THE DIGGING STICK

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THE MISSING DIMENSION: SHAMANISM IN HUMAN EVOLUTION

Bob Forrester

If the Out of Africa hypothesis is correct (now that we have supporting DNA evidence it does seem incontrovertible), it is in Africa that we shall find clues that point to the earliest manifestations of 'spirituality' – if only we can spot them. The problem is that we do not know what they may look like.

D Lewis-Williams & D Pearce in *San Spirituality: Roots, Expression, and Social Consequences*

We have all watched a dog dreaming – its feet twitching, tail wagging, nostrils sniffing keenly. The dog dream amuses but it indicates something much deeper. All mammals dream, and so would have *Homo erectus.* But of what did they dream? The question cannot be answered definitively, but a hypothetical reconstruction of how complex culture began and then developed is possible, starting with dreams. Some *H. erectus* dreams would have included dead family members. Around 1,9 million years ago, when the species began, familiar faces in dreams would probably have been mute, or nearly mute, because language would likely have been rudimentary.

As the Early Stone Age unfolded hunting and tracking techniques would have become increasingly sophisticated, language co-evolving with them. Hunting would have involved periods of tracking prey that were frequently out of sight. Late *H. erectus* hunter-trackers would have frequently been dealing with complex hypothetical situations. What had the prey done? Where was it? What was it likely to do? What had happened in previous similar situations? What was the best strategy? Skilled tracking was probably the beginning of complex evidence-based explanations – communicated through speech – that could be used to explain the present and predict future events (Liebenburg 2013).

By around 320 000 years ago years ago language in Africa had developed sufficiently that a tipping point was reached: ancestors in dreams were speaking and could be understood. Late *H. erectus* then applied hunter-tracker logic to dreams (what you

Fig. 1: Small, light, sharp and specialised flaked tools alongside an all-purpose Acheulian hand axe (Bob Forrester)

OTHER FEATURES IN THIS ISSUE

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see is real but needs interpretation) and made a crucial assumption: at death they lost their bodies but continued living in another reality. Familiar faces of dead family members in dreams were the evidence: they could see, hear and communicate with them.

This would have allowed assumptions to unfold. Freedom from the physical limitations imposed by bodies allowed ancestors to go and find out where the animals were and then relay the crucial information back in dreams. Probably, ancestors were believed to be able to go to the future and reveal the true causes of problems, which could then be remedied. This formed an ordinary daily reality and an invisible – yet far more powerful reality – inhabited by ancestors and spirits, in effect the power reality. Accessing the apparently vital information in the power reality became central to group social dynamics, but with some challenges.

Dreams are seldom clear and concise, and they cannot be created on demand. During periods of intense stress, when help was most needed, sleep was least likely. New social forms developed to bypass dreams and connect people to the ancestors in a more reliable manner. Trance rituals provided access more or less on demand. Trance experiences can be terrifying, but also ecstatic. They probably provided the first intense spiritual experiences, linking spirituality and the power reality. Entry into trance was probably through persistence dancing: eventually a swirling vortex or tunnel appeared. Once through the vortex, the power reality would have contained ancestors, spirits and human/animal hybrids. They would have provided answers to the crucial question, but these would often have been confusing. Analogy, simile and metaphor would have been needed to unravel their deeper significance, transforming trance (and dreams) from a jumble of experiences into useable answers to specific questions.

The struggle to understand what the inhabitants of the power reality were saying, and to repeat it convincingly, selected for trance ability, memory, dream interpretation, imagination, symbolic thinking, status, language and communication. This suite of characteristics was genetically expressed as higher intelligence, which is first seen in skulls from Jebel Irhoud in Morocco, dated to between 315 000 and 300 000 years ago. These were the earliest known modern humans, but with archaic skull shapes (Richter et al. 2017). Intelligence is not task-specific: it can be selected in one set of circumstances, and then extend to others.

The Early Stone Age was dominated by hand axes. Making one was comparatively simple; a suitably sized and shaped piece of rock was found, and pieces were knocked off to create an edge. The end product was fairly evident from the start. However, for the last few hundred thousand years of the early Stone Age quite different, small, sharp-flaked tools were also occasionally made (Fig. 1). Although much smaller than hand axes, they were far more complex to make. First one had to visualise the finished tool deep in the rock and then create it through a sequence of precise steps. This limited the making of sharp-flaked tools to a tiny but consistent percentage of comparatively intellectually gifted individuals. Most *H. erecti* could not grasp how to make them.

Two factors probably then coincided: at a time of severe climate induced food shortages, general intelligence (to deal with the power reality) was increasing significantly. With sufficient group

Why I wrote this article

Twenty years ago, I was asked if I would edit the autobiography of a sangoma in Swaziland. I said yes, but my fee was information: he had to answer all my questions. At the same time, I was making displays for an interpretation centre at Ngwenya, the world's oldest mine, dated to 48 000 BP, where ochre was mined. Inevitably the two projects merged, and I became fascinated by how far back it was possible to identify shamanic traits.

For a decade I explored the ochre trail in Swazi traditional culture. There was a dependant relationship between the living and the ancestors, people needed to constantly connect to find out what was happening in their lives, and what would happen. Ochre was a connector to the ancestors. But there was more: ochre use was global and vestiges of an ancient cosmology, as described by the sangoma, were found worldwide in multiple cultures. The simplest explanation was that a complex cosmology had existed in Africa before the 65 000-year-old exodus. But for several frustrating years I could not see how to extract any more detail.

Then I had a breakthrough. Whilst walking in a nature reserve at dusk I came across some animal tracks picked out in the warm, slanting light. In a flash I saw that late Homo erectus *had applied their existing hunter-tracker logic to explain dreams and death. The result was two levels of reality and the birth of shamanism. From that perspective my ideas on how to link early shamanism, evolution and material culture developed over five years. I visualised thought experiments, like the volcanic eruption of Toba, and watched how people responded. I am an intellectual, but not an academic, so there was no need to package ideas into grant-shaped boxes, and no pressure to publish.*

intelligence, the small-flaked tools, including sharp stone-tipped spears, spread and would have improved hunting returns. The age-old hand axe culture began to be replaced by the smaller, lighter, specialised flake tools.

From a shamanic perspective, the widespread use of specialised flake tools prepared from cores was a by-product of increased group intelligence triggered by climate change, not the motor for it. Specialised small-flaked tools from around 320 000 years ago onwards have been excavated at Olorgesailie in Kenya. These tools are associated with black and red ochre and obsidian trade routes with implied extended social networks (Potts et al. 2020). What we now call the Middle Stone Age had begun.

The appearance of ochre with Middle Stone Age flakes is crucial. There is a conceptual link between ochre and ancestors in many contemporary African shamanic traditions having ancient roots. Death and birth often involve blood, events that can be seen as portals to and from the power reality. Ochre looks, and when freshly mined and mixed with water, sometimes smells like blood. Indeed, for some southern African shamans ochre *is* blood (Forrester 2020) and is ritually used to connect to the ancestors. In prehistoric times, ochre/blood probably helped people to connect to the power reality, just as it does now (Fig. 2). Ochre in the archaeological record is consequently an indicator of belief in two levels of reality, as well as symbolism.

Improved hunting returns with stone tipped spears allowed larger, more energy intensive brains to continue to evolve. These were needed to tease out ever more complex causes and effects in the power reality, as well as for social interactions and status competitions. By around 160 000 years ago general intelligence and linguistic abilities were sufficient to connect to the power reality and effectively communicate the experiences. The selective pressure for intelligence was released and brain

Fig. 2: Balls of ochre for sale at Manzini Market, Eswatini. These are often used in a marriage ritual to connect the bride to her husband's ancestors (Bob Forrester)

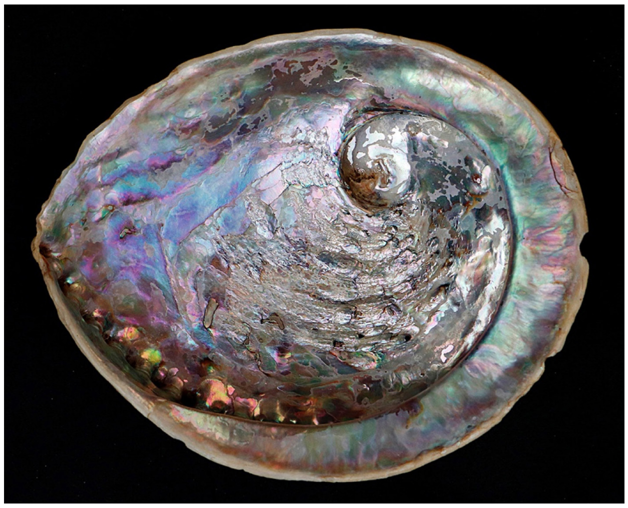


Fig. 3: Abalone shell with shimmering trance-like mother of pearl and spiral interior (Bob Forrester)

capacity stabilised. Average group intelligence was high enough that flake tool use became standard. The truly ancient hand axe culture, long associated with *H. erectus*, finally faded away in Africa. Anatomically modern humans had evolved.

During the Middle Stone Age tool manufacturing technology developed, and rituals and adornment slowly increased in refinement and complexity. Around 100 000 years ago ochre was carefully ground and then mixed with other substances before being stored for future use in large abalone shells at Blombos (Henshilwood et al. 2011). The ochre, as well as the shimmering abalone mother-of-pearl, and the shell's clear internal spiral, visually linked to trance experiences that also had shimmering colours and spirals (Fig. 3). People at that time would have lived at the centre of a cloud of ancestors, guardian spirits and human/animal hybrids. Time would probably have stretched out from the present in all directions. Fear of upsetting the ancestors and spirits would have favoured tried and tested solutions from their cultural repertoire, creating long-lasting, conservative societies.

Then everything changed when Toba erupted in Indonesia between 74 000 and 71 000 years ago. It was the largest volcanic eruption in the last 25 million years and the effects would have been dramatic worldwide. There may have been a distant deep rumbling, followed by the sudden disappearance of the sun for weeks. The world would have turned dark, cold and hostile. Animals would have altered their behaviour patterns, making hunting difficult. Some herbivores would have died along with their sustenance. Gathering would have become increasingly problematic. Tiny, almost invisible fragments of glass ejecta from Toba would have landed on plants and these may have made people's lips bleed and cause gastro-intestinal distress and bleeding.

Fig. 4: Side and top view of a black chert Still Bay point, Pietersburg variation, Eswatini (Bob Forrester)

Although Toba is close to the equator, the wind patterns associated with the Intertropical Convergence Zone would have tended to concentrate ash in the already cooler northern hemisphere, causing temperatures to drop more severely there than in the southern hemisphere. Any modern human groups in the north probably died out, leaving cold-adapted Neanderthals and Denisovans as survivors. In equatorial and southern Africa conditions were probably not as severe; continuous occupational sequences in caves from eastern and southern Africa show that people survived.

What did the survivors see? What did they feel? What did they think? Most importantly, what did they *do* after Toba? In all likelihood, seers would have searched for the causes behind the catastrophe, so as to try and change things. In the contemporary shamanic view nothing happens by chance, there is always a reason, often a conspiracy. When seers were unable to restore equilibrium, bringing back the sun, the warmth and their old life, it would have been obvious that time-tested rituals and techniques were not working. Trance adept individuals would have been forced into the deepest recesses of their minds and come up with solutions. This is probably when seers came to dominate groups when the first true individuals arose. Novel ideas formed in single minds, language was sufficiently evolved to communicate these and seers had the status to implement their concepts. Some innovations would have been cultural cul-de-sacs, but others had a positive outcome.

The results are evident in the burst of innovation that followed the Toba eruption in the southern Cape. The start of the Still Bay culture with exquisitely made stone tools dates to about 72 400 years ago. Some of the tools are so finely made – and fragile – that they were probably created for status and symbolic purposes rather than practical use (Fig. 4). The earliest engraved ochre blocks from Blombos in South Africa were made about 72 000 years ago (Henshilwood et al. 2002). The first poison tipped arrows likely appeared around 70 000 years ago (Lombard 2020). Tiny stone tools known as microliths appeared during the Howiesons Poort industry at around 66 600 years ago. They were probably components of the first composite tools, along with superbly made stone points.

The Blombos ochre blocks have clear engraved zigzags (Fig. 5). The engravings may have originally been influenced by tracking logic. People would have long known that specific tracks were linked to specific animals. Although an animal might be out of sight, tracks were a sign of the animal's existence, establishing a causal link between the two. After Toba, the link began to be used in the other direction; zigzags seen in trance were later carefully carved by hand in miniature, linking trance with ochre blocks.

The same patterns carry from block to block, strongly suggesting symbolism. The ochre blocks would have fitted comfortably into a tightly clasped hand as seers tried connecting deeply into the power reality, seeking answers to their questions. The period from 70 000 to 30 000 years ago is known as the cognitive revolution: behaviourally modern humans had evolved.

Fig. 5: Engraved Blombos ochre. Image courtesy of Christopher Henshilwood and Francesco dÉrrico.

Some southern African coastal regions – the peopled areas farthest from Toba – had comparatively resilient food bases. The fynbos plant kingdom had around 8 000 plant species, some with Toba-resistant carbohydrate tubers. This was supplemented by a littoral protein source, including rich shellfish banks. As a result, the coastal fynbos biome provided a refuge from global cooling. Mitochondrial DNA indicates a small population migration from southern to eastern Africa shortly after 70 000 years BP during a rare period when both southern and eastern

Fig. 6: Zulu sangoma PH Mtshali in full regalia with a flywhisk in his right hand (Bob Forrester)

Africa were humid, making long-distance migrations possible. This migration would have carried the cognitive revolution up eastern Africa. The spread of microliths from southern Africa northwards at this time corroborates the genetic migration evidence (Richards et al. 2019).

Around 65 000 years ago a group of people left eastern Africa, spreading the southern African cognitive revolution worldwide. Their descendants did not return to most of the interior of sub-Saharan Africa until the late 19th century colonial era. Cross-cultural analysis is possible because this group and the people who remained in Africa had originated from a single source but were then isolated for some 65 000 years. If there are specific cultural traits that cannot be ascribed to a common cause, like genetics or the environment, then these may be cultural relics pre-dating the out of Africa exodus. If the shared traits also form a culturally coherent suite of characteristics, then the likelihood increases that they are vestiges of the pre-exodus primal religion.

How and why would ancient beliefs be conserved? Fear of upsetting ancestors caused – and causes – deep shamanic conservatism, effectively conserving ancient rituals. Today shamans around the globe commonly use physical connectors to help enter the power reality: ochre, libations, rattles, drums, tambourines, flywhisks, burning sweet-smelling herbs and the use of animal fat imbued with the essence of the original animal. Negativity is removed in Africa, Asia and Oceania with fly whisks. Often seen as symbols of authority, they are found as far apart in space and time as Zulu shamans, Thai coronations and Mayan royal burials (Fig. 6).

Concepts of health and cleanliness are also widespread. One must be clean to approach the ancestors and spirits, and the removal of dirt, whether physical or psychological, is often ritualised. Breathing in steam from herb infused hot water, often with a head covering to concentrate the vapours, is a common shamanic practice. So are whole body steam baths that both cleanse and can induce altered states. Sickness is often treated with induced vomiting and diarrhoea. This derives from a perception of illness as originating in the centre of the body, and consequently the need to expel it.

Rituals allowing the ancestors to express themselves, but without the trauma and risk of trance, are common. Divination by 'throwing the bones' is prevalent, as are patterns enfolded into nature that can be revealed through shamanic analysis. The flight of birds and the examination of internal organs, particularly the liver, are a general means of divination. Sightings of specific birds and animals often have deep significance, their appearance being loaded with portent of what is to come. If divination fails to resolve pressing questions, then trance ceremonies are usually held. Trance rituals, often accompanied by drumming and dancing, are found on every continent (Fig. 7).

A specific cosmology, that the world is composed of earth, wind, fire and water (with a fifth element sometimes added), was common to Classical Greece, Medieval Europe, China, Tibet, India and Zulu cosmology, as well as to the Aztecs and Mayans. This highly specific explanation could have arisen in

Fig 7: Siberian Tungus shaman dancing, Nicolaes Witsen, 1705 (Wikimedia Commons)

the geologically highly active Great Lakes of East Africa where early people would have literally seen the world forming as fiery lava flows entered the sea or lakes, generating clouds of billowing steam (wind) and solidifying into earth (Forrester 2020).

There are four potential explanations for the shamanic similarities recorded globally: chance, genetic determinism, environmental determinism or a common pre-exodus African cosmology. When one considers that the common shamanic cultural traits worldwide cluster around connecting to the power reality, then the likelihood is that they are the vestiges of a palaeocosmology conserved over aeons. If correct, then it is possible to reconstruct the primal religion to some extent through a cross-cultural evaluation of shamanic practices worldwide. It would also mean that shamans and seers around the world hear the beat of a very distant drum.

There are further implications: dance, music, sex, status, conspiracy, spirituality, religion, symbolism, altered states and the power reality are woven into the very fabric of human consciousness. The approximately 320 000-year-old division of reality into two levels, with extraordinary individuals mediating between them, is foundational to shamanism and the world's two largest religions.

References

Forrester, B. 2020. *The First People: How we became human*, Freethinkers Press.

Henshilwood, C, d'Errico, F & Watts, I. 2009. Engraved ochres from the Middle Stone Age levels at Blombos Cave, South Africa. *Journal of Human Evolution* 57(1): 27–47.

Henshilwood, C, d'Errico, F, Van Niekerk, KL, Coquinot, Y et al. 2011. A 100 000-year-old ochre-processing workshop at Blombos Cave, South Africa. *Science* 334: 219.

Liebenberg, L. 2013. *The Origins of Science*. CyberTracker.

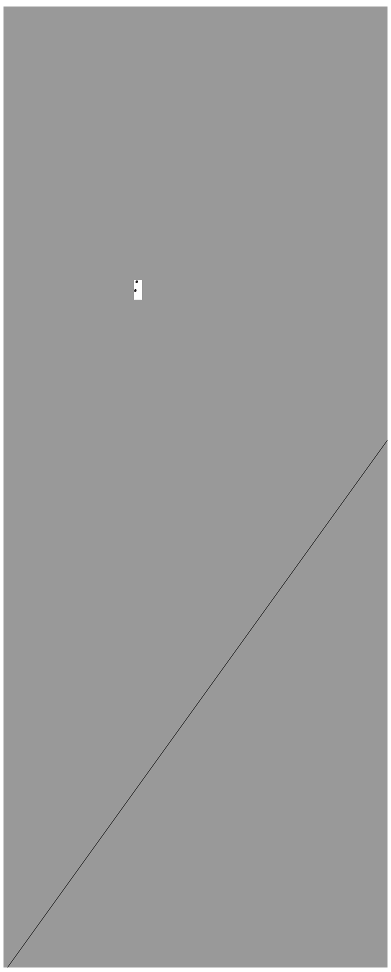
Lombard, M. 2020. First poisoned arrows. *Journal of Archaeological Science: Reports*. 33, Oct. 2020, 102477.

Pagani, L, Lawson, D, Jagoda, E et al. 2016. Genomic analyses inform on migration events during the peopling of Eurasia. *Nature* 538: 238–242.

Potts, R, Dommain, R, Moerman, R et al. 2020. Increased ecological resource variability during a critical transition in hominin evolution. *Science Advances*: 6(43), eabc8975.

Richards, MB, Soares, P, Mellars, P et al. 2019. A dispersal of *Homo sapiens* from southern to eastern Africa immediately preceded the out-of-Africa migration. *Nature*. Scientific Reports 9: 4728. DOI 10.1038/s41598-019-41176-3.

Richter, D et al. 2017. The age of the hominin fossils from Jebel Irhoud, Morocco, and the origins of the Middle Stone Age. *Nature* 5467657: 293–296.



'The Post' by Peter van Straten

Oil on canvas, 90 cm by 120 cm

'In truth, human nature knows nothing of arrival, only constant departure, and return. In truth, we are nothing more than pendulums.' - Pierre de la Rue

Van Straten's body of work is dedicated to return. Return to that which most profoundly feeds us: connection to the natural world, and connection to one another. Return to purpose and return to light.

THE WADI JAWBIYAH SETTLEMENT, CYRENAICA, LIBYA

Gareth A Angelbeck

In August 2017, while browsing Google Earth, I came across what appeared to be the remains of a fortified settlement (Fig. 1) at the Wadi Jawbiyah (a seasonal stream), roughly midway between Benghazi and Tukrah in western Cyrenaica, Libya. After double checking the literature and consulting with the relevant academic authorities, it became apparent that the site may in fact be new to archaeology.

Fig. 1: The Wadi Jawbiyah settlement (Google Earth)

The site is located about 15 km inland from Daryanah (Fig. 2), on the first step of the Jabal Akhdar plateau, and lies at the confluence of two deeply incised tributaries of the Wadi Jawbiyah (Fig. 3). It is possible that the settlement had extended from the fan of higher ground in the fertile valley up on to the ridge so as to include a defensible acropolis (Jones and Little 1971a: 56). This is the site's most prominent feature. It is contained within two concentric defensive circuits, each equipped with what appear to be towers and gates. Satellite images clearly show a street plan, as well as lines of houses and perhaps even public buildings.

The outer defense, which may be the more recent of the two (a Roman addition, perhaps) is surrounded by a *proteichisma* (a low wall usually preceded by a ditch) that runs parallel to the defense and a short distance from it. The outer defense is roughly 330 m in length and contains an area of about 3,5 ha (Google image 1/18/2019, altitude 817 m). Aside from its defensible position and reliable water supply, advantages of the site include easy access to the coastal plain and the Al Marj plateau, as well as an economically favorable position between two major cities, namely Euesperides-Berenice (modern Benghazi) and Taucheira (modern Tukrah).

1969 archaeological survey

While surveying the valley in 1969, GDB Jones and JH Little reported signs of ancient occupation, including scatters of black Samian ware. They also discovered a perennial spring emerging from a cave beneath the ridge and noted the presence of rock-cut tombs (Jones and Little 1971a: 56). Presumably, it was this spring which attracted Greek settlers to the valley in the first place. Interestingly, despite Jones and Little's promising discoveries in the valley, they did not explore the ridge and thus make no mention of the settlement in their report.

Hadrianopolis

While classical sources do mention a few Greek and Roman settlements between Taucheira and Euesperides-Berenice, a lack of archaeological features on the ground suggest that most were little more than villages. This has presented a challenge in placing Hadrianopolis, a city founded under Hadrian sometime in the first half of the second century AD (Fig. 4) and listed in the Antonine Itinerary as being somewhere in the vicinity (Jones and Little 1971b: 54; Kenrick 2013: 47). While a scattering of Roman remains at Tansulukh seemed evidence enough for RG Goodchild to place the city there, Jones and Little preferred to place it at Daryanah (Jones and Little 1971b: 54). Aside from 'Daryanah' likely being an Arab derivation of 'Hadrianopolis', they support their theory by presenting the finds of their survey, which included the remains of cisterns, the aqueduct that supplied them, column fragments, quarries featuring rock-cut tombs, a pottery kiln and a scattering of orthostats (stone uprights indicating the outline of buildings) (Jones and Little 1971b: 54–74; Kenrick 2013: 47). However, in the light of the Wadi Jawbiyah

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Fig. 2: The site lies inland from Daryanah

discovery, I feel the topic needs revisiting.

Considering that Hadrianopolis was founded following the Jewish Revolt of 115 AD, it seems likely that the settlement would have had a defensive circuit, a feature absent at Daryanah but very evident at the Wadi Jawbiyah site (Jones and Little 1971b: 54). The outer circuit may be part of a Hadriatic extension to an older Greek settlement, Kaukalou Kome (Periplus of Pseudo-Skylax[1]). The aqueduct, which Jones and Little traced from the Wadi Jawbiyah to the coast and which represents their strongest evidence for placing Hadrianopolis at Daryanah, served two purposes: to irrigate Roman fields on the coastal plain below the Wadi Jawbiyah and to supply water to the settlement at the coast (Jones and Little 1971b: 58–61).

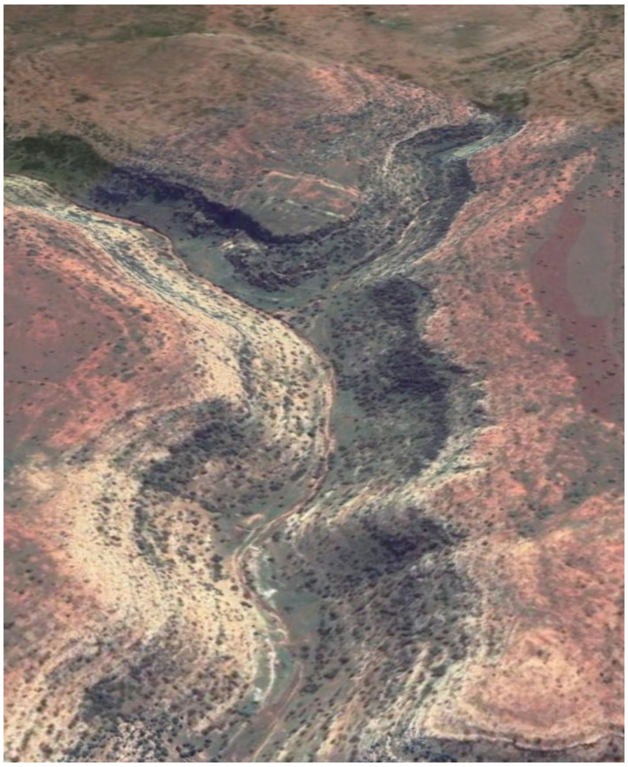

Fig. 3: The fertile Wadi Jawbiyah valley

The fact that the aqueduct, which is little more than a narrow specus, formed part of an irrigation scheme suggests that there need not have existed a major settlement at the end of it to justify its existence. Also, in the light of the Wadi Jawbiyah discovery, it seems doubtful that such a meagre water supply would have been sufficient to support two major settlements and an irrigation scheme as well. It is possible, however, that a minor settlement existed at the coast, perhaps at a T-junction connecting the Wadi Jawbiyah site (Hadrianopolis) with the Berenice-Taucheira road. Indeed, it may have served as a port for the inland Hadrianopolis, despite its less-than-ideal anchorage. It is possible that in time the coastal settlement adopted the name Hadrianopolis/Daryanah as its mother city declined, as was the case with Barca and her port Ptolemais (Kraeling 1962: 5–6).

Fig. 4: Hadrianopolis as it appears on the Tabula Peutingeriana

Conclusion

Whether the Wadi Jawbiyah settlement turns out to be Hadrian's city or not, the site is no doubt significant enough to warrant further exploration and study. It is my hope that in time, Libya's political situation settles sufficiently to allow archaeologists to resume work in this historically rich country.

References

Boardman, J. 1966. Evidence for the dating of Greek settlements in Cyrenaica. *Annual of the British School at Athens* 61: 149–156.

Goodchild, RG. 1952. Mapping Roman Libya. *The Geographical Journal* 118(2): 142–152.

Google Earth Pro (imagery date 01/18/2019).

Jones, GDB & Little, JH. 1971a. Coastal settlement in Cyrenaica. *Journal of Roman Studies* 61: 64–79.

Jones, GDB & Little, JH. 1971b. Hadrianopolis. *Libya Antiqua* Vol. VIII: 53–74.

Kenrick, P. 2013. *Cyrenaica: Libya Archaeological Guides*. London: Silphium Books.

Kraeling, CH. 1962. *Ptolemais, City of the Libyan Pentapolis*. Chicago: University of Chicago Press.

Vickers, MJ & Reynolds, JM. 1971–72. Cyrenaica, 1962–72. *Archaeological Reports* 18: 27–47.

Shipley, G. 2002. www.ancientportsantiques.com, 108.

White, D & White, AP. 1996. Coastal sites of Northeast Africa: the case against Bronze Age ports. *Journal of the American Research Centre in Egypt* 33: 11–30.

[1] The Periplus of Pseudo-Scylax is an ancient Greek mariners' manual probably dating to the mid-4th century BC. It describes the sea routes around the Mediterranean and the Black Sea. (Shipley 2002).

ROCK ART CLUSTERING PROGRAMME FOR PROTECTED AREAS

A Drakensberg case study

Celeste Rossouw and Sonja Krüger

The focus of this article is the Rock Art Clustering Programme (RACP) developed by the late Mr Tommy Topp from 2009 to 2013 to monitor and manage rock art sites in the uKhahlamba Drakensberg Park (UDP), the South African component of the Maloti-Drakensberg Park World Heritage Site (MDP WHS). The programme was piloted at four sites, namely Cobham, Giant's Castle, Injesuthi and Hillside and is aimed at grouping the sites into clusters for monthly monitoring purposes.

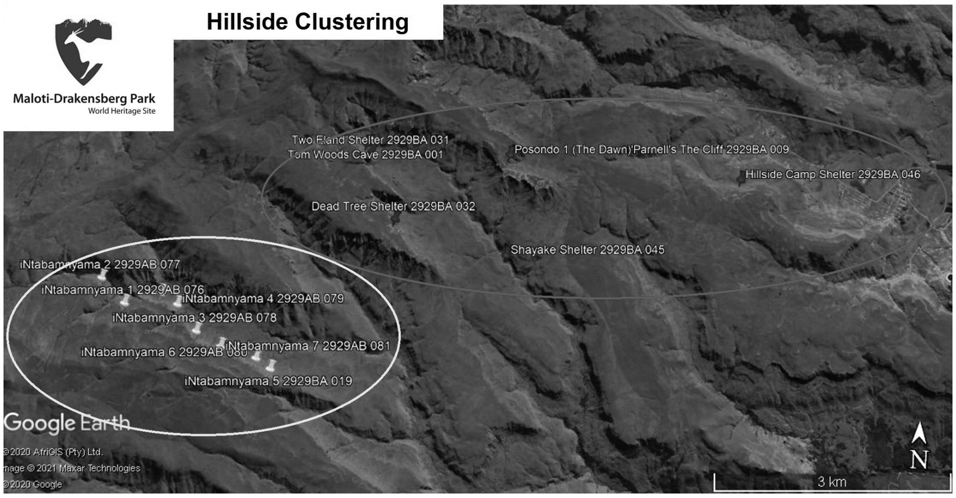

Fig. 1: Map of Hillside showing two clusters of rock art sites. Left = HIL2 iNtambayana, and right = HIL1 Posondo/iNtondolo

This allows staff in the protected area and rock art custodians to plan and perform condition assessments specific to each section of the UDP. This is then used to develop strategies to manage the human and natural impact on rock art. In this article we describe the site where the RACP was trialled and implemented and the process that was followed to improve the management and monitoring of the cultural heritage of the UDP.

The study area

The UDP is a national and international asset because of the outstanding natural and cultural values it contains. It was listed as a mixed World Heritage Site in 2000, and in 2013 the UDP together with the Sehlabathebe National Park in Lesotho, was declared a transboundary World Heritage Site: the Maloti-Drakensberg Park World Heritage Site.

Celeste Rossouw is a senior heritage officer in the Rock Art Section at the KwaZulu-Natal Amafa & Research Institute. She is mainly concerned with the compilation of management plans for threatened rock art sites and those officially open to the public; permit applications for direct intervention at sites; training and accreditation of rock art custodians; grading of rock art sites; and the creation of policies and best-practice guidelines for rock art.

Sonja Krüger is the ecologist for the uKhahlamba Drakensberg Park World Heritage Site for Ezemvelo KwaZulu-Natal Wildlife since 2000, as well as the Harry Gwala District. She is responsible for providing effective ecological advice to address biodiversity conservation issues, which includes the development, implementation, coordination and conducting of research projects and monitoring programmes.

The UDP covers 242 813 ha and its height above sea level extends from 1 200 m to 3 408 m, which is the highest point in South Africa. Ezemvelo KwaZulu-Natal Wildlife (Ezemvelo) is the management authority of the park. It manages the park's cultural heritage component in collaboration with the KwaZulu-Natal Amafa & Research Institute (the Institute), according to an Integrated Management Plan (Ezemvelo 2020). The UDP comprises 15 sections, of which one, namely Hillside, will be used as an example of the methods applied in the RACP.

Methods

Site verification

The first stage of the RACP was to verify the location of all rock art sites recorded in the KwaZulu-Natal Museum's database. Topp undertook this exercise, assisted by the staff of the African Conservation Trust, the KZN Museum, and monitors and custodians of the Mnweni and AmaZizi Communities (under the guidance of the late Mrs Pfotenhauer, the Community Facilitator).

The locational verification of the sites was essential since many sites were already documented in the 1940s when the accurate Geographic Positioning System (GPS) was not yet in use and only vague descriptions of the site locations were made. More than 550 sites were recorded during the verification exercise and several new sites were found. For each site a risk assessment was completed and site- specific management strategies were listed. This stage of the RACP took four years to complete. A management booklet was then prepared for each section of the park with the help of the African Conservation Trust Programme (Ms Nardell and her team). All the rock sites were described, including their location, summaries of the risk assessment and management strategies. Photographs covering all aspects were included.

			Cluster	
Site number	Local name	Monitoring code	Number	Name
2929AB 010	iNtabamnyama	2	HIL2	iNtabamnyama
2929AB 076	iNtabamnyama 1	4		
2929AB 077	iNtabamnyama 2	4		
2929AB 078	iNtabamnyama 3	1		
2929AB 079	iNtabamnyama 4	2		
2929AB 080	iNtabamnyama 6	2		
2929AB 081	iNtabamnyama 7	1		
2929BA 001	Tom Woods Cave	4	HIL1	Posondo / iNtondolo
2929BA 009	Posondo 1 (The Dawn) Parnell's The Cliff	4		
2929BA 010	Honeycomb	1		
2929BA 019	iNtabamnyama 5	1	HIL2	iNtabamnyama
2929BA 031	Two Eland Shelter	4	HIL 1	Posondo / iNtondolo
2929BA 032	Dead Tree Shelter	2		
2929BA 045	Shayake Shelter	1		
2929BA 046	Hillside Camp Shelter	1		

KEY - Monitoring Code / Frequency

12	12 x p/yr	4	4 x p/yr
2	2 x p/yr	1	1 x p/yr

2929CB 019 - Site location unknown.

Maloti-Drakensberg Park
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Fig. 2: Rock art site index for Hillside by Site Number

Monitoring schedule

The second stage of the RACP involved developing a schedule for the monitoring frequency of these sites. This was undertaken by Rossouw together with Ezemvelo from 2017 to 2018. The clustering of sites for monthly monitoring purposes took into consideration their geographical location and the time required to access and monitor the sites; the number of sites that could be monitored in a day and human resources and funding (Figs 1 and 2).

Background research for the clustering exercise included the summaries of 'Threats to Conservation' from the management booklets and the risk summaries in the management plans prepared by Rossouw for the rock art sites open to the public and those for which permits had been issued. Consideration of the available human resources focused on the work schedules of field rangers who were trained to complete condition assessment reports for the sites in their area/management unit of responsibility. The monitoring schedule lists the field rangers and their leave and training schedules and other duties such as law enforcement and biological monitoring.

The frequency of monitoring for each site was determined by its sensitivity to natural and human factors. Sites experiencing low-impact tourism are monitored monthly because of the potential high impact of visitors. Sites prone to illegal visit are monitored quarterly since there is a high threat of destruction. Signs of such visits include litter, vandalism, candle wax, fire rings (circles of stacked rock where fires were made), sleeping enclosures that may consist of rocks arranged in a square or oval form usually filled with grass bedding, and disturbance of the shelter's floor, which may impact the archaeological stratigraphy of the site, thereby compromising its scientific value.

Sites threatened by fire are monitored bi-annually. Burnt vegetation close to the parent rock of the shelter and soot covering the art leads to chemical changes in the composition of the pigments used in the paintings, while external stress from the heat and soot results in exfoliation of the paint. Sites free from threats to the art are monitored annually.

Regular site monitoring by staff from Ezemvelo and the Institute has been successful in reducing illegal visits. Once a site has recovered from negative impacts, the monitoring frequency is adapted in the following year's schedule. The managment strategy of preventing fire from impacting rock art sites consists of determining these sites by superimposing them on a map of planned burns for the park in that year and then trimming the vegetation in a radius of 3 m of the shelter. Plant roots are left intact since their removal will not only constitute development but will also destroy any archaeological deposits.

Following Topp's development of the programme for the pilot sites, it was completed by Rossouw and Mbatha (the Institute's rock art monitor), who spent a year developing the RACP for Royal Natal, Culfargie, Cathedral Peak, Monk's Cowl, Highmoor, Injesuthi, Kamberg, Lotheni, Mkhomazi, Vergelegen, Garden Castle and Bushman's Nek.

Monitoring process

The officer in charge (OIC) uses the Annual Rock Art Monitoring Schedule (Fig. 3) to plan the monitoring schedule for the field rangers indicating how often each rock art site should be monitored and in which months monitoring should take place. It is further used to check whether these sites were monitored and whether the correct number of monitoring cards

(Fig. 4) were completed by the rangers. The monitoring cards require the completion of a checklist on the type and severity of human and natural impacts observed at a site.

The OIC uses the monitoring cards to populate the Monthly Rock Art Monitoring Report (Fig. 5), which indicates the type of human impact (i.e. litter, graffiti, candle wax, fire rings or sleeping enclosures inside the cave, evidence of digging), or natural threats (i.e. plants posing a fire hazard or rubbing against the art, animals interfering with the art and water running over the art, causing mineral accretion over the painted surfaces). The report is forwarded to Sonja Krüger who captures the information into a Rock Art Database. The database is then audited by Rossouw, who applies appropriate management strategies to prevent the scientific/aesthetic/social/historic values of a site from being compromised further.

Site Name	Site No	MF*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tom Woods Cave	2929BA 001	4		x			x			x			x	
Posondo 1	2929BA 009	4		x			x			x			x	
Honeycomb	2929BA 010	1		x										
Two Eland Shelter	2929BA 031	4		x			x			x			x	
Dead Tree Shelter	2929BA 032	2		x						x				
Shayake Shelter	2929BA 045	1		x										
Hillside Camp Shelter	2929BA 046	1		x										
iNtabamnyama	2929AB 010	2			x						x			
iNtabamnyama 1	2929AB 076	4			x			x			x			x
iNtabamnyama 2	2929AB 077	4			x			x			x			x
iNtabamnyama 3	2929AB 078	1			x									
iNtabamnyama 4	2929AB 079	2			x						x			
iNtabamnyama 6	2929AB 080	2			x						x			
iNtabamnyama 7	2929AB 081	1			x									
iNtabamnyama 5	2929BA 019	1			x									

*Monitoring Frequency

Key

Frequency		Description
1	Annually	No problems were identified at the site; only to be monitored annually.
2	Bi-annually	Sites with fire hazards; soot covering art; exfoliation due to heat.
4	Quarterly	Several problems were identified, e.g illegal visitation, graffiti, litter and candle wax.
12	Monthly	Sites officially opened for low-impact tourism are monitored on a monthly basis.

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Fig. 3: Hillside Annual Rock Art Monitoring Schedule

Dr Krüger trained the managers with regard to the completion of the rock art monitoring reports and the scientific technicians on how to capture the data from these reports into the rock art database.

Management strategies to limit negative impacts

Human impact on rock art is easier to manage than natural impact. The Access Policy of the Institute, an appendix of the Rock Art Management Policy, stipulates that a rock art site can only be visited if it is officially open for low-impact tourism and public visits. Each low-impact tourism destination must have a site-specific management plan, prepared by the senior heritage officer Rossouw, and at least two rock art custodians trained by cultural heritage authority for each area.

The Institute is responsible for the training and accreditation of rock art custodians and back-up custodians specifically for each open rock art destination in KwaZulu-Natal. This programme aims to empower local entrepreneurship since rock art custodians may charge a fee for taking visitors to a site. Their responsibility is to accompany visitors to and from the shelter, inform them of the code of conduct and supervise their behaviour at the shelter. They are not accredited guides, and their main function is to ensure the long-term conservation of the rock art sites assigned to them.

The code of conduct at rock art sites embodies the following principles:

- Leave no trace of your visit; take only photos and the experience with you.
- Any form of contact with the rock art is prohibited (such as touching, leaning anything against the paintings, pouring liquid onto the paintings).
- The pouring of any type of liquid over the paintings is viewed as an act of deliberate defacement, since it leads to the chemical deterioration of the paintings when minerals, from within the parent stone, migrate and accumulate over the art to eventually obliterate it.
- When walking through a site, care must be taken not to create dust.
- It is prohibited to remove any artefacts or stone tools.
- Camping near sites with paintings is prohibited, since it inadvertently creates littering, while camping fires and/or candles are a fire hazard.

The Rock Art Monitoring Card (Fig. 4) lists categories of damage caused by people, as well as certain regulations applicable to the reclamation of the site:

- Litter: field rangers and/or rock art custodians must remove all litter from the site, keeping count of the amount of litter and whether it was collected.
- Grass beds: these must be removed by field rangers and/or rock art custodians. However, this process must be approached with caution so as not to disturb the shelter floor and archaeological deposit. The grass bedding must be carefully scooped

The following maintenance work at a cave/shelter can be done by Field Rangers:

1. Trim vegetation growing very close to paintings to stop it rubbing.
2. Carry dead wood and grass beds out of the shelter because it poses a fire threat.
3. Pick up all rubbish / litter.
4. Remove evidence of fires and candle wax from the ground only.
5. Do not remove candle wax / soot /paint *etc.* from paintings
6. Report any construction or maintenance problems along the path leading to the cave/shelter and at the shelter, e.g. fences, signs and boardwalks.
7. Photograph all evidence of damage

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ROCK ART CAVE/SHELTER MONITORING CARD

Date: __________

Management Unit: __________

Name of the cave / shelter: __________

Observer's name: __________

TYPE OF IMPACT	RESULT	
People Impacts		
Is there any rubbish/litter in the cave?	YES	NO
Did you remove the rubbish/litter?	YES	NO
How many pieces of rubbish/litter did you collect?		
Are there grass beds present in the cave?	YES	NO
Did you remove the grass beds?	YES	NO
Are there stone walls sheltering sleeping areas?	YES	NO
Did you remove the stone walls?	YES	NO
Have people been burning *iMphepho* in the cave?	YES	NO
Is there evidence of occupation or digging by people?	YES	NO
Is there candle wax present in the cave?	YES	NO
Where is the candle wax (floor, walls, on rock art)?		
Did you remove the candle wax? From the floor only!!	YES	NO
Fire Impacts		
Have people been making fires in the cave?	YES	NO
Did you remove the fire rings?	YES	NO
Is there evidence of veld fires burning up to the cave?	YES	NO
Is there soot from fires covering the rock art?	YES	NO
Natural Impacts		
Is there any sign of animals using the cave?	YES	NO
Are there signs of animals interfering with the rock art, e.g. trampling causing dust or rubbing against the art?	YES	NO
Are there any plants that are rubbing against the rock art that need to be cut/trimmed?	YES	NO
Did you trim the plants rubbing against the art?	YES	NO
Do the plants outside the cave pose a fire threat?	YES	NO
Is there water running over the rock art?	YES	NO
Is there evidence of any new archaeological deposits?	YES	NO
Vandalism / illegal activities		
Did people write/scratch/engrave on the cave walls?	*YES*	*NO*
What did they use to write/scratch? *SHARP OBJECT* *OTHER (specify):* *CHALK*	*PAINT* *KOKI*	*COAL* *PEN*
Did people write or scratch over the rock art?	*YES*	*NO*
What did they use to write/scratch: *SHARP OBJECT* *OTHER (specify):* *CHALK*	*PAINT* *KOKI*	*COAL* *PEN*
Did you take photos of the damage?	YES	NO
NOTES/COMMENTS:		

Fig. 4: Rock Art Site Monitoring Card used by monitors

which often rub against the art and cause abrasion. Mud and dust from the shelter's floor may cover the art. Running water or seepage causes lime, silica and salt accretions over the art, which not only obliterates it but causes exfoliation.

Conclusion

The RACP ensures a structured and efficient approach to the monitoring and managing of rock art sites. The UDP is the only world heritage site where such a cultural heritage monitoring programme has been implemented.

from the floor without lifting any of the top dust layers.

- Fire rings: these must be removed with great care to ensure that no intrusions are made in the floor.
- Candle wax-spillage: these may be removed by a field ranger or rock art custodian. However, only an accredited rock art conservator may remove wax from the parent rock of the shelter or paintings.
- Evidence of digging into the shelter floor or any other disturbance must also be reported on the monitoring card.

The Rock Art Monitoring Card reports on vandalism of the art, including graffiti having been added or engraved. If 'added', the medium is noted, e.g. charcoal, chalk, oil paint. etc. The location of the graffiti in relation to the art is recorded, e.g. whether it is next to the art or covers it. The size of the area affected by the graffiti is also documented. The information provided by these monitoring cards allows the Institute to assess the damage to a site and decide on the necessary restoration measures. The landowner, who is liable for the costs, must obtain a direct intervention permit from the Institute and can select an accredited rock art conservator from a list provided.

Natural damage is more difficult to manage, especially in a protected area. Damage may be caused by animals sheltering at the site,

The principle of adaptive management is applied to the RACP. The programme is regularly audited to improve the management of our irreplaceable rock art heritage, which was the most important cultural component that led to the uKhahlamba Drakensberg Park being declared a World Heritage Site.

This programme can be used by managers as a template for implementation in other protected areas containing cultural heritage sites.

References

Ezemvelo KZN Wildlife. uKhahlamba Drakensberg Park: Integrated Management Plan 2020. Unpublished Report Version 2.0. Pietermaritzburg, KwaZulu-Natal, South Africa. 235 pages.

·UKHAHLAMBA· DRAKENSBERG PARK World Heritage Site

Hillside – Monthly Rock Art Monitoring Report

MONTH: __________

			PEOPLE							FIRE			NATURAL IMPACTS				VANDALISM / ILLEGAL ACTIVITY			PAINTINGS	
						Candle wax					Soot			Plants							
Site no	Site name		Rubbish	Grass bedding	iMpepho	On the Floor	On the Walls	On the Art	Evidence of digging	Fire rings	On the Walls	On the Art	Animals interfering with the art	Rubbing against the art	Outside plants is a threat	Water running over the art	Writing / scratching on the walls	Writing / scratching on the art	New or old graffiti	No of paintings	Last count
2929AB 010	iNtabamnyama																				
2929AB 076	iNtabamnyama 1																				
2929AB 077	iNtabamnyama 2																				
2929AB 078	iNtabamnyama 3																				
2929AB 079	iNtabamnyama 4																				
2929AB 080	iNtabamnyama 6																				
2929AB 081	iNtabamnyama 7																				
2929BA 001	Tom Woods Cave																				
2929BA 009	Posondo 1 (The Dawn) Parnell's The Cliff																				
2929BA 010	Honeycomb																				
2929BA 019	iNtabamnyama 5																				
2929BA 031	Two Eland Shelter																				
2929BA 032	Dead Tree Shelter																				
2929BA 045	Shayake Shelter																				
2929BA 046	Hillside Camp Shelter																				

Fig.5: Monthly Rock Art Monitoring Report

IN WHICH CASES IS IT APPROPRIATE TO USE ETHNOGRAPHY TO EXPLAIN ROCK ART AND CAN WE SAY ANYTHING ABOUT IT IN THE ABSENCE OF ETHNOGRAPHY?

Barry Jacoby

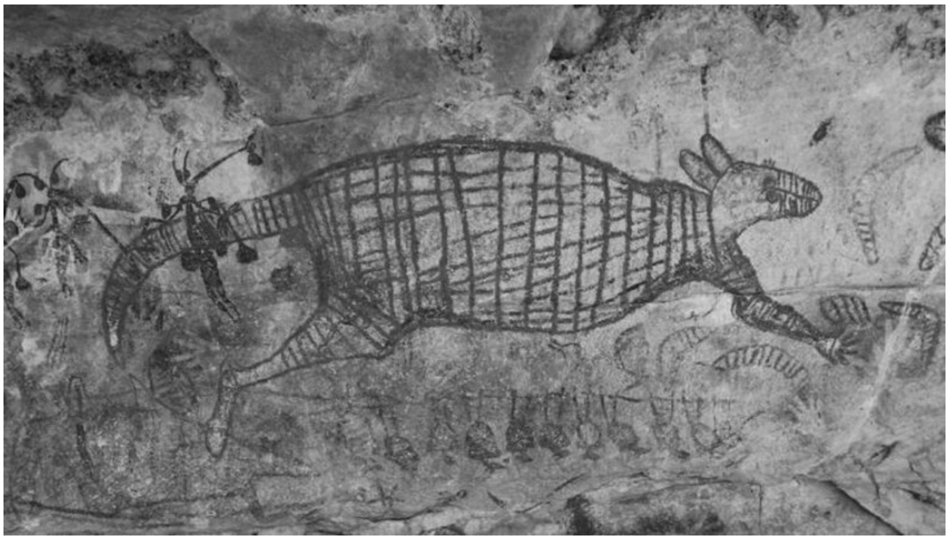

Fig. 1: Aboriginal Art, Australia (Google Images)

It is difficult to interpret the metaphors of hunter-gatherer and farmer rock art, which may date back for vast periods of time, in terms of modern day thinking. To the artists who painted the pictures or made the engravings, the spirit world was as real as our technological society is to us. However, as in most cases the communities that created the art are long since gone, we can only try to find meaning in their work by using examples from other societies whose beliefs are or were as similar to theirs as possible. There are living communities in the world today, or communities that existed until recent times of whom records survive, from which we can begin to understand the beliefs of lost communities. (Renfrew and Bahn 2004). Certain actions or functions may have been done in the same way in communities the world over. Lewis Bindford's (1978) work with the Nunamiut Eskimos in Alaska enabled him to interpret the plan of habitation of the Palaeolithic site at Pincevent.

One of the major problems in the interpretation of rock art is the fact that each artistic tradition has its own iconography, which must be interpreted through the use of relevant ethnography (Layton 2001). Sometimes the art is part of a living tradition, as in Australia in which case local ethnography can be used, or else there is ethnographic literature available, but in other cases one has to extrapolate from other sources on rock art. In some cases, the information is available in the local community, which, however, does not choose to share it with the researcher for one reason or another. Some communities do not permit outsiders access to all aspects of their metaphysical world. Bednarik (n.d.) gives the example of some Australian aborigines who will limit the information they are prepared to pass on, sometimes because of the strict gender division in cultural knowledge. At other times they will give a simpler explanation than needed. He makes the point that 'It is inconceivable that information at the level of sacred knowledge would be passed on to uninitiated alien researchers simply to satisfy their curiosity' (Fig 1).

On the other hand, many Aboriginal elders are anxious to pass on information about their rock art lest all knowledge of their way of life and beliefs is lost forever. Many of these elders have created rock art themselves or have watched others do so (Taçon 2001). In some Australian instances, beliefs about sprits are held in common by different language groups so the information from some of them may assist in the interpretation of the rock art of others (Vinnicombe and Mowaljarli 1995). These comments apply to the interpretation of the more recent Australian rock art and not to the oldest styles.

Using direct interpretive evidence

Sometimes it is relatively easy to find more direct evidence to interpret rock art. Probably the best-known example is Lewis-Williams' interpretation of the meaning of San rock art. By using the records of Bleek and Lloyd, who recorded thousands of pages of accounts of Bushman life by //kabbo, Dia!kwain and other Bushmen, as well as the records of /Xam San beliefs and the writings of Orpen, who recorded many of the explanations by Qing, his bushman guide, and

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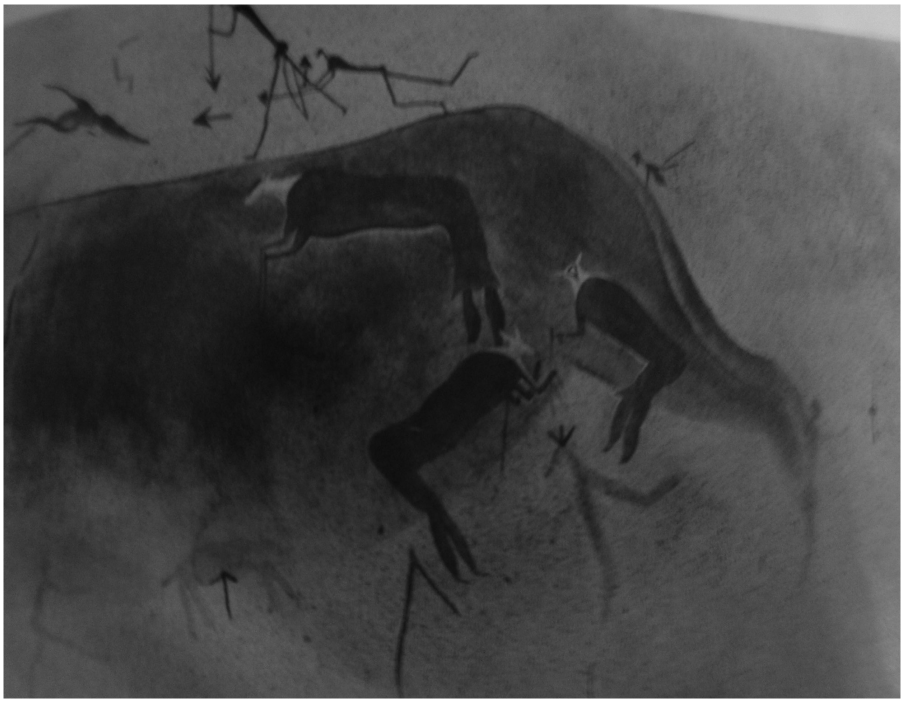

Fig. 2: Patricia Vinnicomb's copy of the men with rhebok heads (Google Images)

by relating these to contemporary accounts given by Kalahari Bushmen in Botswana, Lewis Williams was able to understand the hidden meaning of their rock art (Lewis-Williams and Pearce 2004; Lewis-Williams 2003). The explanation given by Qing about a painting of men with rhebok heads, 'They were men who had died, and now lived in rivers, and were spoilt at the same time as the elands and by the dances of which you have seen paintings', is not meant to be taken literally as real death but as going into a trance. 'Living in rivers' is a metaphor for the sensation of being in a trance, with the dance exploiting the potency of the eland (Layton 2001) (Fig. 2).

Lewis-Williams and Pearce (2004) explain on what ethnographic basis they interpret the symbolism in a rock painting from Barkly East. The depictions of eland, dancers who are bent over, the 'streamers' and the therianthrope are all metaphors that bridge the way into the spirit world. Nothing in this panel makes sense without an understanding of the ethnography. However, by using ethnographic information, the panel can be understood and the figures and the actions they perform can be made sense of. This understanding of the rock art has assisted in the identification of some of the metaphors in the Palaeolithic art of France (Lewis-Williams 2002).

Rock art at Mwana wa Chentcherere II

The rock art of Central Africa is also a case where meaning can be obtained from the use of ethnography because records exist of tribal beliefs related to some of their rock art. Ceremonies are still performed and instruction is given to young boys and girls on subjects of which the rock art is a record. The meaning of the paintings is connected to the teaching, or to the advice given during the ceremony (Zubieta 2006). In interpreting the White Spread-eagle tradition of paintings at Mwana wa Chentcherere II, Leslie Zubieta (2006) relied on accounts given by informants and on information taken from literature to obtain insight into the paintings (Fig. 3). She makes the point that 'the ideal research programme for rock art interpretation would be to know the belief system from an explicit theoretical standpoint and then to try to elucidate the code in which those beliefs are expressed in art'.

One must realise that non-material subjects can be displayed in the rock art and therefore an understanding of the local conventions of depiction is essential. Without such understanding and knowledge of the cosmos of the makers of the art it is not possible to interpret the paintings. Such understanding must be obtained from relevant ethnographic sources. One must also be aware that traditions may have changed in time.

Fig. 3: White Spread Eagle art from Mwana wa Chenterere II rock shelter

Fig. 4: Scandinavian ship (Google Images)

Through an understanding of the historical events that led to the creation of rock paintings, Benjamin Smith (2001) was able to offer a plausible construction of the reasons behind rock art relating to Nyau ceremonies and secrets. Without such ethnographic background he would not have come to the conclusion that because of raids by the Ngoni it was not safe for the Chewa people to perform their Nyau ceremonies, nor was it safe or possible to make the large masks needed for them. At different times, Nyau ceremonies were also banned by the church and opposed by the government of Malawi. The paintings were therefore made to record knowledge that could not otherwise be passed on to preserve their memories.

Hunter-gatherer rock art in Scandinavia

In some cases, however, there are no longer tribes or people alive with any connection to the rock art and it cannot be interpreted without some other form of ethnography. The hunter-gatherer rock art of Scandinavia is a case in point. Records exist from the Viking age and it is therefore easier to interpret the farmer rock art of this era than it is to interpret the earlier hunter-gatherer art. But by drawing parallels with art in other societies and making deductions from information known about the later farmer art, meaning is given to the Bronze Age art. However, John Coles (2005) warns against over-reliance on the myths and legends of the Poetic Edda, the Prose Edda and the Skaldic verses because they contain references to so many people and events that he believes it is impossible to associate any carving with any of them to any degree of certainty.

Ships play a major role in Scandinavian art (Fig. 4). Ballard et al. (2003) and others have used the ethnography of south-east Asia and Melanesia with regard to rock art in mortuary rituals. They have suggested that boats have long been associated with burials and have deduced that the boat is a symbol of death. They have identified three features in the archaeology of the area: the long running tradition of burying people in boats, the ship-like cairns of the Bronze Age and the association between carvings of ships and water, such as drawings of ships being crossed by running water (Ballard et al. 2003).

From this starting point they have linked the ethnography of parts of south-east Asia, where there is much information on boat imagery, with the Bronze Age art of Scandinavia. Boats represent the family or community, and representations of boats appear in rituals connected with initiation, marriage and death. Ships are used to ferry the souls to the land of the dead. In some communities the words 'boat' and 'coffin' are interchangeable. Symbols similar to those found in Scandinavian art are also found in south-east Asian art, such as the sun discs. There are also striking similarities between drawings of Bronze Age Scandinavian and south-east Asia boats. Using this information, the researchers have drawn inferences regarding the depiction of the Scandinavian ships.

The Scandinavian hunter-gatherer world was permeated with spirits, and shamans were an integral part of the lives of the people. Sami shamans achieved a trance state through the use of drums. Few of these drums have survived today but there are many drawings of them in existence (Fig. 5). They are covered with symbols and pictures, many of which are similar to those found in rock art. It is contended that it is appropriate to use the symbolism on the drums to assist in the interpretation of the rock art. Many of the drum skins are divided into parts by

Fig. 5: Sami Shaman drum (Google Images)

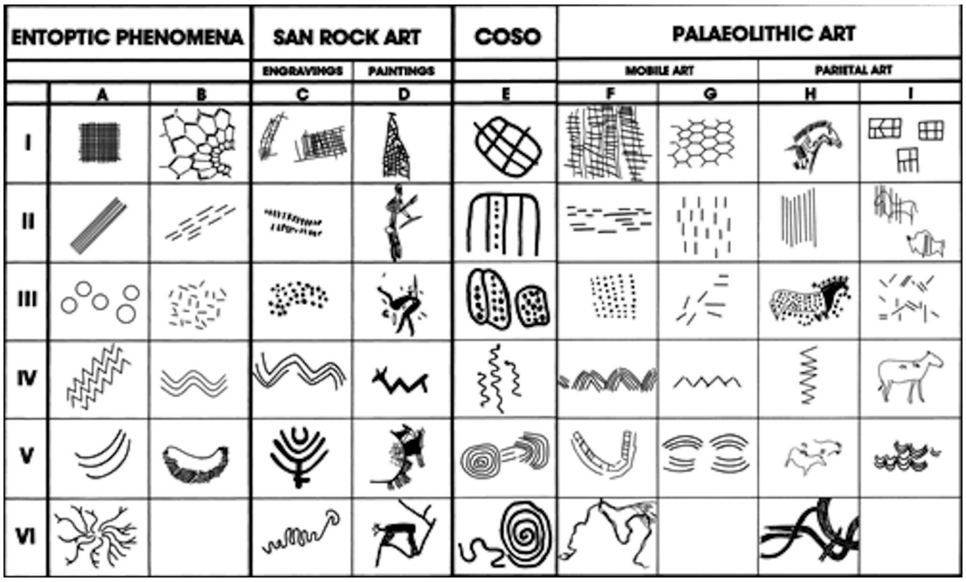

Fig. 6: Entoptic phenomena (Google Images)

lines. The divisions represent the parts of the Sami cosmos, the sky (upper world), the earth and the lower world beneath the earth (Emerson n.d.) Knowledge of the Sami world view may be gained by a study of the ethnography of other peoples in the arctic regions. It becomes clear that the shoreline, where the three worlds meet, is of great importance in Sami belief (Helskog 1995).

Ethnographic information concerning spirits in Sami shamanistic practices and Finnish epic poems seem to be relevant. The types of animals shown in the rock art mirror those appearing in traditions of the historical period (Lahelma 2005). When a Sami shaman went into a trance he literally fell to the ground. Some rock paintings of Finnish origin show a human figure at a 45-degree angle accompanied by an animal. According to Lahelma (2005) these animals would be the spirit helper who accompanied the shaman on his journey. The rock carvings are associated with people's understanding of the worlds in which they and the spirits lived, and with their communication with the spirits (Helskog 1995). Using our knowledge of the ethnographic record shows how the beliefs of many arctic people were connected with animism (Helskog 1999).

Important rituals were (and still are) performed on the shoreline. These are rites related to the changing seasons and transformation from one life to another (Helskog 1999). It can thus be understood why so many examples of Scandinavian rock art are found close to water, either on the shoreline or else close to it, or in rivers. A very important element in this rock art is the rock's physical connectedness with water. Some paintings are situated on a symbolic vertical axis formed by the rock and the deep water below it at which point water, earth and sky meet (Lahelma 2005). One of the recurring Scandinavian myths concerns the sun, which travels across the heavens. The sun is represented by a disc and is often portrayed with a ship, symbolic of its journey below the earth when night falls (Ions 1974). Many of these myths are recorded in Scandinavian literature and knowing them is a factor that enables us to understand some of the symbols in the rock art, such as the sun disc found on the ships or the gold-plated disc of Bronze Age horse-drawn chariots.

Upper Palaeolithic rock art of France

Finally, we must discuss the interpretation of rock art for which no ethnography exists. The Upper Palaeolithic rock art of France presents such a challenge. Most of this art was created during the Magdalenian period of 17 000 to 10 000 years ago, although some of it dates back 30 000 years. There is thus no likelihood of finding ethnographic evidence from other areas of similar dates to help us interpret the art.

Here we turn to what has been called 'the ethnography of the mind'. The brilliant work of Lewis-Williams (2002) and others has identified the cave art as relating to altered states of consciousness. Many of the strange symbols are depictions of that which can be experienced by people under certain circumstances, specifically experiences occurring under conditions of sensory deprivation while frightened and disorientated in a deep, dark, cold and silent cave. Initially one sees shapes such as grids, zigzags, curves, dots, lines, etc. In the second stage one tries to make sense of them by reference to known objects (Fig. 6). An Eskimo might see a polar bear whereas a San would see an eland, both of which were part of the daily life of those people.

In the third stage the person no longer sees images but is now part of another world (Lewis-Williams 2001; 2002). When entering the third stage many people speak of going through a tunnel or vortex. Lewis-Williams (2002) likens the entry into the depths of caves as the equivalent of the vortex. He has explained how the paintings and carvings in the depth of the caves are linked to the spirit world, animals seem to come out of rock or recede into them, depending on the play of light from and oil lamp. In his words, '… the spirit world was there, tangible and material … and some people could empirically verify it by entering the caves and seeing for themselves the "fixed" images of the spirit animals that empowered the shamans of the community and also by experiencing visions' (Lewis-Williams 2002). A cave may be seen as a symbolic womb and as the entrance to the underworld. Caves with running water in them or in which water crosses the boundary to the underworld would be of special significance (Bahn and Vertut 1988).

Images depicted in French caves, in San art and in other shamanistic art relate to trance experiences and an understanding of the meaning of San and similar shamanistic art relating to trances or shamanistic behaviour is thus the key to the understanding of French Upper Palaeolithic art, notwithstanding the lack of other ethnography. Using the analogies of the other shamanistic art, Lewis-Williams (1991) sets up a neuropsychological model to interpret the Upper Palaeolithic art. Being in a trance can create a sensation of flying or swimming, so pictures of humans together with birds or fish are metaphors for trances or diving into the spirit world (Lahelma 2005) (Fig. 7).

Depictions of wounded men are common to the San, Shamanistic and Upper Palaeolithic art. One of the sensations experienced in trance is that of pain. There are many accounts of shamans who tell of their painful experiences while in a trance or on a vision quest. These somatic hallucinations explain the depictions of people whose bodies appear to be pierced by arrows or spears or, in the case of the San, being stung by bees (Lewis-Williams 2002). In the opinion of Vinnicombe & Mowaljarlai (1995), 'the quest for access to, and the control of, unseen forces through concepts of power or potency, is a primary factor underlying the production of rock art … Similar concepts may be recognised in the ethnographies of pre-literate societies in other parts of the world'. It should therefore be reasonable to use the ethnography of one such society to help to explain the art of another.

In conclusion, therefore, it may be said that it is appropriate to use ethnography to explain rock art where such ethnography is relevant and where there are possibly several strands in the cable of evidence linking the ethnography to the art in question. One must steer a careful course between using intuitive logic and making deductive leaps by using the ethnography of one society to interpret the art of another in an age far removed from that where the evidence was taken. A leap of faith should not become a jump into the deep end of prehistory.

Fig. 7: Wounded man, French cave art (Google Images)

References

Bahn, P & Vertut, J. 1988. *Images of the Ice Age.* London: Bellew Publishing Co.

Ballard, C, Bradley, R, Myhre LN & Wilson, M. 2003. The ship as symbol in the prehistory of Scandinavia and Southeast Asia. *World Archaeology* 35(3), 385–403.

Bednarik, R (n.d.). Ethnographic interpretation of rock art. http://mc2.vicnet. net.au/home/interpret/web/ethno/html.

Bindford, L. 1978. *Nunamiut Ethnoarchaeology.* New York: Academic Press.

Coles, J. 2005. S*hadows of a Northern Past.* Oxford: Oxbow Books.

Deacon, J. 2002. Southern African Rock Art sites. http://www. icomos.org/studies/sarockart.htm

Emerson, K. Sami drums – then and now. http://www.utexas. edu/courses/sami/diehtu/giella/music/noaidi.htm.

Helskog, K. 1995. Male and femaleness in the sky and the underworld – and in between. In K Helskog & B Olsen (eds), *Perceiving Rock Art: social and political perspectives*, Oslo: Lie & Co, 247-262.

Helskog, K. 1999. The shore connection: cognitive landscape and communication with rock carvings in northernmost Europe. *Norwegian Archaeological Review* 32(2): 73–93.

Ions, V. 1974. *The Worlds Mythology in Colour.* London. Hamlyn Publishing Group.

Lahelama, A. 2005. Between the worlds: rock art, landscape and shamanism in sub-Neolithic Finland. *Norwegian Archaeological Review* 38(1), 29–47.

Layton, R. 2001. Ethnographic study and symbolic analysis. In D Whitley (ed.), *Handbook of Rock Art Research*, Walnut Creek: AltaMira Press, 311–325.

Lewis-Williams, JD. 1983. An ethnographic interpretation of a rock paining from Barclay East. *Humanitas* 9(3): 245-249.

Lewis-Williams, JD. 1991. Wrestling with analogy: a methodological dilemma in Upper Palaeolithic art research. *Proceedings of the Prehistoric Society* 57(1): 149-162.

Lewis-Williams, JD. 2001. Brainstorming images: neuropsychology and rock art. In D Whitley (ed.), *Handbook of Rock Art Research,* Walnut Creek: AltaMira Press, 332–351.

Lewis-Williams, JD. 2002. T*he Mind in the Cave*. London: Thames & Hudson.

Lewis-Williams, JD. 2003. *Images of Mystery*: *rock art in the Drakensberg*. Cape Town: Double Storey Books.

Lewis-Williams, JD & Pearce, D. 2004. *San Spirituality*: *expressions and social consequences.* Cape Town, Double Storey Books. 171.

Renfrew, C & Bahn, P. 2004. *Archaeology: theories, methods and practice*. London: Thames & Hudson.

Smith, B. 2001. Forbidden images: rock paintings and the Nyau Secret Society of Central Malawi and Eastern Zambia. *African Archaeology Review* 18(4), 187–201.

Taçon, PS. 2001. Australia. In D Whitley (ed), *Handbook of Rock Art Research*, Walnut Creek: AltaMira Press.

Vinnicombe, P & Mowaljarlai, D. 1995. That rock is a cloud: concepts associated with rock images in the Kimberley region of Australia. In K Helsog and B Olsen (eds), *Perceiving Rock Art: social and political perspectives*, Oslo: Lie & Co, 228–246.

Zubieta, L. 2006. *The Rock Art of Mwana wa Chenterere II Rock Shelter, Malawi.* Leiden: African Studies Centre.

SA ARCHAEOLOGICAL SOCIETY

Applications for Research Grants from the Kent and Ward Fund

The Kent and Ward Fund was established as a result of two generous bequests from long-term members of the South African Archaeological Society. The first, in 1992, was from the late Dr Leslie Kent, a geologist in Johannesburg, and the second, in 2019, was from the late Valerie O'Hagan Ward, who organised the Society's branch in Pietermaritzburg for many years. The society has invested the income, and the interest is distributed from time to time at the discretion of the ArchSoc Council to contribute towards –

- financing of field work;
- research projects;
- analysis of archaeological material; and
- publishing or supporting the publication of the results of research.

The Society invites applications each year for awards in all categories. Please read the following guidelines and instructions carefully before completing the official application form. The maximum amount available from the fund per year is R20 000.

Guidelines

- The work must be conducted in southern Africa.
- Preference will be given to researchers domiciled in southern Africa.
- Preference will be given to researchers who are starting a career in archaeology.
- Projects may include archaeological work of any kind that enhances the knowledge of the lifestyle of humankind in southern Africa, such as excavation, rock art recording, site recording, artefact or faunal analysis, identification of plant or animal remains, dating, surveys, physical anthropology, analysis of archaeological collections in museums, experimental archaeology and archival or bibliographic work.
- Proposals may also include publication of the results of research that popularise archaeology for public education and community awareness.
- The fund is not intended for and will not support per diem payments to the applicant, nor to living expenses during the writing of reports or publications.
- The fund will not support fieldwork costs involved in preparing archaeological or other heritage impact assessments.
- The fund will not contribute to the purchase of expensive equipment such as cameras, microscopes or laptops for the analysis of results.
- Successful applicants will be required to provide a digital copy of a report on work completed, or submit a paper for publication to the *South African Archaeological Bulletin* or *The Digging Stick*.

Application forms are available from the ArchSoc website, https://www.archaeology.org.za/grants_and_awards/kent_ward_bequest, or via email requests to secretary@archaeology.org.za. Completed applications must be submitted **before 31 July of each year.** All applications will be refereed by specialists. The successful applicant/s will be notified by 15 September of each year.

SA ARCHAEOLOGICAL SOCIETY

Notice of Annual General Meeting

Notice is hereby given in terms of section 8(a)(i) and (ii) of the Constitution that the Annual General Meeting of the South African Archaeological Society will be hosted by the Northern Branch on 27 May 2021. Because of the restrictions on meetings associated with the Covid-19 pandemic, the meeting will be replaced by annual reports distributed to all branch members by email in the week before 27 May 2021, with responses requested by 1 June 2021.

For further information, please contact the Assistant Secretary, Carole Goeminne at secretary@archaeology.org.za.

Janette Deacon, Honorary Secretary

2 April 2021

ARCHAEOLOGY IN BRIEF

Agreement on aboriginal heritage

The First Nations Heritage Protection Alliance in Australia struck a deal with BHP in October 2020 under which the company agreed to support changes to state and federal laws to ensure that traditional owners give 'free, prior and informed consent' before striking agreements with mining companies. The alliance was set up after Rio Tinto blew up 46 000-year-old rock shelters in the Pilbara. It was also agreed to set up places to keep artefacts taken from sites that 'are a source of pride'. BHP said it had agreed to a set of shared principles around Aboriginal heritage in Australia that reaffirmed its commitment to free, prior and informed consent in agreement making.

Ben Butler & Lorena Allam, 13/11/20

SOUTHERN AFRICAN MIDDLE STONE AGE HOMININ TRACKSITES

Charles Helm, Martin Lockley, Hayley Cawthra, Jan De Vynck, Mark Dixon, Carina Helm, Renée Rust, Willo Stear, Guy Thesen

Through the Cape south coast ichnology project, we have identified more than 300 Pleistocene vertebrate tracksites over the past 14 years. These lie along a 350 km stretch of coastline between Arniston in the west and Robberg in the east. The sites demonstrate how events that transpired on ancient dune and beach surfaces can be preserved, sometimes in impressive detail, and how they are today amenable to analysis and description on the surfaces of aeolianites and cemented foreshore deposits.

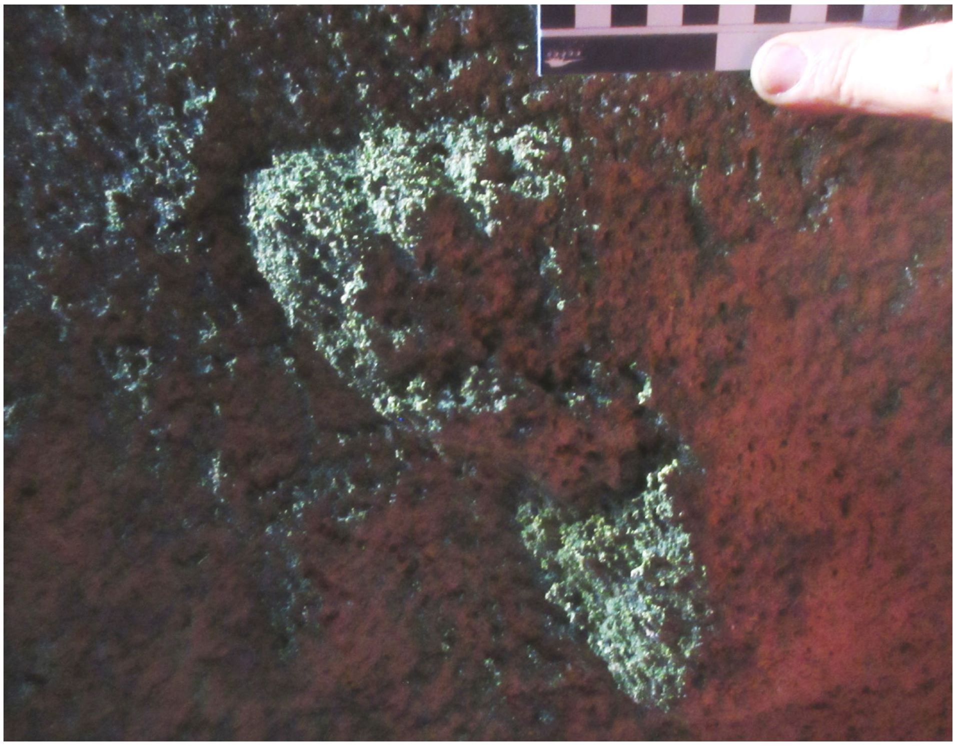

Fig. 1: Natural cast of a hominin track, photographed in natural light (scale bar = 10 cm)

We knew from the outset that early members of our species, *Homo sapiens*, had in all likelihood trodden and traversed some of these surfaces. Searching for hominin tracks thus became a quest and in 2016 we were rewarded with the discovery of such a site (Helm et al. 2018), thereby adding to two previously known sites from southern Africa at Nahoon Point and Langebaan. Anticipating the discovery of further possible hominin tracksites, we suggested criteria and guidelines for their identification in a subsequent publication and considered other track patterns that might potentially be confused with hominin tracks (Helm et al. 2019a). In attributing tracks to *H. sapiens*, we acknowledged that species such as *H. naledi* and *H. helmei* could not be absolutely excluded.

Our suggestions were limited to the analysis of footprints and we were surprised by what we encountered next. It appeared that humans left more than just their footprints on these surfaces since we identified patterns with a 'hominin signature' that suggested foraging behaviour or 'palaeo-art'. We coined the term 'ammoglyph' to describe such patterns created in unconsolidated sand, but which are now apparent in rock (Helm et al. 2019b). In a recently published article in the *South African Journal of Science* we documented three further hominin tracksites on the Cape south coast, thereby bringing the southern African total to six (Helm et al. 2020a). In addition, we reported on another possible but inconclusive site.

As a result of extensive archaeological research, the Cape south coast is known to be of pivotal importance in the origin of cognitively modern humans in the Middle Stone Age. Sites like Blombos Cave, Pinnacle Point and Klasies River have become famous internationally, along with the notion that the region formed a refugium that facilitated human survival (Marean 2010). Ichnology, the study of tracks and traces, has the potential to buttress this corpus of research. For example, our identification of giraffe, hatchling turtle, crocodile and large bird tracks has

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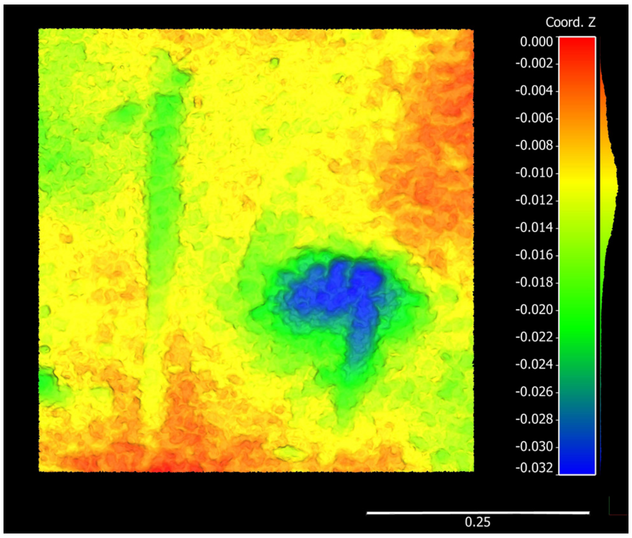

Fig. 2: Photogrammetry colour mesh of a hominin forefoot impression beside one of the groove features in the Goukamma Nature Reserve (horizontal and vertical scales are in metres)

complemented the fossil record and allowed for new palaeo-environmental inferences.

The relative profusion of Pleistocene hominin tracksites in southern Africa is of global importance. The purpose of this article is to briefly review the six southern African tracksites from the Middle Stone Age that have been attributed to *H. sapiens*, consider possible additional sites and discuss related topics.

The six established tracksites

1. The Nahoon Point tracksite, near East London, was identified on an *in situ* aeolianite surface in 1964. Soon afterwards the track-bearing layer collapsed but the slab containing the three hominin tracks in hyporelief (natural casts, representing the infill layer) was recovered and housed in the East London Museum. The tracks have been dated through Optically Stimulated Luminescence (OSL) to ~124 000 years (Roberts 2008).

2. The Langebaan tracksite at the West Coast National Park was identified on an aeolianite surface in 1995 (Roberts 2008). Modern graffiti narrowly missed defacing the tracks. The track-bearing surface, containing three tracks in epirelief (impressions or natural moulds on the original surface), was airlifted to the Iziko South Africa Museum in Cape Town. They have been dated through OSL to ~117 000 years. The discovery received substantial coverage and the tracks became known as 'Eve's Footprints', although they have not been unanimously accepted as being of hominin origin.

3. The Brenton-on-Sea tracksite, on the Cape south coast, was identified in a small wave-cut cave within coastal aeolianite cliffs in 2016 (Helm et al. 2018). The track-bearing layer was not manually recoverable; instead, photogrammetry was performed to provide a digital record. The tracks were inferred to date to ~90 000 years, using carbonate diagenesis and stratigraphic correlation to nearby OSL-dated sites. Forty tracks were present, seen in hyporelief on the ceiling of the cave (Fig. 1) and in cross-section in the cave walls.

4. An epirelief site on an in situ aeolianite surface was identified in 2018 in the Goukamma Nature Reserve on the Cape south coast, between Sedgefield and Buffels Bay (Helm et al. 2019b). Initially, one left forefoot impression, with toe impressions and surrounded by an array of sub-parallel groove features and circular depressions was noted (Fig. 2). It was speculated that these may have been created by a hominin using a stick or a finger, suggesting foraging or messaging. A year later, substantiating evidence was found when two further probable forefoot impressions were discovered (Helm et al. 2020a). One was on an underlying layer, accompanied by further groove features, indicating a repeating pattern over time.

5. Another tracksite in the Goukamma Nature Reserve was identified in 2012 but not initially analysed in detail. Its hominin origin was established in 2019 (Helm et al. 2020a). This site is perhaps globally unique among hominin tracksites in that the hyporelief aeolianite surface occurs in situ under an overhang and the corresponding epirelief surface is exposed on a fallen slab below it (Fig. 3). Thirty-two tracks were present, with a variety of trackways and track sizes (Fig. 4).

6. A tracksite in the Garden Route National Park between Wilderness and Sedgefield was identified in 2013 but again not analysed in detail at the time. Its hominin origin was established in 2019 (Helm et al. 2020a). As many as 18 tracks, of which six

Fig. 3: A member of the research team examines the infill layer of tracks under an overhang in the Goukamma Nature Reserve sites. The fallen block containing the layer in which the tracks were made can be seen below.

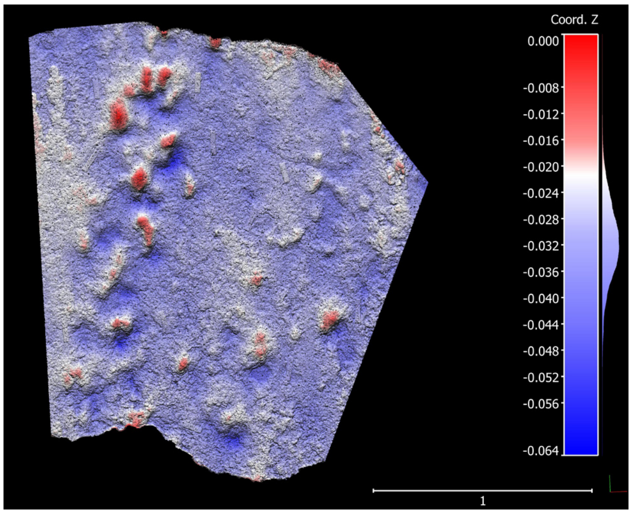

Fig. 4: Photogrammetry colour mesh infill layer showing multiple tracks in the Goukamma Nature Reserve (horizontal and vertical scales are in metres)

could be identified as hominin tracks, occurred in hyporelief on the ceiling of a cave at the foot of aeolianite cliffs (Figs 5 and 6). The interior of the cave is buffeted by waves during high tides and track degradation has been noted. Tracks of various sizes were present.

Other possible sites

In addition to these tracksites, there are a number of other possible sites. One such site at Brenton-on-Sea, just over 300 m from the established hominin tracksite described above, displayed seven tracks in cross-section in aeolianite layers in cliffs (Helm et al. 2020a). Track dimensions, narrow straddle and pace length were consistent with a hominin trackmaker but a definitive conclusion would require the excavation of surrounding sediments for track morphology to be better assessed. Another site in the Garden Route National Park was identified on a loose slab, months after it had been exposed following a large rockfall. Two parallel trackways exhibited features consistent with hominin tracks but a striking feature was a pair of grooves, one beside each trackway with a similar diagonal orientation relative to the direction of travel (Helm et al. 2019b). In this case a thin veneer on the track-bearing surface preserved the detail of these features but over a period of days and weeks after the discovery the veneer was eroded by forces of wind and water. Within less than a year the tracks and grooves could barely be identified.

If the definition of 'tracksite' is broadened to include features other than footprints, then a further site can probably be claimed because of putative knee impressions. One of the ammoglyph sites, on a loose slab in the Garden Route National Park, featured a circular groove with a central depression (Helm et al. 2019b). A plausible explanation for this phenomenon was that a forked stick was used to create it in a process similar to the use of a compass for drawing a circle. If a kneeling posture was adopted, the two appropriately spaced oval depressions adjacent to one portion of the circle may indicate where knees were placed. These would be the oldest human knee impressions thus far described. This specimen is on exhibit in the Blombos Museum of Archaeology in Still Bay.

Associated features

We view the hominin tracks not in isolation but as part of a bigger picture. For example, the tracks at Brenton-on-Sea were found close to elephant tracks and bovid and equid tracks of various sizes. Tracks of other vertebrates are present at all three of the newly described sites, either on the same surface or on surfaces slightly higher or lower in the geological sections.

The presence of Middle Stone Age tools can be another useful indicator. Recently we found a number of such tools embedded in an aeolianite surface about 500 m east of the Brenton-on-Sea site in association with bone and shell fragments. Some 200 m further to the east we have noted a cave in Cape Supergroup rocks that may have been available for use at the time the tracks were made. Stone tools were identified just inside the entrance. At another site, two Middle Stone Age tools were embedded in a large surface containing crocodile and water monitor tracks (Helm et al. 2020b). These reptiles do not occur in the southern Cape today.

Stature, velocity and groups

It has become commonplace, when describing hominin tracks and trackways, to provide estimates of trackmaker stature, walking speed and body mass based on a number of formulae. We recognise the pitfalls inherent in providing such estimates in view of variables such as substrate consistency, gait, upslope vs downslope travel, quality of preservation, etc. While we caution against over-reliance on such

Fig. 5: The entrance to the small cave containing hominin tracks in the Garden Route National Park.

Fig 6: Hominin track in the Garden Route National Park, lightly outlined in chalk (track length = 24 cm)

estimates, they may be of interest nonetheless.

The height of the Nahoon Point and Langebaan trackmakers was estimated to be ~1,28 m and ~ 1,52 m respectively (Roberts 2008). For the main Brenton-on-Sea site, a height estimate was obtained of ~1,53 m for the largest tracks and 1,16 m for some of the smaller tracks (Helm et al. 2018). For the newly described tracksites, such estimates could only be provided for one Goukamma site and the Garden Route National Park site, as the second Goukamma site only contained partial tracks. The largest track at the Goukamma site (length ~20 cm) yielded a height estimate of 1,33 m, while the shorter tracks (length 13 cm) yielded a height estimate of 0,87 m. For the Garden Route National Park site, the largest track (length ~24 cm) yielded a height estimate of ~1,60 m.

Pace length and stride length can be used to estimate trackmaker velocity but we have shied away from such estimates. We have simply noted, for example, that pace and stride lengths at the Brenton-on-Sea site were substantial and that trackmaker direction was down a dune slope. This led to the inference of high trackmaker velocity, with jogging or running down the dune being a possibility. This speculation led to a productive collaboration with Dr Tim Noakes of the University of Cape Town who was interested in what may be the oldest documented evidence thus far of *H. sapiens* running.

Three of the six sites each contained three tracks. The others contained tracks of various sizes. Given the small size of the track-bearing surfaces, the number of individuals represented is a likely a minimum number since there is evidence of several individuals moving in the same direction. While we have been cautious not to over-interpret this evidence, it appears that family groups or other groups made the tracks.

Dating studies

Accurate dating of the tracksites is essential. The Nahoon Point and Langebaan sites have been dated using OSL technology. Because such analyses can currently not be performed in southern Africa, we have sent over two dozen samples to the United Kingdom for OSL dating and are awaiting the results, with the COVID-19 pandemic having delayed the process. In the meantime, we rely on stratigraphic correlation to known dated sites and the use of carbonate diagenesis.

The palaeogeography of the Cape south coast is related to the results of the dating studies since the distance of the tracks from the coastline at the time they were made is related to Pleistocene sea-level oscillations and the repeated exposure and inundation of the vast Palaeo-Agulhas Plain. The shoreline may at times have been up to 60 km seaward of the present-day coast.

The global hominin track record

A comprehensive review of hominin tracksites and ichnotaxonomy on a global level listed 63 sites (Lockley et al. 2008). At that point, there were only six generally accepted hominin tracksites that were older than the South African examples and none of these were attributed to *H. sapiens*. Many additional sites have been reported since the paper by Lockley et al. but subsequent discoveries on the Cape south coast make southern Africa one of the most productive regions in the world for finding Middle Stone Age hominin tracks.

In the same week that our latest findings were published in the *South African Journal of Science* (Helm et al. 2020a), an article in *Science Advances* provided details of a site identified in lakeshore sediments on the Arabian Peninsula dated to between 121 000 years and 112 000 years ago. The tracks were attributed to *H. sapiens* (Stewart et al. 2020) and the site therefore joins the six South African sites as the oldest-known sites with tracks attributed to our species. For the sake of completeness, we also mention here a Holocene site in the Namib Desert that contained a large number of tracks from a variety of species, including humans (Morse et al. 2013).

The southern African sites all occur in aeolianites representing past dune surfaces. However, from a global perspective this is rare (Lockley et al. 2008). More common substrates are solidified volcanic ash and undisturbed cave floor deposits, which more readily preserve track morphology than aeolianites. The great majority of global hominin track record are also evident in epirelief (Lockley et al. 2008). The prevalence of tracks in hyporelief in southern Africa is therefore a regionally common but globally rare phenomenon.

Did Middle Stone Age humans use footwear?

Given their other technological accomplishments, could our Middle Stone Age ancestors on the Cape south coast have fashioned footwear? The chances of such perishable materials surviving and being identifiable must be minimal. However, the means, motive and opportunity may have been present.

The Cape south coast contains some of the earliest records of bone awls and blades (Henshilwood et al. 2001), which can be seen as a proxy for the development of complex clothing and possibly footwear. There is no evidence of shod humans from the six sites thus far identified. However, there are plausible motives for footwear use, which may have been intermittent to prevent lacerations during intertidal foraging on sharp rocks or provide protection against the extremes of heat and cold. Ichnology may be the most promising discipline with which to investigate this possibility in South Africa.

Preservation, recovery and replication

After being buried for tens of thousands of years, once exposed by erosion or cliff collapse, track-bearing surfaces are subjected to the same effects. Within as little as weeks, detail may be lost and we suspect that survival beyond a few decades would be unusual. An example is the recent collapse of a portion of the cave roof at the main Brenton-on-Sea site, resulting in the loss of a number of hominin tracks.

Each identified site has heritage value and each discovery therefore presents a challenge with regard to protection, preservation and replication. The Nahoon Point and Langebaan examples demonstrate how physical recovery and curation in a secure facility presents one option. In other cases, the nature of the site, e.g. a cave ceiling, makes such attempts unfeasible. Traditional means of replication, such as casting, run the risk of damaging the surface. Newer techniques, such as the creation of 3D models through photogrammetry, present a non-invasive form of documentation and replication. Photogrammetry studies have therefore been applied to the four hominin tracksites that we have identified.

A dynamic and ephemeral resource

We view each identified tracksite as something precious and ephemeral, part of a dynamic process that involves the exposure of new sites and the loss of previously identified sites. We can only speculate on how many thousands of tracksites, including hominin sites, may have come and gone over the past centuries. We also recognise that the forces of erosion are sometimes temporarily on our side, enlarging the exposed portions of track-bearing surfaces and revealing unexpected details, before the surfaces eventually become degraded or are lost completely. Modern graffiti, unfortunately, is increasingly present, and a number of tracksites have been damaged.The message is clear: constant vigilance and exploration are required to find and document new sites soon after exposure. But regardless of whether or not we identify more hominin tracksites in the future, it is evident that such sites, with their global heritage implications, are more common than was previously supposed.

References

Helm, CW, McCrea, RT, Cawthra, HC, Cowling, RM, Lockley, MG, Marean, CW, Thesen, GTT, Pigeon, T & Hattingh, S. 2018. A new Pleistocene hominin tracksite from the Cape south coast, South Africa. *Scientific Reports* 8, Art #3772. https://doi.org/10.1038/s41598-018-22059-5.

Helm, CW, Lockley, MG, Cole, K, Noakes, TD & McCrea, RT. 2019a. Hominin tracks in southern Africa: a review and an approach to identification. *Palaeontologia Africana* 53, 81–96.

Helm, CW, Cawthra, HC, De Vynck, JC, Helm, CJ, Rust, R & Stear, W. 2019b. Patterns in the sand: a Pleistocene hominin signature along the South African coastline? *Proceedings of the Geologists' Association* 130(6), 719–740. https://doi.org/10.1016/j.pgeola.2019.08.004.

Helm, CW, Lockley, MG, Cawthra, HC, De Vynck, JC, Dixon, MG, Helm, CJZ & Thesen, GTT. 2020a. Newly identified hominin trackways from the Cape south coast of South Africa. *South African Journal of Science* 116(9/10) https://doi.org/10.17159/sajs.2020/8156.

Helm, CW, Cawthra, HC, Combrink, X, Helm, CJZ, Rust, R, Stear, W & Van den Heever, A. 2020b. Pleistocene large reptile tracks and probable swim traces on South Africa's Cape south coast. *South African Journal of Science* 116(3/4). https://doi.org/ 10.17159/sajs.2020/6542.

Henshilwood, C, d'Errico, F, Marean, C, Milo, R & Yates, R. 2001. An early bone tool industry from the Middle Stone Age at Blombos Cave, South Africa: implications for the origins of modern human behaviour, symbolism and language. *Journal of Human Evolution* 41, 632–678. https://doi.org/ 10.1006/jhev.2001.0515.

Lockley, M, Roberts, G & Kim, JY. 2008. In the footprints of our ancestors: an overview of the hominid track record. *Ichnos* 15(3–4), 106–125. http://dx.doi.org/10.1080/10420940802467835.

Marean, CW. 2010. Pinnacle Point Cave 13B (Western Cape Province, South Africa) in context: the Cape floral kingdom, shellfish and modern human origins. *Journal of Human Evolution* 59(3–4), 425–443. https://doi.org/10.1016/j.jhevol.2010.07.011.

Morse, SA, Bennett, MR, Liutkus-Pierce, C, Thackeray, F, McClymont, J, Savage R & Crompton, RH. 2013. Holocene footprints in Namibia: the influence of substrate on footprint variability. *American Journal of Physical Anthropology* 151,265–279. https://doi.org/10.1002/ajpa.22276.

Roberts, DL. 2008. Last Interglacial hominid and associated vertebrate fossil trackways in coastal eolianites, South Africa. *Ichnos* 15(3), 190–207. http://dx.doi.org/10.1080/ 10420940802470482.

Stewart, M, Clark-Wilson, R, Breeze, PS, Janulis K, Candy, I, Armitage, SJ, Ryves, DB, Louys. J, Duval, M, Price, GJ, Cuthbertson, P, Bernal, MA, Drake, NA, Alsharekh, AM, Zahrani, B, Al-Omari A, Roberts, P, Groucutt, HS & Petraglia, MD. 2020. Human footprints provide snapshot of last interglacial ecology in the Arabian interior. *Scientific Advances* 6, eaba8940. https://doi.org/10.1126/sciadv.aba8940.

WORLD ARCHAEOLOGY

Ancient Mayan water filtration system

As early as 2 185 years ago, the Maya built a complex water filtration system at the Corriental reservoir not long after settlement of Tikal in today's Guatemala began around 300 BC. The system, which relied on crystalline quartz and zeolite, a compound of silicon and aluminium to create a 'molecular sieve' capable of removing harmful microbes, heavy metals and other pollutants in settling tanks, remained in use until the city's abandonment around 1100. The same minerals are used in modern water filtration systems. Archaeologists have documented other types of water systems, including ones based on sand, gravel, plants and cloth in Egypt, Greece and south-east Asia as early as the 15th century BC.

'A lot of people look at Native Americans as not having the same engineering or technological muscle of places like Greece, Rome, India or China,' said lead author Kenneth Tankersley from the University of Cincinnati, 'but when it comes to water management, the Maya were millennia ahead. Water quality would have been a major concern for the Maya as Tikal and other cities across the empire were built on porous limestone that left little water during seasonal droughts. Without a purification system, drinking from the Corriental reservoir would have made people sick because of the presence of cyanobacteria and similarly toxic substances. Researchers previously found that other reservoirs in the area were polluted with mercury, possibly from pigment the Maya used on walls and in burials. However, Corriental was free of contamination. Tikal, known as Yax Mutal to its ancient inhabitants, consisted of more than 3 000 structures. At its height in 750, it was home to at least 60 000 people. *Scientific Reports, 02/11/20*

ERRATUM

A layout glitch occurred in the December 2020 issue of *The Digging Stick.* In Dawn Green's lead article 'Gender and northern eastern Cape San rock art', Fig. 4 on page 3 was duplicated as Fig. 3 with an incorrect caption at the head of the page. Apart from this, all figures in the article are correctly positioned and numbered. With apologies to Dawn Green.

The South African Archaeological Society

This is the society for members of the public and professionals who have an interest in archaeology and related fields such as palaeontology, geology and history. Four branches serve the interests of members. They arrange regular lectures and field excursions guided by experts, annual and occasional symposia, and longer southern African and international archaeological tours.

The Society was founded in 1945 to promote archaeology through research, education and publication. It is a non-profit organization – Registration No. 024-893-NPO.

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- ***South African Archaeological Bulletin***, biannual scientific publication of current research in southern Africa.
- ***The Digging Stick***, the Society's general interest magazine – three issues a year.
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