from the *Communist Manifesto* by Marx and Engels (1848), we see the 'constant revolutionising of production, uninterrupted disturbance of social conditions . . . venerable prejudices and opinions swept away . . . all that is holy is profaned . . .'.

This reviewer is in total accord with the last part of the above quotation. Where aboriginal peoples of the world maintain any continuity with prehistoric rock art, their perceptions of it are governed by the supernatural. With this in mind, it is recommended that the states of Utah and New Mexico provide copies of this book to all tribal groups in those states.

Professor Jack Steinbring
University of Winnipeg, Canada

5-098□

[Refer also Letter to the Editor, on p. 88 of this issue.]

ORIENTATION

FIRST ROCK ART SYMPOSIUM IN BOLIVIA
Cochabamba, 15–17 January 1988
ROY QUEREJAZU LEWIS

The Sociedad de Investigación del Arte Rupestre de Bolivia (SIARB) held its first rock art symposium in the Catholic University of Cochabamba, Bolivia, from 15 to 17 January 1988. The 30 participants included three foreign SIARB members: Dr Juan Schobinger, from the Institute of Archaeology and Ethnology, National University of Cuyo, Mendoza, Argentina; Professor Juan Chacama, from the University of Tarapacá, Arica, Chile; and Anne Ilelsley, from the University of Texas, Austin, U.S.A.

The papers given by the various participants covered different aspects of rock art research in Bolivia and the neighbouring countries. As a result of the three-day event a working panel proposed symposium resolutions covering different aspects of rock art research, documentation, protection, conservation and dissemination of the cultural value of rock art.

The third day concluded the event with an excursion to petroglyph sites near Cochabamba and a farewell luncheon in one of the principal restaurants of the city.

The Second Symposium on South American Rock Art organised by SIARB will be held in La Paz, Bolivia, from 13 to 16 January 1989. This second SIARB conference will include an exposition on rock art in the Ethnographic Museum, with an extensive documentation of the rock paintings at Chirapaca, La Paz. A special section of this Second Symposium will deal with rock art of the colonial period, others will cover new research on rock art of Bolivia and the neighbouring countries. Organiser of this symposium is Matthias Strecker, Secretary of SIARB, Casilla 3091, La Paz, Bolivia.

A new, enlarged editorial board of SIARB's publications was announced during the First Symposium in January 1988. It includes Matthias Strecker as chief editor, Dr C. N. Dubelaar (Haren, Netherlands), Dr Juan Schobinger (Mendoza, Argentina), and Professor Juan Chacama (Arica, Chile). In 1988 SIARB will edit its *Boletín No. 2* and the second issue of the series *Contribuciones al Estudio del Arte Rupestre Sudamericano*, that this year will cover a study of Argentinian rock art.

5-099□

SÉMINAIRE INTERNATIONAL REPRÉSENTATIONS PRÉHISTORIQUES
Art Préhistorique, Musée de l'Homme
Janvier – Mars 1988
DENIS VIALOU

22 Janvier:
M. le Pr. Duccio Bonavia, Universidad Peruana Cayetano Heredia, Lima: *Art rupestre au Pérou.*
M. le Dr Henri Duday, Laboratoire d'Anthropologie - Bordeaux I, et Michel Garcia, Laboratoire d'Anthropologie - Musée de l'Homme: *Montespan: Iconologie et contexte archéologique des oeuvres d'art.*
29 Janvier:
M. le Conservateur Ken Hedges, San Diego Museum of Man, Californie: *Origines chamaniques de l'art rupestre de l'Ouest Américain.*
M. Yves Martin, Conservateur de la grotte de Gouy: *L'art pariétal paléolithique de la grotte de Gouy.*
26 Février:
M. Jean Plassard, Conservateur de la grotte de Rouffignac: *Rouffignac: après 31 ans connaît-on la caverne et son art?*
M. le Dr Gilles Delluc et Mme Brigitte Delluc, U.A. 184 C.N.R.S.: *Le sang, la souffrance et la mort dans l'art paléolithique pariétal et mobilier.*
4 Mars:
Mme Ann Sieveking, British Museum: *Mode d'emploi de la décoration schématique dans le Magdalénien.*
M. Jean-Marc Bouvier, U.A. 133 C.N.R.S. et Mesdames Michelle Bouyssonnie et Michèle Cremades: *Bâton percé et gravé de la Madeleine. Etudes paléontologique, zoologique et technologique.*
10 Mars:
Séance organisée à Saint-Germain-en-Laye avec le concours de M. Henri Delporte, Mme Lucette Mons, M. Jean-Jacques Cleyet-Merle le matin, de Mlle Marylène Patou sur: *L'art rupestre d'Afrique australe.*
11 Mars:
M. Alfonso Moure Romanillo, Directeur du Museo arqueológico nacional de Madrid et M. le Pr. Rodrigo de Balbin Behrmann, Universidad de Alcalá de Henares: *Point sur la grotte de Tito Bustillo.*
Mme Primitiva Bueno, Département de Préhistoire de l'Université de Alcalá de Henares: *Statues-menhirs et stèles anthropomorphes de la Péninsule Ibérique.*
18 Mars:
Mme Sophie A. De Beaune, U.A. 275 C.N.R.S.: *Fonction et décor de certains utensiles paléolithiques en pierre.*
M. Jean-Loic Le Quellec: *Pierres de Ben Bârûr et Radnetzen.*
Dr Denis Vialou has been responsible for organising the above international lecture series entitled 'Prehistoric representations'. It was conducted at the Museum of Man, Paris, from 22 January to 18 March 1988.

5-100□

ROCK ART SESSION, ANNUAL MEETING OF THE SOCIETY FOR CALIFORNIA ARCHAEOLOGY
Redding, California
24–26 March 1988
E. BRECK PARKMAN

A four-hour session on California rock art studies was organised and chaired by E. Breck Parkman at which eight papers were delivered. The papers reported on various sites and study areas throughout California. They included (the names of AURA members are emphasised):

Revisiting CA-SBN-12, a Petroglyph Site in the Franciscan Complex near Hernandez Reservoir, San Benito County, California, Robert K. Mark, Evelyn B. Newman and Bruce W. Rogers. Recorded as a steatite quarry for bowl manufacture in 1950, CA-SBN-12 was later submerged beneath the waters of a reservoir. Recent drought conditions allowed the site to be visited again for the purpose of re-recording the quarry evidence. Extensive petroglyphs, including PCNs, incised lines and cupules, were found to abound at the site.

Notes on two Recently Recorded Rock Art Sites in Lake County, Patrick Peterson and Paul Peterson. This paper discussed CA-LAK-1577 and CA-LAK-1582. CA-LAK-1577 consists of a single schist boulder on which are numerous PCNs. CA-LAK-1582 is a rock art site including a concentric circle pictograph and a small grid of incised lines within a rockshelter above an 8000-year old occupation site. The concentric circle pictograph is thought to have possibly been a part of a winter solstice observatory.

Footprints of the First People: a Survey of Cupule Rocks in the Pit River Region, Floyd Buckskin and Arlene Benson. This paper described the less than twenty cupule sites known for the Pit River area, and evaluated the ethnographic data attributing several of them to the acquisition of power by Pit River men.

Pebble Art, E. Breck Parkman. This paper examined the archaeological and ethnographic evidence of pebble use among California Indian groups. Brightly coloured and unusually marked or shaped stones were seen to have been used as charms, while other pebbles were used as cooking stones, sling stones and rattle stones. Occasionally some pebbles were painted with geometric designs that may have facilitated their use as gaming tokens, or enhanced their imagined powers.

The Key-Stone Petroglyph Site, Mark Gary and Deborah McLear-Gary. The authors of this paper discussed CA-MEN-2200, a recently discovered petroglyph boulder in ethnographic Pomo territory. This elaborately carved boulder bears thousands of incised lines, cupules and concentric circles. The authors examined all cases of superimposition in deciding that the concentric circles had been the first elements carved on the rock, a probable fertility site.

Coso Rock Art and Archaeological Context: some new Observations, S. G. Botkin, Carolyn Shepherd and C. William Clewlow, Jr. This paper discussed recent archaeological survey in a previously unstudied portion of the Coso area. Unusually pristine archaeological site complexes were described, and rock art associated with these complexes was seen to be unusual in both element content and locational placement.

Unusual Pictography in Coso Rock Art, C. William Clewlow, Jr. and Carolyn Shepherd. The authors examined two atypical pictograph sites in the Coso area, characterised by non-local and non-traditional motifs and compositions. The examination of these two late period sites allowed for observations concerning some social and ritual aspects of late Coso rock art.

Boles Creek Rock Art: a Report on the 1987 Field Season, Arlene Benson. This paper reported on a recent project in which a Foundation for Field Research team surveyed for rock art along Boles Creek, in north-eastern California. Twelve new petroglyph loci were recorded, and the area's rock art was examined in order to determine whether it might shed light on the ill-defined boundary between the Pit River and Modoc Indians.

In addition to the presentation of the eight papers, the audience (approximately 120 in number) was delighted at the surprise exhibit of artist John Betts' rock art illustrations. John exhibited several of his almost-unbelievable works, including large-format illustrations of the Key-Stone (CA-MEN-2200) and Spyrock Road (CA-MEN-1912) Sites.

The session concluded with a short discussion by E. Breck Parkman of the upcoming AURA Congress in Darwin. Slides were shown of the Darwin area, and of Northern Territory rock art sites as an advertisement of the Congress. Additional information was distributed to interested members of the audience after the session ended.

5-101□

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ROCK ART ASSOCIATION OF MANITOBA FORMED

JACK STEINBRING

In February of 1988, the Manitoba Chapter of the Canadian Rock Art Research Associates underwent a major reorganisation. The parent organisation had been essentially non-functional for many years, and had structural characteristics which prevented a highly active and responsive venture. Among the latter were an exclusive focus on biennial conferences, without continuity, an organisational format which was inconsistent with the requirements of incorporation and, consequently, a non-incorporated status. The Manitoba reorganisation actually involved only one change, the name was altered in order to effect a legal, non-profit status. This was accomplished with the decision to rename the Chapter 'Rock Art Association of Manitoba'. Non-profit corporation status was accorded it on 1 April 1988. The constitution remained the same, and all but one of the members remaining from the former Chapter are still members of R.A.A.M. In addition, the membership has grown substantially, many of the new members being graduates of the University of Winnipeg's anthropology course entitled 'An Introduction to the Prehistoric Rock Art of North America'.

The officers of the organisation are:

Jack Steinbring, President
Gary Granzberg, First Vice President
Bob McNally, Second Vice President
Michael Daly, Secretary/Treasurer
Marjorie Meldrum, Editor

The organisation meets on the third Thursday of the month from September through April, at the University of Winnipeg. The Annual Meeting is in March. The first field trip was conducted on 7 May 1988 under the direction of Dr Tony Buchner of the Manitoba Historic Resources Branch. The provision of vehicles for this event was by the Manitoba Department of Culture, Heritage and Recreation. Points of interest on that field trip were the Lockport Site, the Whitemouth Falls Site, and the Bannock Point, Pine Point, MacCharles and Inverness Falls rock arrangement sites.

The organisation is deeply involved in two critical conservation problems, one concerning the most northerly rock painting site in the mid-continent which is being flooded by northern dam projects, and the second, the threat of a granite quarrying venture near Canada's largest rock arrangement site in the Whiteshell Park. Both sites are of international significance.

The future prospect of a field recording school is being contemplated, along the lines of several in the United States. Hopefully this would be a fully accredited, university-based school, and as such the first in Canada.

A major project, to be completed by September 1988, is the compiling and publication of the entire rock art inventory for Manitoba. It will be published in the September issue of *The Rock Art Association of Manitoba Newsletter*.

The mailing address for the Rock Art Association of Manitoba is:

c/o Department of Anthropology
University of Winnipeg
515 Portage Avenue
Winnipeg, Manitoba R3B 2E9
Canada.

5-102□

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ROCK ART ASSOCIATION OF HAWAII FORMED

RAAH, the Rock Art Association of Hawaii, has just been formed in Honolulu. The purpose of the new organisation is to promote and work toward the conservation and maintenance of Hawaiian rock art, fostering through education its appreciation and understanding.

The objectives of RAAH are to:

(1) Develop a model conservation program for rock art.
(2) Inventorise all rock art sites in Hawaii.
(3) Record all Hawaiian rock art.
(4) Seek determination and nomination of selected rock art sites to the State and National Historic Sites Registers.
(5) Develop conservation and maintenance guidelines for all property owners whose land contains rock art.
(6) Work toward development of a statewide rock art education program.
(7) Increase knowledge and understanding of rock art through scholarly activities and research.
(8) Act as a resource for the dissemination of information on rock art.
(9) Help facilitate curatorship of rock art sites including periodic observation and inspection.
(10) Act as a liaison for other agencies and organisations, both public and private, in all matters related to rock art and rock art sites.

For enquiries write to:

RAAH
666 Prospect Street, #305
Honolulu, Hawaii
U.S.A.

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THE ROCK ART ARCHIVE UNIVERSITY OF CALIFORNIA, LOS ANGELES

The Rock Art Archive, a specialised research facility of the Institute of Archaeology, is in its tenth year of operation. The Archive has been supported by grants and external funding, and George and Helen Michaelis established a generous endowment fund in 1987 to sustain the Archive's activities. This assures basic operating costs without regular university funding, and guarantees that the Archive will be a permanent part of the Institute of Archaeology.

The Curator of the Archive, Helen Michaelis, keeps the facility open on weekday mornings and by appointment for special research needs. This is a unique resource (the only collection of its kind in North America), and an outstanding source of reference material for anyone requiring data on rock art. It is extensively used by foreign scholars as well as Californians. The Archive provides research data for graduate students, field workers, and theses in archaeology, art history and related studies. The Archive has also sponsored and supported publication of a number of volumes dealing with rock art.

While the documentation in the Archive is strongest for rock art sites in the western United States, extensive files of original slides and field data are constantly being acquired for many other regions including Mexico, Chile, Australia, Canada, France and other countries. Much of the documentation is invaluable and not available anywhere else, in some cases dating back to field records made more than 60 years ago. Several of the world's leading rock art scholars have contributed originals or copies of

their records, in some cases amounting to thousands of photographs and slides and many volumes of documentation.

The fiscal stability gained from the 1987 endowment has already stimulated contributions of additional research material from scholars who see the Rock Art Archive as the best place for housing their data, and has also stimulated additional cash contributions from other donors who are aiding to increase the endowment fund so that a more extensive research and publication program can be sustained.

Rock Art Archive
The Institute of Archaeology
University of California, Los Angeles
Los Angeles, CA 90024
U.S.A.

DARWIN 1988

Third Announcement

First AURA Congress

Darwin, 29 August to 2 September 1988

ACADEMIC PAPERS (PRELIMINARY LIST)

In presenting this preliminary list of academic papers that are to be given at the First AURA Congress it is emphasised that only those are listed that had been processed and were with the respective symposium chairs in early May 1988. Many more are still being received, the closing date for submitting oral presentations is 15 June 1988. The following schedule excludes the oral presentations of plenary sessions, and presentations of films, videos and posters, which will be listed in the precongress publications, immediately before the congress.

In this preliminary schedule, papers are listed at random within each symposium, and there may still be some reallocations to be effected. Many papers will include films or videos, most include slide presentations. Papers delivered in a foreign language will be followed by an English synopsis. All papers are to be offered for debate, and presenters will respond to questions from the audience. The final program of all papers will appear in the precongress publications, listing the time of presentation and complete abstract of each one. Copies of precirculated papers will be available at the congress, prior to presentation.

It is to be noted that there is no closing date for film, video and poster submissions as these are not accommodated in the structured academic sessions. Such submissions will be accepted up to and including on Registration Day, 28 August. In addition, some late oral presentations may be accepted, subject to approval from one of the symposium chairs (e.g. where a programmed presentation had been cancelled).

SYMPOSIUM A - ROCK ART STUDIES IN THE OLD WORLD.
Chaired by Dr Michel Lorblanchet (France) and Professor Chen Zhao Fu (People's Republic of China).

Dr Karl Heinz STRIEDTER, Federal Republic of Germany. Rock art research on the Djado Plateau, Niger.
Dr Yashodhar MATHPAL, India. Rock art studies in India.
Professor CHEN Zhao Fu, People's Republic of China. The discovery of rock art in China.
Masaru OGAWA, Japan. The depiction of the human figure in Spanish Levantine art.
Erwin NEUMAYER, Austria. Indian rock paintings and bruisings.
Professor Margarita BRU, Spain. The bull representation and myth.
B. D. NANDADEVA, Sri Lanka. Vedda rock drawings: an introduction to the rock art of the Sri Lankan aborigines.
Drs Dirk Lucien HUYGE, Belgium. Rock art and the archaeological record in upper Egypt.
Dr Yusuf M. JUWAYEYI, Malawi. The state of rock art research in Malawi.
Dr Michel LORBLANCHET, France. The finger marks of Pech Merle and the beginning of the art.
Dr Tewari RAKESH, India. Rock paintings of Mirzapur, India.
C. E. THORNYCROFT, Zimbabwe. Rock art of Zimbabwe.
Dr Vishnu S. WAKANKAR (in absentia by a colleague), India. Rock painting in India.
Meenakshi DUBEY, India. Rock paintings of Pachmarhi Hills of India.
Professor Fabrizio MORI, Italy. The prehistoric art of the Sahara: its value and meaning.
TANG Hui Sheng, People's Republic of China. Tibetan rock art.
Gajendra S. TYAGI, India. The decorative intricate design patterns in Indian rock art.
Professor François SOLEILHAVOUP, France. L'art rupestre au Sahara - importantes découvertes dans les Tassilis du Hoggar, Algérie.
Dr Giriraj KUMAR, India. Engraved ostrich eggshell objects: new evidence of Upper Palaeolithic art in India.

SYMPOSIUM B - ROCK ART STUDIES IN THE AMERICAS.
Chaired by Professor Jack Steinbring (Canada) and Professor Niéde Guidon (Brazil).

Professor Clement W. MEIGHAN, U.S.A. Central American rock art as seen from the site of La Española, Costa Rica.
María M. PODESTA and Carlos ASCHERO, Argentina. Approaches to Argentinian Puna rock art.
Professor B. K. SWARTZ, Jr, U.S.A. A survey of Klamath Basin petroglyphs and pictographs.
Dr Agueda VILHENA VIALOU, France. Rock art representations and prehistoric settlements in Mato Grosso, Brazil.
Dr J. Eldon DORMAN, U.S.A. Prehistoric Indian rock art of the San Rafael Swell, Utah.
Professor Gabriela MARTIN, Brazil. The Seridó rock painting subtradition.
Dr C. N. DUBELAAR, Netherlands. Stylistic affinities of Lesser Antillean petroglyphs.
Professor Niéde GUIDON, Brazil/France. Rock art traditions in north-eastern Brazil.
Dr Anne-Marie PESSIS, France. Graphic presentation systems in rock art of Piauí, Brazil.
Roy QUEREJAZU LEWIS, Bolivia. Bolivian rock art.
Professor Eloy LINARES MÁLAGA, Peru. Arte rupestre en el antiguo Perú - modalidades, epocas, culturas.
Dr Robert K. MARK and Evelyn B. NEWMAN, U.S.A. Concentric circle petroglyphs: northern California and beyond.
Keo BORESON, U.S.A. Methods and materials for manufacturing petroglyphs and pictographs in the interior of the Pacific Northwest, U.S.A.
E. Breck PARKMAN, U.S.A. California Dreamin': cupule petroglyph occurrences in the American West.
Dr André PROUS, Brazil. Stylistic modifications and economic changes in Peruaçu valley, Brazil.
Maria ONETTO, Argentina. Stylistic sequence of rock art in the valley of Piedra Parada, Argentina.

SYMPOSIUM C - ROCK ART STUDIES IN AUSTRALIA AND OCEANIA.
Chaired by Dr Josephine M. Flood (Australia) and Josephine McDonald (Australia).

Dr Matthew SPRIGGS, Australia. Southern Vanuatu rock art.
Elizabeth HATTE, Australia. The rock art of the Burdekin River region, north-east Queensland.
Professor Wilhelm G. SOLHEIM, II, U.S.A. A new area of rock paintings in Irian Jaya, Indonesian New Guinea.
Josephine McDONALD, Australia. Rock art in the Sydney Basin - a regional art style.
Dr Michel LORBLANCHET, France. The rock engravings of Gum Tree and Skew Valleys, Dampier, Western Australia.
Chris BALLARD, Australia. An Austronesian rock art tradition in western Melanesia?
Evelyn B. NEWMAN and Dr Robert K. MARK, U.S.A. Three geographically and artistically diverse rock art sites in Papua New Guinea.
Noelene COLE and Percy TREZISE, Australia. A new engraving style for Laura?
Dr Josephine M. FLOOD, Australia. Rock art of Koolburra, Cape York Peninsula.
Hilary SULLIVAN, Australia. Rock engravings in Kakadu National Park.

SYMPOSIUM D - THE ROCK ART OF NORTHERN AUSTRALIA.
Chaired by Hilary Sullivan (Australia), co-chair to be decided.

Paul S. C. TAÇON, Australia. Somewhere over the rainbow: an ethnographic and archaeological analysis of recent rock paintings in western Arnhem Land, Australia.
W. PEDERSEN, Australia. Rediscovering rock art documented by the Gregory Expedition in 1856.

Dr David M. WELCH, Australia. Kakadu Dreaming: ancestral heroes in the rock art of the Kakadu region.
Ivan P. HAŠKOVEC, Australia. Regional art in Kakadu National Park.
Noelene COLE, Australia. 'Human' figures in the rock art of Jowalbinna.
Bruno DAVID, Australia. Spatial organisation of rock art in the Chillagoe region, north Queensland.

SYMPOSIUM E/P - RECORDING AND STANDARDISATION IN ROCK ART STUDIES.
Chaired by Professor B. K. Swartz, Jr (U.S.A.).
William D. HYDER, U.S.A. Multidimensional scaling in rock art studies: California examples.
Clifford OGLEBY, Australia. The application of photogrammetry to recording rock art sites.
Paul FAULSTICH, U.S.A. A rock art replica at the Southwest Museum: a step toward preservation?
Cynthia STILES-HANSON, U.S.A. A race against time: documenting petroglyph sites in western Wisconsin.
Clifford OGLEBY, Australia. The creation of a graphical data base of rock art sites, Cape York region.
Professor B. K. SWARTZ, Jr, U.S.A. Levels of rock art recording.
Robert G. BEDNARIK, Australia. Standardisation in rock art terminology.
Professor B. K. SWARTZ, Jr, U.S.A. Archival storage of digitised rock art photographs.

SYMPOSIUM G - ROCK ART AND PREHISTORY.
Chaired by Dr Paul G. Bahn (United Kingdom) and Dr Andrée Rosenfeld (Australia).
Dr M. J. MORWOOD, Australia. The archaeology of art in the north Queensland highlands.
Professor Francesco G. FEDELE, Italy. Towards an ecology of rock art.
Kelvin L. C. OFFICER, Australia. A direct date from a burnt ochre painting, south-eastern N.S.W.
Dr Fidelis T. MASAO, Tanzania. In search of the meaning of the rock art of central Tanzania - an ethnoarchaeological approach.
Patricia M. BASS, U.S.A. Rice University's Pecos Rock Art Project.
Professor Denis VIALOU, France. Palaeolithic cave art arrangements as symbolic expressions of ethnic groups.
Nicholas J. WALKER, Botswana. The spatial organisation and development of the rock art of the Matopos, Zimbabwe.
Dr Robert LAYTON, United Kingdom. What do we really know about prehistoric rock art?
Susan A. JOHNSTON, U.S.A. Spatial analysis of prehistoric Irish petroglyphs.
Josephine McDONALD, Australia. Theoretical considerations and methodological procedures in the analysis of two art components.
Peter J. JACKSON, United Kingdom. Cup and ring marks of British Isles and Galicia - chronology and symbolic system.
Masaru OGAWA, Japan. Rock engravings in Fugoppe Cave, Japan.
Steve BROWN, Australia. Tasmanian rock art: a regional overview.
Dr André PROUS, Brazil. Pictogram dating in Santana do Riacho rockshelter, Brazil.
Bruno DAVID, Australia. Rock pictures of the Chillagoe region of north Queensland, Australia.

SYMPOSIUM H - ROCK ART AND ETHNOGRAPHY.
Chaired by Dr M. J. Morwood (Australia) and Dr Patricia Vinnicombe (Australia).
Professor Megan BIESELE, U.S.A. Further light on 'Animals de Passage': !Kung *N/um k'xausi* statements and modern !Kung mythology.
Dr Sudha MALAIYA, India. Hand-in-hand dancing in Indian rock art and its continuities.
Richard G. KIMBER, Australia. Scratching the surface: towards an understanding of central Australian art.
Dr F. N. ANOZIE, Nigeria. Rock art, mural art and Uli body decoration in Africa.
Professor CHEN Zhao Fu, People's Republic of China. A brief account of mask engravings in China.
Dr Josephine M. FLOOD, Australia. Rock art and ethnography in the land of the Lightning Brothers.
Dr K. C. TRIPATHY, India. Rock art and ethnographic parallels in Orissa.
C. E. THORNYCROFT, Zimbabwe. The trance dance: continuity of tradition from ancient to modern San.
Carol PATTERSON, U.S.A. Pueblo Indian myths and symbology in petroglyphs.
Sarah R. L. SHEMPEMBA, Tanzania. Evidence of hunting in the rock art of central Tanzania.
Dr Osaga ODAK, Kenya. Cup mark patterns as an interpretation strategy in southern Kenya petroglyphs.
Darrell LEWIS, Australia. Cultural significance of Victoria River rock art.
Paul FAULSTICH, U.S.A. Of earth and Dreaming: integration in Warlpirl art.
Dr Malika HACHID, Algeria. Le site rupestre de Tiout (Atlas saharién), magie ou religion?
Paul S. C. TAÇON, Australia. 'If you miss all this story, well bad luck': rock art and the validity of ethnographic interpretation in western Arnhem Land, Australia.
Carol PATTERSON, U.S.A. Uretsete and Naotsete genesis myth petroglyph.
Dr Patricia VINNICOMBE, Australia. Rock art in the western Kimberley: material property and spiritual reality.
Dr Osaga ODAK, Kenya. Ethnographic contexts of rock art: role, attitudes to, interpretation and discovery of rock art in east Africa.

SYMPOSIUM K - ARCHAEOPSYCHOLOGICAL INTERPRETATION OF ROCK ART.
Chaired by Professor Whitney Davis (U.S.A.).
Professor John HALVERSON, U.S.A. Palaeolithic art and cognition.
Dr Kingsley PALMER, Australia. Indigenous art and the limits of Social Science.
Professor Jack STEINBRING and Dr Gary GRANZBERG, Canada. Elemental analysis in pursuit of perceptive function in rock art.
Arlene BENSON, U.S.A. The light at the end of the tunnel.
Dr Margaret BULLEN, Australia. Decoding the signs of women.
Patricia BASS, U.S.A. Semiotic models for west Texas rock art.
Professor Heinz HUNGER, Federal Republic of Germany. Ceremonial sex in rock art.
Carol PATTERSON, U.S.A. Styles, art and symbology: a look at the term 'rock art' versus 'rock writing'.
Dr Frederick LEVINE, Australia. Hands of the ancient ones: symbol formation and cultural identity in the prehistoric Southwest.
Linda SEHGAL, U.S.A. Climbing Jacob's Ladder: symbolism of a fantastic journey along the Milky Way.
Dr Jarl NORDBLADH, Sweden. Meanings from petroglyphs and space: a study in rock carvings from the Swedish coast.
Professor Helen H. SCHUSTER, U.S.A. Shamanism, altered states of consciousness, and rock art.
Robert G. BEDNARIK, Australia. Art origins.
Dr Karl Heinz STRIEDTER, Federal Republic of Germany. Ideograms in north African and Saharan rock art.
Paul FAULSTICH, U.S.A. Massaging the earth: a psychoarchaeological interpretation of Pleistocene parietal art.

SYMPOSIUM L - PICTURES AND HUMAN BEHAVIOUR.
Chaired by John Clegg (Australia).
Paul S. C. TAÇON, Australia. Does 'art' exist? Problems encountered when describing what has been termed 'art' in traditional Aboriginal and contemporary Western societies.
Professor Francesco G. FEDELE, Italy. High-altitude, historical engravings in the Alps: behaviour and context.
Professor Michael GREENHALGH, Australia. Attitudes to 'primitive' art, 1600-1900.
Professor B. K. SWARTZ, Jr, U.S.A. Marker signs: an example of locational analysis.
Kelvin L. C. OFFICER, Australia. What's in an anthropomorph?
Professor Jan B. DEREGOWSKI, United Kingdom. Some psychological speculations on the origin of artistic styles.
Professor Robert E. CONNICK and Dr Frances CONNICK, U.S.A. A summer solstice petroglyph site.
Professor Heinz HUNGER, Federal Republic of Germany. Sacred rocks and the emergence of their spirits.
Andrew LEE, Australia. Hip hop graffiti in the Sydney cityscape.
Kelvin L. C. OFFICER, Australia. The edge of the sandstone - what makes style change? (South eastern N.S.W.)
Alexandra RIVERS, Australia. Pictorial records of Sydney Aborigines 1788-1792.

SYMPOSIUM M/N - CONSERVATION AND SITE MANAGEMENT.
Chaired by Dr Colin Pearson (Australia) and Dr Alan Watchman (Australia).
Jacques BRUNET, Professor J. VOUVÉ and P. VIDAL, France. La grotte des Combarelles (Les Eyzies): apports de la connaissance de l'environnement a la conservation des gravures.
Dr Eric W. RITTER, U.S.A. Conservation and protection within the American Rock Art Research Association.

Ivan P. HAŠKOVEC, Australia. Preservation and conservation of rock art in Kakadu National Park.
Hilary SULLIVAN, Australia. Site management in Kakadu National Park.
Paul FAULSTICH, U.S.A. From ashes to gravestones: the charcoal drawings of Gua Badak, Malaysia.
Peter RANDOLPH and Joe WALLAM, Australia. Bunburi Cave, North West Cape, Western Australia: planning for tourism.
Professor François SOLEILHAVOUP, France. L'évolution micromorphologique des surfaces d'art rupestre dans le monde; altération et conservation.
Desmond COULTHARD, Australia. Rock art conservation in South Australia.
Dr Robert K. MARK and Evelyn B. NEWMAN, U.S.A. Some observations on rock art conservation in Spain.
Robert G. BEDNARIK, Australia. The Paroong Cave Preservation Project.
David LAMBERT, Australia. Conserving Australian rock art.
Pierre VIDAL, France. La grotte des Combarelles aux Eyzies: aménagement et contact direct du public avec les oeuvres pariétales.
Alex APOSTOLIDES, U.S.A. The Storyteller Women Panel, Alamo Canyon - an endangered site.
Dr Colin PEARSON, Australia. Training in rock art conservation.

SYMPOSIUM O - RETOUCH: AN OPTION TO CONSERVATION?
Debate session chaired by Dr Graeme K. Ward (Australia).

All presenters of papers are asked to peruse this schedule to check that their submission(s) has (have) been included. If their work has been submitted prior to April 1988 but is not listed here, a copy of the abstract should be immediately sent to the Editor.

FIELD TRIPS

In addition to the package tours listed in the official program of field trips (Second Announcement) there will be various privately arranged field trips available. The itineraries of three of them have been finalised:

THE GRAND TOUR OF THE TOP END, led by George Chaloupka (N. T. Museum anthropologist, Co-chairman of congress) and the Northern Territory Conservation Commission. Approximately 9 days duration, camping, and travelling in private or hired vehicles. This field trip will include numerous rock art sites in Arnhem Land (the full sequence of Arnhem Land Plateau rock art will be shown), Kakadu National Park, Wardaman country, the 'best' sites at Victoria River and Keep River National Park. It has been proposed to connect it with the planned Kimberley - Pilbara tour, as the trip will end close to the Kimberley region.

Itinerary: On the first day from Darwin to Oenpelli, Arnhem Land, visit sites, camp on East Alligator River. Second day Ubirr, Ngarradj, Malakunany, camp on way to Nourlangie Rock. After the third day (at the Nourlangie sites) to Cooinda camping ground (motel available). Day 4 to Christmas Creek sites, then on to Katherine. On the fifth day to Ingaladdi waterhole, one or two days at Wardaman art sites, then one day at the Victoria River Crossing sites, and on to the Keep River sites the following day. From here, participants would either return to Darwin, or proceed to Kimberley sites, and ultimately to the Pilbara.

Transport: the trip is designed for conventional vehicles, but there will be occasional 'ferrying' with 4-wheel drive vehicles. The convoy will consist of three 'official' vehicles (including a transport truck for luggage), and privately owned vehicles and hire cars, including large wagons, air-conditioned minibuses and others.

Accommodation: participants to supply own camping gear, which can be hired in Darwin. One vehicle rental company also provides camping equipment and may well be selected. For one or two nights, the option of staying at a motel would be available for those wishing to do so.

General: the tour includes no long hikes or traversing of excessively difficult terrain, but reasonable physical fitness is required. Participants should have camping experience, and have an appreciation of the demands of prolonged camping in an extremely remote region. People wishing to terminate their participation could, at any time, return to Darwin, provided they have transport.

The number of participants of this field trip is not limited, and the itinerary would be most flexible. This tour will commence early on Sunday, 4 September, and will finish on Monday, 12 September, at Keep River. Participants not continuing on the Kimberley-Pilbara tour (see below) will return to Darwin either on the evening of the 12th, or on the following day.

Costs: transport costs would be in the vicinity of $A150 to $A200 per person (hire vehicle). Add to this the cost of hiring camping gear, where required, plus food and film.

KAKADU STAGE III TOUR, led by Ben Gunn (archaeologist and rock art specialist) and David Cooper (Aboriginal Sacred Sites Authority), with the assistance of Hilary Sullivan and Ivan Haškovec (A.N.P.W.S.). This field trip will relate to one of the papers presented at the congress (Gunn et al.), and visits of highly restricted sites will be conducted in the presence and under the control of senior Aboriginal custodians. One of the purposes of the excursion is to emphasise the role of rock art in contemporary Aboriginal thought. There will be certain restrictions on participants which may include the banning of photography of sacred motifs, for example. Participation will be limited to bona fide rock art researchers who have an appreciation of traditional ownership of rock art, and of the privilege offered to them by permitting this visit.

The number of participants of the Kakadu Stage III Tour is limited to ten. It will commence early on 6 September from the congress venue, there will be an overnight camp in the bush, and participants will return to Darwin on the evening of 7 September. The cost will be $A200 per person.

VICTORIA RIVER DISTRICT TOUR, led by Howard P. McNickle (rock art specialist and photographer). 4 days duration (from Katherine), camping, travelling in private/hired vehicles. The Victoria River is a still largely unexplored major rock art concentration, and McNickle has recently conducted two six-months reconnaissance expeditions into this vast region. In contrast to the rock art at the 'Top End', which consists largely of paintings, in the V.R.D. paintings and petroglyphs frequently occur together, and many sites are truly spectacular.

Itinerary: Day 1 - depart Katherine (which is 3-4 hours' drive from Darwin), 200 km to Innesvale Homestead, visit two major rock art complexes, drive 90 km to Victoria River, overnight at camping ground (all facilities). Day 2 - visit sites, then 200 km drive to Revolver Springs, make camp. Day 3 - visit several sites, some walking, climb escarpment, drive 90 km to Keep River National Park, overnight at Park camping ground. Day 4 - view three site complexes (9 km of mostly flat walking), possibly a fourth, return to Katherine.

Transport, accommodation and general: refer to 'Grand Tour' above, except that there are few motel options. There are a few 'basic' motel units at Victoria River Crossing and at Timber Creek, but camp sites are good, usually with water available. There is no limit on participant numbers.

The postcongress V.R.D. Tour will commence in Darwin on 6 September (allowing participants to do the Kakadu Conservation Tour) and should end at Darwin late on 9 September. If there is adequate interest, a similar field trip will be conducted before the congress, from 24-27 August. Participants who express interest in this precongress tour (on back of membership renewal form 1988) will be contacted by us individually, and if the tour proceeds will meet in Darwin on 23 August.

Costs: transport, based on hire vehicle, would cost between $A100 and $A150 per person, from Darwin. Add to this the cost of hiring camping gear, where applicable, and food, film.

KIMBERLEY - PILBARA EXPEDITION: Details will be finalised in Darwin during the congress, by the participants. The tour will commence from Keep River, at the conclusion of the Grand Tour of the Top End, on 13 September. All vehicles will need to have 4-wheel drive. The tour is being planned with the help of the Department of Aboriginal Sites, Western Australian Museum, and will cover Wandjina sites in the Kimberley and numerous petroglyph sites in the Pilbara. A duration of about two weeks is planned, and participants not driving would have the opportunity of flying to Darwin or Perth (probably from Dampier) on conclusion.

There is no limit on the number of participants, transport will be by private or hired vehicles, accommodation would be camping, and occasionally in motel, where desired. Costs would be on a cost-sharing basis, perhaps in the order of $A400-500 per person. Participants will hold a meeting in Darwin during the congress.

THE ARNHEM LAND TOUR announced in the preliminary Congress Program (*RAR* 4: 177) will not proceed.

BASIC INFORMATION FOR THE TRAVELLER

Darwin is located within the tropics, and the Congress is held during the 'dry period' of the year. This means that it will be characterised by warm and moderately humid climate, with rain being extremely unlikely, though still possible. Temperatures will

be between 21°C and 32°C (70°F and 90°F) and it would be quite pointless to take along any heavy, warm clothing as the temperature will certainly not fall below the above minimum (unless travelling in southern Australia). Light clothing is required, shorts are acceptable 'formal' attire in Darwin. All congress venues and accommodation establishments are airconditioned. For the field trips, hiking shoes and a wide-brimmed hat will be appreciated by those wearing them. It is useful to bring along a pair of binoculars, in view of the wildlife likely to be encountered, and the inaccessibility of some rock art.

Overseas visitors are reminded that in Australia tipping of taxi drivers and hotel personnel is not customary.

GENERAL ANNOUNCEMENTS

Publishers and producers of any literature about rock art, prehistoric art and related subjects are reminded that the First AURA Congress will comprise a book exhibition. An exhibition area will be set aside for this purpose, and may be open to the public.

The draft constitution for AURA, required for the First General Meeting, has been published in *AURA Newsletter* 5/1, April 1988. This draft, or an amended version of it, will be presented for adoption at the meeting on 2 September 1988.

For comprehensive details about all aspects of the congress, refer to previous announcements in *RAR* and *AURA Newsletter*.

REGISTRATIONS for congress participation will be accepted right up to 28 August. Registration fees are $A100 for AURA members, $A50 for student members, and $A150 for non-members. Registration forms are available from the Editor, from members of the Executive Committee, and from the North American Subcommittee.

QANTAS Airways Limited, Australia's international airline, has been appointed the international airline for the first AURA Congress.

RELATED EVENTS. Six conferences are in some way related to the AURA Congress (through subject and/or venue) and their attendance can be combined with that of the AURA Congress. They are the Meeting of the ICOM Working Group on Rock Art Conservation (convened by Dr Andrée Rosenfeld), the First General Meeting of AURA, the CAR Meeting, the Fifth International Conference on Hunting and Gathering Societies, the Eighth National Aboriginal Sites Authorities Committee Meeting, all in Darwin, and the First World Archaeological Congress's Inter-Congress, in Port Moresby, Papua New Guinea. For details refer to *AURA Newsletter* 5/1, April 1988, and to previous announcements.

EXHIBITIONS/DEMONSTRATIONS. A most generous grant from the Australian Institute of Aboriginal Studies will meet the substantial costs of staging Aboriginal dance performances and demonstrations by tribal rock artists. It is intended to erect an artificial rock wall in the Beaufort Congress Centre, and congress participants will be able to observe the techniques of traditional artists. This event, a truly rare opportunity, will be hosted by anthropologist George Chaloupka. Artists will be available for questions and discussion.

The Congress Executive Committee, the Chairs of the eleven symposia and the Congress Chairmen will all be delighted to welcome you in Darwin. We are confident that Darwin 1988 will be the great event we have planned it to be.

My most sincere thanks to all who have contributed to the preparations for the AURA Congress.

Robert G. Bednarik

5-103

Notices

INDIAN ROCK ART RESEARCH ASSOCIATION: Attempts to form IRARA are under way, but Dr V. S. Wakankar's sudden death (obituary in November issue) has been a major setback in these developments.

DR J. ELDON DORMAN, of Price, Utah, has been awarded the prestigious Certificate of Commendation presented by the American Association for State and Local History.

DR C. N. DUBELAAR, At Haren, Netherlands, has won the Pieter de la Court Award 1987, for his dedicated and outstanding work in rock art research. This is awarded annually by the Royal Netherlands Academy of Sciences.

DR WILLIAM BREEN MURRAY, Monterrey, Mexico, has won the Castleton Award for 1988.

The symposium THEORY AND METHODOLOGY IN ROCK ART RESEARCH will be included in the section Archaeology and Pre-Columbian History of the 46th International Congress of Americanists, to be held from 4 to 8 July 1988 in Amsterdam, Netherlands. The symposium will be chaired by Dr C. N. Dubelaar and Mario Consens.

EDITORIAL BOARD: Roy Querejazu Lewis, of Bolivia, has accepted a position on the editorial board of this journal. He is the President of SIARB.

SENIOR LECTURER GRADE 2, CONSERVATION OF ROCK ART. A temporary position (October 1988 to end of 1989) is available for a suitable person to direct the one-year Graduate Diploma Course in the Conservation of Rock Art to be offered jointly by the Canberra College of Advanced Education and the Getty Conservation Institute (refer page 66, this issue). For further information contact: Dr C. Pearson, Cultural Heritage Science Division, Canberra College of Advanced Education, P.O. Box 1, Belconnen, A.C.T. 2616, Australia. Telephone (062) 52 2368. Closing date 15 July 1988. Ref. No. 88/2069.

Letter to the Editor

Dear Sir,

We would like to call the attention of your readers to the potential hazards to rock art that could result from imitation of photographic techniques seen in *Marks in Place*, a book of photographs and essays on rock art recently published by the University of New Mexico Press. The book features a dramatic cover photograph by Steve Fitch of a rock art site illuminated by a nearby campfire. Inside are several more photos by Fitch with one or more fires shown in close proximity to well-known Utah and New Mexico rock art panels, including the 'Holy Ghost' panel in Horseshoe Canyon, the Rochester Creek petroglyphs, and Sego Canyon and Sheik Canyon rockshelters.

As Frank Bock noted in an editorial in *La Pintura*, rock art conservationists have reason to fear others will attempt to emulate Fitch's highly questionable practices. Any fire, even a small one, has the potential of harming fragile rock art panels, either by spalling caused by sudden temperature changes or by smoke damage. Furthermore, a fire on an archaeological site would probably interfere with future dating of the associated remains.

In consultation with ARARA's Conservation and Preservation Committee Chairman Eric Ritter I learned that committee member John Noxon had objected to the Fitch photographs when they were first shown in the 'Visions of the West' exhibition touring the western states in 1986. Noxon persuaded the exhibition curator to include a statement to the effect that the use of fire as lighting for photographing archaeological resources, which include rock art sites, is strictly prohibited on public and Indian Lands in the United States under the provisions of the Archaeological Resources Protection Act of 1979.

Despite the history of controversy over the Fitch photographs, the book contains no caveat regarding the use of fires on or near archaeological sites. The publisher has so far shown no inclination to accept our suggestion that a notice of possible damage to rock art through such illegal fires be inserted in any further shipments of the book and in future advertising.

We are presently preparing a statement to be mailed to State Archaeologists and American rock art site managers in the National Park Service, the National Forests and the Bureau of Land Management to alert them to the possibility of a new fad for 'rock art by firelight', encouraged by the *Marks in Place* publication and its sales promotion.

Further action by ARARA will be on the agenda at our annual meeting on 29 May 1988 in Ridgecrest. Although the book also contains a fine essay by Polly Schaafsma and poignant photographs by John Pfahl showing the location of rock art sites drowned by dammed rivers, we hope people concerned with rock art conservation and protection will boycott the book until such time as the publisher agrees to attach a warning notice to copies of the book sold in the future. Letters may be addressed to Elizabeth Hadas, Director, University of New Mexico Press, Albuquerque, New Mexico 87131, U.S.A.

Sincerely yours,
Helen K. Crotty, President
American Rock Art Research Association

5-104

[Refer book review on pages 81 and 82, this issue.]

NOTES FOR CONTRIBUTORS

Manuscripts of research papers should preferably be from 2000 to 5000 words. Longer articles will be considered on the basis of merit. Submissions should contain the original, together with one copy, typed in double-space, with a five centimetre margin on one side of each page. Please underline words to be italicised, and identify each page by number and the author's surname. The content of the paper should be outlined by three to five key words (e.g., 'Petroglyphs - patination - style - Pilbara') placed above the title.

Footnotes ought to be avoided where possible. The bibliography and references in the text should follow the conventions established in most Australian archaeological and anthropological journals, following the style indicated in this issue.

If line drawings are included, they must be larger than the intended published size (by a factor of about 1.5 to 2) and line thicknesses, stippling, lettering sizes, etc. must be selected accordingly. Photographs should be black and white gloss prints of high contrast. Captions (on a separate sheet) are required for all illustrative material, together with an indication in the text as to where they, and any tables and schedules, are to be placed.

There are no formal deadlines, but material intended for a particular issue ought to be available about three months before publication. Galley proofs will not be issued. Each author, or group of co-authors, will receive thirty free copies of their article; additional copies are available at cost.

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