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THE P5 PROJECT: RESEARCH QUESTIONS, CURRENT RESULTS AND FUTURE DIRECTIONS

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Glacial periods in human prehistory have long been viewed as stressful – even deleterious – times for humans, impacting their behavioural adaptations, proliferation and survival. Across Africa, numerous palaeoenvironmental and palaeoclimatic records have shown that during glacial periods in the Pleistocene many inland areas suffered from drought, plant and animal resources dwindled, and hunter-gatherers abandoned areas that could not sustain them. Coastal areas were not immune to these changes either and studies of past relative sea levels have shown that large tracts of land were exposed on shallow continental margins as sea levels fell.

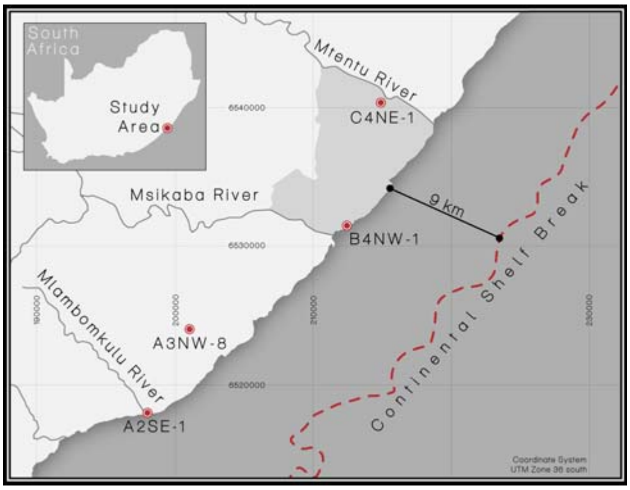

Fig. 1: Map of eastern Pondoland showing the P5 study area, the narrow width of the continental shelf and the four archaeological sites mentioned in the text

Across South Africa, marine geomorphic mapping and geospatial studies have shown that a landmass equivalent to the island of Ireland today (~80 000 km^2) may have even been exposed on the continental margins during glacial maxima (Fisher et al. 2010).

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The effects of this outward expansion of the coastline would have been most pronounced across the broad and flat Agulhas Bank and the Atlantic margin, and many of the most famous coastal Middle Stone Age (MSA) archaeological sites, like Klasies, Pinnacle Point, Blombos and Elands Bay, would have been located 20 km to 100 km inland at these times.

There is an active interest in hunter-gatherer adaptations to coastal zones right now, and for good reason. Coastal intertidal foraging would have provided an abundant and predictable food base to modern humans when other areas may have been uninhabitable. Recent studies of modern coastal foragers from the south coast of South Africa have shown that the measured energetic return rates from intertidal foraging during spring low tides could have easily sustained hunter-gatherers with minimal subsidies of energy and protein from terrestrial resources (De Vynck et al. 2016). Intertidal shellfish are also rich in polyunsaturated fatty acids, iodine and iron that may have even given early modern humans a selective advantage towards developing and supporting larger brains.

OTHER FEATURES IN THIS ISSUE

We acknowledge with thanks the colour sponsorship by Prof. Francis Thackeray, Evolutionary Studies Institute, University of the Witwatersrand.

The rich nutrient loads in shellfish would have also aided gestation, neonatal and juvenile cognitive development and provided essential health benefits to adults, just as they do today. In fact, recent nutrient analyses of common marine and terrestrial fauna from the west coast of South Africa have shown that it would have been possible for MSA hunter-gatherers to meet daily nutrient levels of protein and iron, which are necessary to maintain health and ensure juvenile development (Kyriacou et al. 2014). In addition to shellfish, coastal zones would also have provided access to sea birds, seals, tortoises, beached whales, and other terrestrial plants and animals that would have provided further resources to support hunter-gatherers. This dense and predictable smorgasbord of food resources may have even contributed to the formation of many prosocial behaviours found in modern humans, as hypothesised by Curtis Marean (2015), as bands of hunter-gatherers began working together to maintain patches of coastal resources and defend their resources from other groups.

But there is a problem. Both archaeological and ethnographic observations suggest that hunter-gatherers did not regularly collect coastal resources when their base camp was located beyond the distance a person could walk out and back in a day, which is about 8 km to 10 km. Throughout much of the glacial record, South Africa's modern coastline (and archaeological sites) would have been too far away from most places on the contemporary South African seaboard to support regular coastal foraging. Instead, hunter-gatherers would have had to move out onto the exposed continental platform to remain within easy foraging distance to their contemporary coastlines. As sea levels rose during interglacial periods and ultimately at the onset of the Holocene, ~13 000 years ago, that entire record of glacial coastal foraging on the exposed continental shelf would have been destroyed. In fact, up to 55 per cent of the last 200 000 years of coastal foraging may now be lost to the Atlantic and Indian Oceans.

How did coastal hunter-gatherers adapt to glacial conditions? Did coastal resources play a key role in modern human survival and evolution during the Pleistocene? Answering these questions hinges on finding and studying new records of coastal foraging prehistory in areas where a narrow continental margin has created a stable coastal environment that would facilitate the formation of long-term coastal foraging records, spanning both glacial and interglacial periods. One of the few places across southern Africa where long-term and continuous records of coastal foraging may be found is in Pondoland on South Africa's eastern seaboard. This is because the continental margin across this region was sheared by the movement of the Falklands microplate during the breakup of Gondwanaland around 135 to 115 million years ago, creating an exceptionally narrow continental shelf that is now only around 8 km wide.

The narrowness of this shelf means that any archaeological site found on or near the modern coastline would have remained within the walking limits of daily coastal foraging throughout the Pleistocene. Pondoland also hosts a dense, highly-productive and ancient indigenous vegetation that is tightly packed into a narrow coastal zone that includes numerous animal and plant resources. There are even abundant coast-perpendicular river valleys that are sources of fresh water and well-protected rock shelters. In fact, palaeohydrological records from a marine sediment core taken offshore from the Kei River suggest that many of the larger river systems in Pondoland would have remained active throughout glacial phases, providing a ready supply of fresh water to people, plants and animals (Ziegler et al. 2013). Pondoland, therefore, is one of the few places across the entire South African seaboard where one can justifiably expect to find continuous records of coastal foraging that have not been influenced by coastline changes.

Fig. 2: Site A2SE-1 in the Lambasi region of eastern Pondoland looking east. The site is located adjacent to Waterfall Bluff.

In 2011, the Pondoland Palaeoenvironment, Palaeoclimate, Palaeoecology and Palaeoanthropology Project (P5) conducted a preliminary ground survey of eastern Pondoland. The survey was limited to the Mkambati Game Reserve, Msikaba and Lambasi areas immediately to the south of where coastal exposures of quartzitic cliffs are common (Fig. 1). During the survey we found abundant marine mollusc shells in association with stone tools and terrestrial faunal remains at nearly two dozen rock shelters, and many of the stone tools that we observed appeared to be characteristic of lithic traditions dating from the last ~20 000 years, attesting to human occupations at those times. We also found surface collections of MSA artefacts in association with marine shellfish remains at several rock shelters.

At site B4NW-1 we even documented later Acheulian Early Stone Age and MSA artefacts on exposed coastal palaeosols, although shellfish remains were absent. Our preliminary single-grain luminescence ages from archaeologically-sterile sections in two of those palaeosols are the first direct dates of these formations from the region and they show that humans have been living in Pondoland minimally for the last ~300 000 years. We even collected several sediment cores from across the area and our analysis of a core collected near the Four Falls waterfall in the Mkambati Nature Reserve is the first diachronic palaeoenvironmental sequence from the area. The pollen and phytolith analyses from this core support the antiquity of the grasslands in the area, and these analyses have given us the first indication that there may even have been a shift from C3 to C4 vegetation in the past, though much more work needs to be done to validate these findings.

In 2015, P5 returned to eastern Pondoland to conduct test excavations at four of our highest-priority sites identified during the 2011 survey. Criteria for being considered for test excavations included the abundance and diversity of stone artefacts, the presence of marine and terrestrial plant and animal remains, and inferences that we could make about the sediment depth and stratification based on natural erosional profiles and the geomorphic configurations of the rock shelters. The first site we tested was A2SE-1 (Fig. 2). The rock shelter is 76 m long x 15 m wide and it is located ~25 m above mean sea level (amsl) near the point where the Mlambomkulu River cascades into the Indian Ocean. Our excavations have focused on sections of natural erosion adjacent to the dripline where we could see stratified sediments with in situ stone artefacts and shellfish. Our excavations have uncovered strata with abundant rocky intertidal shellfish, stone artefacts and fauna with intermittent macrobotanic preservation and charcoal. We also collected numerous charcoal samples for radiocarbon and palaeoenvironmental analysis, as well as optically stimulated luminescence (OSL) dating samples, which will be used to date the stratigraphic sequences.

The second site that we tested was A3NW-8, which is part of a much larger rock shelter complex located about 3 km inland within the upper Mkweni River valley (Fig. 3). The site is 28,5 m x 6,5 m and has an open, flat and dry floor. However, in spite of unique rock art located across the walls of the shelter, and abundant stone artefacts and faunal remains scattered across the shelter floor, the excavated sediments were archaeologically sterile save for the top ~5 cm, where occasional artefacts were found.

Fig. 3: Site A3NW-8, located adjacent to the Mkweni River in eastern Pondoland has abundant rock art, but the sediments were nearly archaeologically sterile

Fig. 4: Site C4NE-1 near the Mtentu River within the Mkambati Nature Reserve. Despite being the furthest inland of the four tested sites, C4NE-1 still had abundant marine shellfish remains within the archaeological deposits.

The third site tested was C4NE-1 (Fig. 4), which is located in the north Mkambati area less than 1 km from the Four Falls waterfall that empties into the Mtentu River. The site is 33 m x 9 m but the inner ~4 m of the site has been infilled nearly to the shelter roof by aeolian processes. The deposits are well-protected from rain and the floor is dry and composed of lightly-cemented silty-sands. Our deepest test excavations at this site have revealed a ~70 cm stratified sequence with abundant shellfish, stone artefacts and terrestrial faunal remains. Charcoal was rare, but we did collect luminescence dating samples alongside several micromorphological samples and sediment samples for archaeobotanical analysis. One test excavation quad was stopped at ~20 cm after articulated human remains were discovered, documented and carefully reburied.

Our final site was B4NW (Fig. 5). It is located near the north shore of the Msikaba River mouth and ~175 m from the shoreline. The site is located on a vegetated dune lying parallel to the coast where natural exposures have revealed multiple stratified red palaeosols where abundant Acheulian and MSA artefacts can be found. In 2011, we dated archaeologically-sterile sections of the lower palaeosol to ~300 ka and an upper palaeosol to ~130 ka. Our recent test excavations have exposed the contact between these two sedimentological deposits, but they have revealed a previously unrecognised sedimentological unit stratified in between these two palaeosols that may fill in part of the time gap between 300 ka and 130 ka. We also documented a dense MSA occupation surface elsewhere on the dune complete with refitting artefacts.

In addition to the archaeological excavations, one of our archaeobotanic specialists, Irene Esteban (University of Barcelona), also surveyed across much of our study area, collecting multiple long transects of modern soils and cross-cutting each of the main vegetation types. These soil samples will be used by our archaeobotanic team members (Frank Neumann – University of Münster, Marion Bamford – University of the Witswatersrand, Rosa Albert – University of Barcelona, and Irene Esteban) to characterise the modern distribution of plant pollen and phytoliths across the landscape as we proceed to study the archaeological macrobotanic and microbotanic remains in the future. Our project geologist, Hayley Cawthra (SA Council for Geoscience), also spent a considerable amount of time surveying the study area and collecting geological samples that will give us a better understanding of the coastal geomorphic history of the study area.

Fig. 5: Site B4NW-1, which is located near the Msikaba River within the Mkambati Nature Reserve, contains abundant Early and Middle Stone Age artefacts. The dune is composed of at least three palaeosols dating as far back as 300 000 years ago.

All of the collections are now being processed in our laboratory at the East London Museum, with analysis ongoing. This includes studies of the archaeomalacology (Antonieta Jerardino – Pompeu Fabra University); lithic artefacts (Justin Pargeter and Matthew Sisk – University of Notre Dame); luminescence dating (Zenobia Jacobs – University of Wollongong); magnetic susceptibility (Andrew Herries – LaTrobe University); micromorphology (Hayley Cawthra); modern ecology (Jan Venter – Nelson Mandela Metropolitan University); micromammals (Thalassa Matthews – University of Cape Town); and terrestrial fauna (Jamie Hodgkins – University of Colorado, Denver).

Furthermore, our project members have also spent a considerable amount of time developing a robust interaction with South African scientists, students and local communities. In fact, one half of our senior scientists on the P5 Project are South African. We have also partnered with the SACP4 Project (principal investigator, Curtis Marean) and MAP-CRM (co-directors, Curtis Marean and Bettina Gennari) in Mossel Bay to work with their highly trained South African crew. In the past field season we worked with two of MAP-CRM's most experienced excavators, Bonile Mjacu and Lwando Maxidolo, who also speak fluent isiXhosa, and we were able to begin training local amaPondo recruits in archaeological excavation. We have also partnered with the East London Museum where we are working with museum staff to develop modern, multilingual education exhibits about the prehistory of the Wild Coast. Towards that goal, a collaboration was recently begun with NGT Consulting (director, Nkosinathi Tomose) to translate our research publications and educational outreach into isiXhosa. Lastly, P5 members have worked closely with the community leaders from Mkambati and Lambasi, informing them of results, plans and preparations. This past field season we also cooperated with the traditional chief of the Lambasi amaPondo, Nkosi Mthuthuzeli Mkwedini, to provide 100 chairs for their local community in lieu of a traditional fee to camp on their land and to assist the communities that supported us during our field research.

P5 follows in the footsteps of several influential prior researchers, such as Oscar Davies (1950, 1982), Jim Feely (1980, 1985, 1986, Feely & Bell-Cross 2011, Granger et al. 1985), and Robin Derricourt (1977), each of whom has made a substantial contribution to our understanding of the people and prehistory of Pondoland. This area's coastal foraging history remains virtually unknown, however, and yet we think that it could provide one of the best chances to recover long-term and continuous records of coastal foraging. Our research is driven by the hypotheses that the unique convergence of natural resources and the narrow continental shelf promoted a long-term and continuous occupation of the region spanning both the Middle and Late Pleistocene. If we are correct, then our recent findings are the first step towards filling in those critical missing pieces of coastal foraging history – how coastal hunter-gatherers responded to glacial conditions – and understanding what effect, if any, coastal intertidal foods had on the physiological and behavioural changes in modern humans.

Acknowledgements

The P5 project thanks the generosity and cooperation of the Mkambati and Lambasi communities for allowing it to camp and work in their area. We also want to thank Vuyani Mapiya and the staff at the Mkambati Nature Reserve; John Costello, Sello Mokhanye and the Eastern Cape Provincial Heritage Resources Authority; Celeste Booth and the Albany Museum; Kevin Cole and the staff at the East London Museum; and Curtis Marean, MAP-CRM and the SACP4 Project. The field research was made possible through the support of a grant from the US National Science Foundation (BCS-1501914 to Fisher) and from a grant from the John Templeton Foundation to the Institute of Human Origins at Arizona State University.

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ARCHAEOLOGY IN BRIEF

Ancient Roman cult temple. Archaeologists have uncovered possibly the oldest known Roman temple at Sant'Omobono church, at the foot of Capitoline Hill, one of the most remarkable and least understood archaeological sites in Rome. Previous work has uncovered multiple layers comprising Middle and Late Bronze Age materials dating back to the 7th century BC, as well as substantial evidence of continuous cult activity beginning in the late 7th and early 6th centuries BC. The archaeologists dug down 5 m below the water line to reach the ruins of the temple, where they found large numbers of votive offerings. Today, the Tiber River is about 100 m away, but when the city was being created it flowed close to the temple and a bend in the river provided a natural harbour for merchant ships. *Ancient Origins, 30/01/2014*

A RITUAL 'GEMSBOK HUNT' AMONG SAN IN THE KALAHARI

Gary Trower and Francis Thackeray

From December 2004 to August 2006, Gary Trower resided in Botswana and attended many trance dances performed by several San communities in the central western regions of the Kalahari. Among the dances seen were a number by Nharo dancers who performed a 'gemsbok hunt' ritual. The majority of these rituals took place at night around a fire at Dqae Qare game reserve in the Ghanzi district. One of the male performers simulated the behaviour of a gemsbok (*Oryx gazella*), carrying long sticks over his head to simulate its horns (see figure). The dancer impersonated the gemsbok, mimicking its walking and grazing. One or two dancers stepping a short distance behind the gemsbok played the role of 'hunters' following the spoor of the antelope and discussing the best way to proceed. Other dancers would act like dogs on the spoor, mimicking the movements of the excited animals. Once the hunters and dogs were close to the antelope, the dogs would start barking and nipping at the legs of the gemsbok, which would attempt to kick and impale them with its horns. After the gemsbok had been cornered by the dogs, the hunters would spear and symbolically kill it, using their dance sticks as spears. In addition to the dance sticks, the hunters wore cocoon dancing rattles and made use of flywhisks.

We suggest that such gemsbok hunting rituals were analogous to hunting rituals recorded by Heinrich Lichtenstein (1812). He reported a hunter simulating the behaviour of a herbivore that was symbolically wounded and killed, in the belief that this was essential for success in a forthcoming hunt. These rituals, definitely associated with the principle of 'sympathetic hunting magic' or 'empathy', may in turn relate to rock art such as therianthropes at Melikane in Lesotho, as discussed by Thackeray (2005).

It would seem that hunting rituals associated with sympathetic hunting magic were related to trance during which individuals were believed to 'die at the same time as the antelope' in the belief that hunters could thereby access control over game (Thackeray 2005a & b). 'Death' was a metaphor for trance (Lewis-Williams 1980, 1981).

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Acknowledgement

Gary Trower thanks the San community from Dqae Qare in the Kalahari for the opportunity to participate in and photograph the ritual shown in the accompanying figure.

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ARCHAEOLOGY IN BRIEF

Humans lived on Thames in 7 000 BC. Evidence that humans lived on the River Thames 9 000 years ago has been discovered by archaeologists working on the Crossrail project. A Mesolithic tool-making factory featuring 150 pieces of flint was found at the tunnelling worksite in Woolwich. The find indicates that humans returned to England after a long hiatus during the Ice Age. *BBC, August 2013*

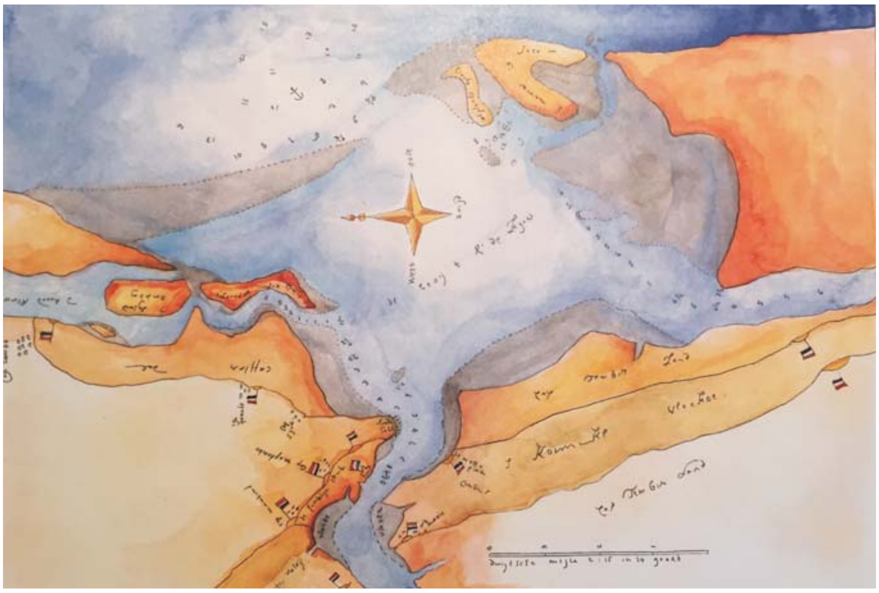
BLUE BEADS IN DUTCH 18TH CENTURY TRADE IN DELAGOA BAY

Linell Chewins

In 1721 the Dutch settled on the northern shore of Delagoa Bay in the hope of trading for ivory and gold. In May of that year the crew of the *Snuffelaar* off-loaded, amongst other goods, a barrel of blue glass beads. Little did the band of soldiers turned traders know to what extent these beads would determine the future success of their trading post.

This first consignment of beads disappeared into the hands of black traders in just seven days and from then on a steady stream of complaints about the lack of a suitable assortment of beads flowed to the metropolis in Holland. In the two months prior to the fateful arrival of the barrel of blue beads, trading post employees had had no difficulty in trading any type of bead for goods and labour (Cape Archives nd1).[1] Throughout the existence of the trading post, blue beads would remain in short supply. Urgent requests to the Council of Seventeen to take note of the examples sent and to supply beads of that exact size and colour apparently fell on deaf ears, and the ivory trade slowed down to almost nothing each time the supply of blue beads ran out (Nasionaal Archief nd1). Over time the demand for blue beads increased, especially as traders from the interior became regular visitors to the bay. The unrelenting demand is suggestive of the great value of blue beads, which became so valuable, in fact, that they could be exchanged for cattle. Considering the obvious importance of blue beads to societies around Delagoa Bay, it may be that the constant demand for these beads was linked to an environmental factor: drought.

The association between beads and agriculture is an ancient one, and is linked to the advent of agriculture in the Near East (Mayer & Porat 2008). Here, in a world where rainfall is sporadic and unpredictable, magical thinking played a role in providing a sense of security around harvests (St James et al. 2011). Farmers went to great lengths to acquire green beads (in an area that contained no green minerals) to influence new growth and the promise of a successful harvest.[2] Green and blue beads were substituted for each other in different societies because stones and minerals of these colours often range between these two hues. The association of such beads with luxuriant vegetation and the rain that results in growth seems to be a universally-accepted notion (Budge in in Meyer & Porat 2008). This idea also spread to societies in southern Africa, who through trade came in contact with the Muslim world and its culture at least a thousand years before the arrival of the Dutch in Delagoa Bay.



Map of Delagoa Bay, drawn by Linell Chewins after Jan de Koninck, 1726

In view of the wide association of blue beads with fertility and rain, the demand for blue beads seems logical in an often drought-stricken Delagoa Bay and hinterland. Like the rest of southern Africa, Delagoa Bay is exposed to the vagaries of weather patterns related to El Niño.[3] Blue beads, and other blue objects like Chinese porcelain, were used as charms or amulets and 'are common items in archaeological assemblages from [African] coastal Islamic sites' and 'blue beads, blue buttons … and even pieces of blue pottery are powerful against the evil eye' (Donley 1987). In West Africa the colour blue represented

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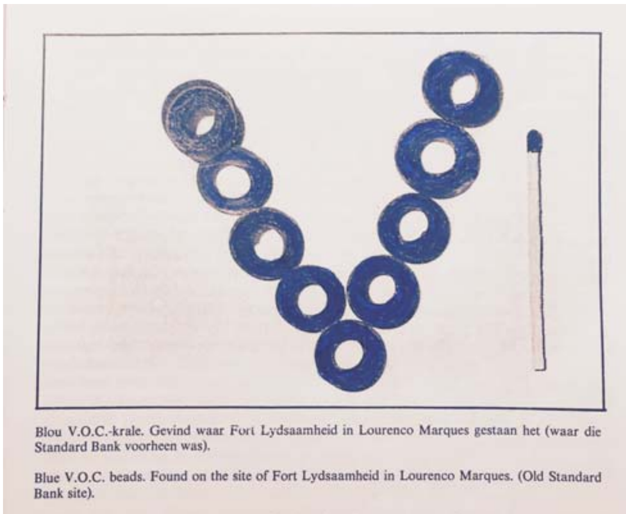
1 Labour at the fort was predominantly provided by women and children who gladly accepted any kind of bead for their work.

2 The green beads found in Neolithic sites consisted of one of the following materials: apetite, fluorapatite, malachite

3 El Niño, which is associated with drought, is the warming of sea-surface temperatures in the equatorial Pacific Ocean. This influences atmospheric circulation and consequently rainfall and temperature in specific areas around the world, including southern Africa.

spiritual protection. African-American slave burial sites consistently present blue beads; no other colour is so uniformly presented (Stine et al. 1996). The preponderance of blue beads at these sites suggests that they were regarded as objects that could ensure success in a range of aspects of life, such as journeys, hunting, farming and the acquisition of goods, apart from having a protective function to ward off evil (Stine et al. 1996, 54). In West Africa the predominant evil may have been harm from others and sickness, but in southern Africa the great enemy was drought and famine.

In Zulu culture, light blue beads indicated ripeness and fertility (Morris 1994, in Meyer & Porat 2008). The Venda prized small blue beads called 'beads of the water', a title that could either refer to the place of their origin (the coast) or to rainwater. As elsewhere in the world, where cultivation occurred in arid and semi-arid areas, the impulse to have green beads existed in southern Africa. The Tswana produced beads from serpentine rock, which was associated with well-watered areas and good pasture (Harger 1941).



Blue VOC beads found on the site of Fort Lydsaamheid in Lourenço Marques (Maputo). This was the old Standard Bank site.

A drought had gripped Delagoa Bay when the Dutch arrived in the autumn of 1721. The men struggled to cope in a heat wave as they explored the shore and chose to escape to the relative coolness of the ship's decks (Cape Archives nd2). After they eventually settled ashore, they continually complained of burning hot days – 'by dag brandend heet' (Cape Archives nd3). Despite the sweltering conditions, the Dutch planted a garden but its early development consistently told a tale of drought, and letters to the Cape were filled with complaints about the difficulties the cultivators had in propagating seedlings in circumstances of 'excessive hitte' (Cape Archives nd4). In October, the first trading post commander, Casparus Swertner, wrote to the Political Council at the Cape about the state of the garden:

'Because of the great drought in the area and the lack of rain, the earth consists of pure sand … the absence of moisture and excessive heat scorched [seedlings]' (Cape Archives nd5).

The planting of seedlings under trees was of little help when rains failed in 1721. While locals promised that the rainy season had arrived, Swertner reported in November that according to their standard, the weather they were experiencing was inconsistent with the term rainy season. High temperatures and the lack of rain continued into 1722, when seedlings barely a 'vinger breedte of twee' (a finger's breadth or two) above the ground dried up as a result of the heat. The hope for a garden growing taro, beans and vegetables seemed lost to the ravages of drought (Cape Archives nd6).

Further evidence of a drought at this time comes from a sacrifice brought by chief Maphumbo during a hot and dry December 1721. The trading post lay in the territory of the Mfumo, who offered sacrifices to invoke rain. According to Junod (1962), if the spring rain fails, a sacrifice of a black animal is offered to entice the ancestors to send rain. Maphumbo's lineage, like most societies around Delagoa Bay, was claimed to come from Kalanga, whose inhabitants followed Mwari (god) rainmaking rituals. Throughout Mfumo history they had a contingent of high priests to make sacrifices for rain when either Mwari or the territorial spirits of the ancestors, who represented the founders of a community, needed to be appeased (Feierman 1992). Maphumbo claimed to be of such a priestly line and that he alone had the power to invoke either Mwari or the ancestors to make rain (Nasionaal Archief nd2).

When the rain failed to materialise after Maphumbo had made this particular sacrifice, he blamed the empty skies on the Dutch, who had previously shot at the hippopotamuses in the river (Nasionaal Archief nd3). The chief's response alludes to the possibility that his clan claimed the hippo as its totem and forbade the hunting of these creatures. Maphumbo's knowledge and power over the domain of water and rain through his association with the hippo that lived in water strengthened his authority in the spiritual realm to command rain (Vijfhuizen 1997). Living in Maphumbo's territory and thus considered his subjects, the Dutch were bound by the same laws. By breaking the totem law, they invoked the anger of the god or ancestors, who withheld rain as punishment.

The rainfall improved from late 1722 and by July 1725 the Dutch proudly announced to their superiors that the garden was producing an increasing amount of vegetables, sufficient to feed the settlement and ships' crews once a week (Cape Archives nd7). The good rains of 1725 coincided with a plentiful supply of beads and probably strengthened the magical association between rain and beads (Cape Archives nd8). But by 1726, Delagoa Bay was slipping into another dry cycle. This coincided with the escalation of hostilities between Mfumo chiefs.

The influence of the supply of blue beads on trade and politics

The Dutch trade became entangled in the political struggle and threatened the success of their trading post. Chiefs competed over access to traders and their goods, and halted those travelling through their territories. Strangers entering a chief's territory were required to announce themselves to him and to pay a tribute of ivory for the privilege of trading in his domain. This protocol controlled the entire transaction – the supply of ivory to the Dutch, as well as the movement of blue beads out of the territory.

To control the flow of beads, chiefs Mateke, Maphumbo and Tembe each captured a specific group of traders for their market. Tembe hosted those from Nassangano, Maphumbo traded with the Machikosse and Mateke with those from Paraotte. The largest ivory tusks came into the possession of Maphumbo and Mateke, whose territories were on the northern shore and who were competing for political power and therefore access to blue beads.

Traders who came from areas outside the immediate area to do business placed an extra demand on the local blue bead trade. Before the arrival of strange traders to the coast, chiefs consistently demanded high prices for ivory and withheld larger tusks if the bead supply was unsatisfactory. The Dutch had the prospects of accessing better quality goods through newcomers to the coast, but these continued the custom of selling smaller tusks to them. The Dutch frequently complained about the poor quality (predominately small tusks) and small quantity of ivory offered. In spite of this, however, the Dutch consistently accepted these goods for good reason. The first was to reflect transactions in their account book to appease their superiors, and the second was to encourage the supply of ivory (Cape Archives nd9).

The *buitelanders* arrived in ones and twos, and paid tribute in the larger tusks (Cape Archives nd10). Frustrated by the inferior ivory supply, the Dutch challenged the regional chiefs and accused them of purposely thwarting them in their trade. This accusation was vehemently denied and accompanied by placating assurances that traders from afar only brought small tusks to trade, a standard response that evoked the following peevish comment: 'We know very well that foreigners had brought larger tusks' (Cape Archives nd11).

To ensure the receipt of larger tusks, the Dutch tried binding both Maphumbo and Mateke to their promise to bring traders to them by making them sign contracts. But the leaders only partially adhered to the stipulations of these agreements. In fact, Mateke proposed a condition that the Dutch bring any local or foreign traders to him (Cape Archives nd12). Chiefs, then, did not merely act as middlemen between the incoming traders and European traders; they were firmly in control of the access to and the movement of goods. The process of negotiation over the acquisition of larger tusks signified the status and prestige of the chiefs. Having the best items to sell was imperative to maintaining or gaining political power.

As the numbers of traders from Paraotte and Machikosse (areas associated with Mpumalanga and Swaziland respectively) increased from 1724, the demand for blue beads grew. In addition to ivory, traders from Paraotte occasionally brought small quantities of inferior quality gold dust.[4] This earned very high prices because of Dutch desperation for this metal. They capitulated to excessive demands, but in their view this potentially attracted greater numbers of traders to the Bay. Since the Paraottean traders came through Mateke's territory, the trade in gold channelled significant quantities of beads into Mateke's hands.

The need to gain and control access to incoming and outgoing goods resulted in a struggle for dominance and a destabilisation of the political landscape. Chiefs attempted to drive away lesser chiefs who held up the flow of traders. One such chief was Cherinde, who kept traders from contacting other chiefs so that he could complete his own transactions for beads. This behaviour prompted Bombo, Maphumbo and Mateke to request Dutch assistance to drive Cherinde away (Cape Archives nd13). Besides these developments, the robbing of beads became more frequent because of increasing demand and a chronic shortfall in supply. For example, the Matola took goods from the Nassangano, who were travelling to their host Tembe. The Nassangano in turn took goods from Matola's subjects who went trading for ivory in Nassangano (Cape Archives nd14). As the competition grew, incoming traders were robbed of both ivory and beads and the political tension on the north bank increased even more.

The increase in foreign traders coincided with the start of another dry cycle and a surge in the demand for blue beads. This forced the chiefs to adopt military measures to continue their domination of the territory from the beginning of 1726. A pattern of forming different permutations of alliances to drive away those who threatened access to trade prevailed until 1730, when the Dutch abandoned the trading post in Delagoa Bay.

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Cape Archives 1, C406 f. 264.

Cape Archives 2, C406 f. 105.

4 The Nassangano brought gold once, those from Paraotte were responsible for the rest.

Cape Archives 3, C406 f.182. Letter of 11 October 1721.

Cape Archives 4, C406 f.182. 'Excessive heat.'

Cape Archives 5, C406 f. 190: *[W]egens die groote droogte van het land en bij gebroke van regen sijnde die grond hier om heen puer gul sandt … onstentenisse van vogt door de excessive hitte verbranden.*

Cape Archives 6, C407 f. 106.

Cape Archives 7, C430 f. 50.

Cape Archives 8, C417 f. 7. Letter of 9 July 1725. This amounted to between 70 and 100 people.

Cape Archives 9, C406 f. 196

Cape Archives 10, C415 f. 62

Cape Archives 11, C415 f. 62: 'although we know that foreigners had brought larger tusks'.

Cape Archives 12, C413 f. 112.

Cape Archives 13, CA C417 f. 14: 9 July 1725. The Dutch preferred to stay neutral to provide options within negotiations.

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WORLD ARCHAEOLOGY

Neanderthals, humans interbred '100 000 years ago'

Traces of human DNA found in a Neanderthal genome suggest that we started mixing with our now-extinct relatives 100 000 years ago. Until now it has been thought that the two species first encountered each other when modern humans left Africa, about 60 000 years ago. The research by Dr Sergi Castellano of the Max Planck Institute for Evolutionary Anthropology in Germany is published in *Nature.* The genetic analysis of the remains of a female Neanderthal, found in a remote cave in the Altai Mountains in Siberia, has indicated that portions of human DNA lie within her genome.

Neanderthal genes from sexual encounters are found in humans today, and recent studies have shown that these portions of DNA play an integral role in everything from our immune system to our propensity to diseases. But the latest finding of a flow of genes in the opposite direction, from humans to Neanderthals, suggests such mating was happening thousands of years earlier.

If early humans were having sex with Neanderthals 100 000 years ago, then they must have been doing so outside of Africa because our close relatives were not found there. And it means that they had left Africa before the larger dispersal that took place at least 40 000 years later. This adds to the idea that early forays out of the continent took place. Other recent evidence includes early human fossils found in Skhul and Qafzeh in Israel, and recent research that suggests that people were living in China at least 80 000 years ago.

Commenting on the study, Prof. Chris Stringer, research leader in human origins at the Natural History Museum, London, commented that geneticists should eventually be able to show if the transfer of DNA in either direction was mainly via males, females or about equal in proportion, but it would need a lot more data before that became possible. *BBC News,17 February 2016*

ON WEST COAST EARLY HERDERS, TAPHONOMY AND AN HISTORICAL BRAAI

Antonieta Jerardino

Throughout the late 15th and early 16th centuries, historical records from the Cape of Good Hope describe pastoralists (the 'Khoikhoi') as rearing domestic cattle and sheep in large numbers, sometimes keeping goats and dogs, and making their own pottery. These groups neither grew crops nor did they have iron-working technology like the Bantu-speaking Iron Age farmers, who moved and settled into the eastern half of southern Africa at the beginning of the Christian era (Russell et al. 2014). The earliest-known domesticated fauna (sheep/goat) introduced by Khoisan herders is found in Namibia (Leopard Cave) (Pleurdeau et al. 2012) and the Northern Cape Province (Spoeg River Cave) (Sealy and Yates 1994). These faunal remains date to c. 2130–2230 cal. (calibrated) BP (c. 185–280 BC) and c. 2025 cal. BP (c. 75 BC), respectively. There is little doubt, however, that such domesticates must have been introduced from north of the equator, as they do not have wild progenitors in southern Africa (Sealy and Yates 1994; Smith 2005; Sadr 2015).

More debate surrounds the origins, timing and hypothetical routes by which domesticates would have spread southwards (Sealy and Yates 1994; Smith 2008) and the mechanisms involved in their introduction to southern Africa (Kinahan, 2001; Russell 2004; Jerardino et al. 2014; Sadr 2015). Advanced mainly by initial demic diffusion models (the movement of people into new territories), the routes proposed for the introduction of stock into southern Africa (first sheep, then cattle) have basically been two (Fig. 1). One proposes that East African pastoralists moved southwards into Zambia and Zimbabwe, then spread west from northern Botswana to southern Angola, and continued southward along the west coast to the southernmost tip of Africa (Stow 1905; Cooke 1965). The other is more complex, with pastoral groups considered to have moved along eastern parts of Botswana and then south towards the confluence of the Orange and Vaal Rivers, with a major split from there on: one group following the Orange River downstream into Namibia and the other continuing southward via the central Karoo to reach the south coast of South Africa (Elphick 1977).

Proponents of cultural diffusion are fewer, but growing in numbers. They argue persuasively that stock and herding skills were initially introduced by pastoralists to neighbouring hunter-gatherers who then passed on the knowledge of herding to other nearby hunter-gatherer groups through exchange networks (Kinahan 2001; Sadr 1998, 2013; Jerardino et al. 2014; Russel and Lander 2015). Mid to late 20th century Kalahari hunter-gatherers who kept small flocks of goats while continuing to rely on wild food (Ikeya 1993; Kent 1993) have been presented as analogues for past small-scale herder-forager groups responsible for the introduction of stock into southernmost Africa.

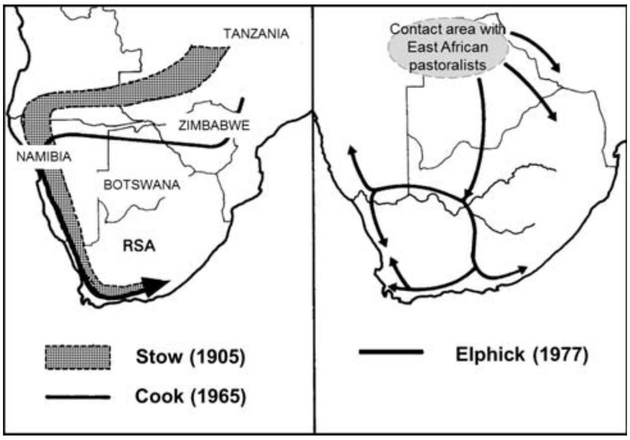

Fig. 1: Possible routes of early herders according to Stowe (1905), Cooke (1965) and Elphick (1985) (after Sealy & Yates 1994)

Much of the evidence brought to bear on all these models ranges through studies on linguistics, oral traditions, diversity of ceramic styles, types of rock art imagery, and absolute dates for the earliest livestock bones and ceramics, as well as quantified observations on other material culture recovered from archaeological excavations (Smith 2008; Orton 2013; Sadr 2013, 2015). A number of sites with early domestic fauna (sheep, goat, cattle) have been excavated and dated in the last ten years, allowing the re-evaluation of previous interpretations. Moreover, recent mathematical modelling of dated and spatially-mapped data (Jerardino et al. 2014) arrived at the conclusion that the west coast of South Africa was a likely route for the early introduction of herding, that cultural diffusion was the main driving mechanism and that demic processes played a smaller role. Moreover, it was found that this wave of advance (~2 km/yr) was about twice as fast as the European Neolithic, which is widely understood as having occurred as a result of an active movement of food-producing groups. This suggests that there are neither universal mechanisms nor standard speeds of Neolithic transitions in human history.

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Taphonomy at archaeological sites

Vertical displacement of archaeological contents across stratigraphic boundaries is known to occur in many contexts and types of sites. This problem can easily occur in unconsolidated and coarse-grained (porous) deposits containing large quantities of marine shell, such as coastal shell middens. Truncation of older deposits by former pre-colonial inhabitants and the filling of dug-out basins with fresh discarded material can result in small faunal specimens (bones or teeth) from younger layers migrating downwards and becoming mixed in with older stratigraphic contexts. For these reasons, and as Sealy and Yates (1994) were able to show, the contemporaneity between charcoal-dated stratigraphic layers and associated fauna found in the same stratigraphic unit cannot be assumed uncritically. In fact, this was one of the main arguments for dating Steenbokfontein Cave (SBF) sheep remains. Several but not all of the sites Sealy and Yates (1994) studied (all of them coastal middens) turned out to show much more recent ages for sheep remains than previously considered on the basis of stratigraphic association.

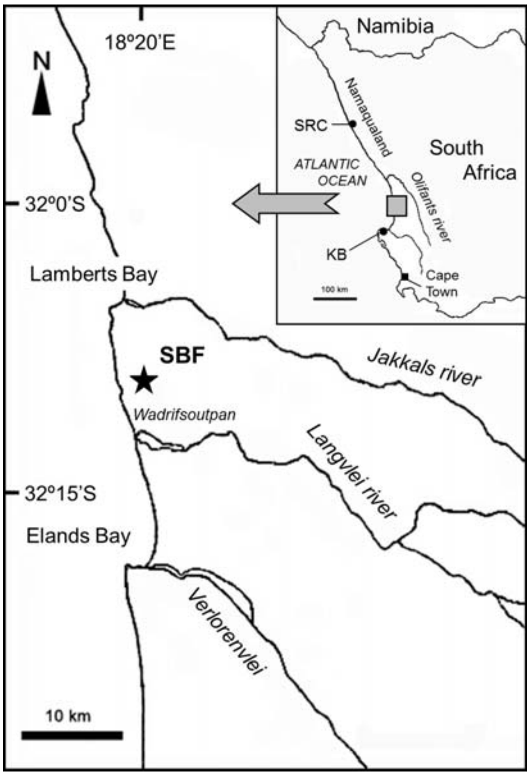

Fig. 2: Map showing the geographic location of Steenbokfontein Cave (SBF), Spoeg River Cave (SRC) and Kasteelberg (KB). Landscape features are shown for reference.

Direct dating of domestic sheep (*Ovies aries*) from Steenbokfontein Cave

The majority of the earliest directly dated domestic fauna were excavated from sites located in the northern extent of southern Africa, such as Botswana (Robbins et al. 2005), Namibia (Pleurdeau et al. 2012), and the Northern Cape (Sealy and Yates 1994, Orton et al. 2013), but also in the southern Cape (Henshilwood 1996). Situated somewhat midway between the sites in the Northern Cape and the southern Cape is Steenbokfontein Cave in the Lamberts Bay area (Fig. 2). SBF sheep remains were positively and securely identified from this site by the renowned faunal analyst Prof. Richard Klein (Stanford University) (Jerardino and Yates 1996), but they remained undated through direct means as done elsewhere (Fig. 3). It became clear that determining the age of SBF domestic sheep would help to re-evaluate the timing and the likeliest early routes, as well as checking once again on the speed with which the Neolithic transition took place in southern Africa. To this end, grant funding was successfully obtained from the Trans-Vaal Branch of the South African Archaeological Society to cover the cost of obtaining one accelerated mass spectrometry (AMS) radiocarbon date. Permits for the partial destruction of SBF sheep teeth and their export to an overseas dating facility were obtained from the relevant heritage management authorities, namely Heritage Western Cape (permit Case No. 14041704GT0430) and the SA Heritage Resources Agency (Case ID: 5644, permit ID: 1839).

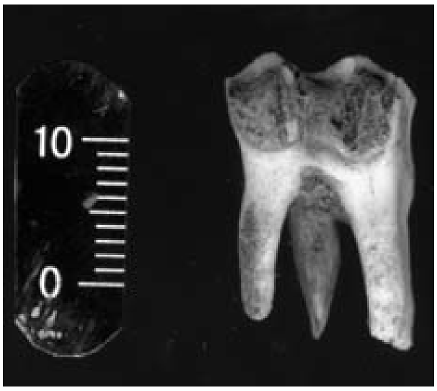

Fig. 3: Sheep tooth (dP3) from Steenbokfontein Cave dated by means of accelerated mass spectrometry at the Oxford Radiocarbon Accelerator Unit.

The Upper Left dP3 sheep tooth from unit ST (Shell and Twigs) and square K4 was selected as the best candidate on the basis of stratigraphic association with Layer 1 carbon dated to c. 2170 cal. BP (Figs 3 and 4). Other specimens were recovered either too close to the present cave surface or found in Layer 2 carbon-dated to c. 2340 cal. BP (Fig. 4). The latter date seemed too old and therefore the association between this particular tooth and the carbon date appeared unconvincing. The selected SBF sheep specimen was taken to the Oxford Radiocarbon Accelerator Unit (ORAU) in late November 2014. ORAU is where the large majority of other early domestic faunal remains from southern Africa have been AMS-dated. Dating the SBF sheep tooth in this international facility would thus ensure a reliability of results and comparison with results previously obtained. Surprisingly, ORAU's report received in June 2015 showed a mean age of 123 cal. BP (c.

1825 AD, Lab Nr. OxA-31937; using the southern hemisphere calibration curve by Hogg et al. [2013]). Only lower-most values for one sigma (σ) range (66,7 per cent probability) and 2σ range (95 per cent probability) could be calculated because the upper-most values were younger than 1950, the accepted time zero for radiocarbon measurements (https://c14.arch.ox.ac.uk/embed.php?File=calibration.html). These lower-most calibrated values are 260 cal. BP and 273 cal. BP, respectively. Clearly, the so-called early sheep remains at SBF were intrusive from younger and surficial material.

Even though much care was taken by the main excavator (Royden Yates) when SBF sheep teeth were recovered during field work in 1992, it is clear that they had vertically migrated from above Layer 1. Inspection of available stratigraphic profiles shows that Layer 1 consists of the filling of a recent basin that accumulated between about c. 2770 and 2170 cal. BP (Fig. 4). Sometime after the later date, Layer 1 up-sloping material forming a mound of undetermined dimensions towards the north and north-west end of the cave was razed, thus giving shape to the present flat surface where excavations took place. While the reasons and timing for the removal of this material are still unknown, it probably happened before SBF sheep teeth became incorporated into the deposit. The levelling of the original mound exposed Layer 1 youngest material (dated to c. 2170 cal. BP) to the cave's surface, allowing it to be in direct contact with any material that would have been dropped as a result of much later visits.

Because European farmers had already established themselves in the Lamberts Bay area around the mid-1700s under the rule of the Dutch East India Company (Raper and Boucher 1988), it is possible that SBF sheep teeth are the remnants of a meal of the last Khoisan groups along the West Coast, or that of a traveller or shepherd passing by or staying over in the cave around 1825 AD. The timing of this event would have been well after the establishment of the second British occupation of the Cape (1806–1814) (Raper and Boucher 1988). As shown by this and earlier studies, direct dating of domestic sheep remains in southern Africa is very important before a claim is made about their early presence in the archaeological record based on stratigraphic association alone.

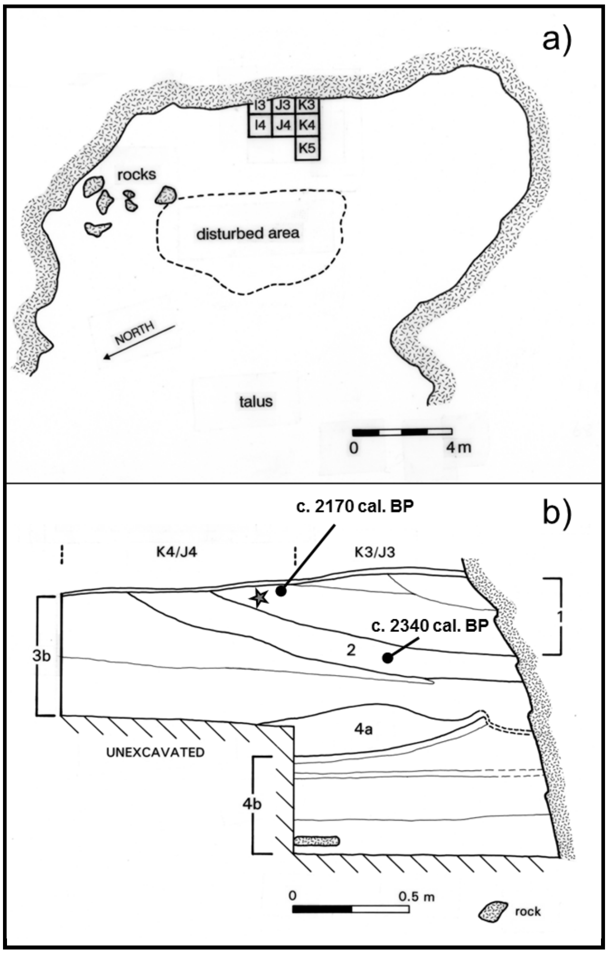

Fig. 4: Site plan of Steenbokfontein Cave (a) and stratigraphic profile of excavations (b). Excavated squares and stratigraphic layers are identified alphanumerically. Star symbol denotes location of accelerated mass spectrometry-dated sheep tooth.

Acknowledgements

I am most grateful to the Trans-Vaal Branch of the SA Archaeological Society for funding the AMS radiocarbon date reported here. Thanks are also extended to Heritage Western Cape and the South African Heritage Resources Agency for providing the relevant permits. I am also thankful to Herman and Kitta Burger of Steenbokfontein farm for their friendship, assistance and hospitality over the years.

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THE SA ARCHAEOLOGICAL SOCIETY

APPLICATIONS FOR 2016 RESEARCH GRANTS FROM THE KENT BEQUEST

The late Dr Leslie Kent, a long-time member of the SA Archaeological Society in Johannesburg, left a generous bequest to the society in 1992. The terms of this bequest are that the proceeds must be invested and the income, which amounts to about R9 000 per year at the current interest rate, be distributed from time to time at the discretion of the Society for –

- financing of field work or expeditions to undertake research according to guidelines laid down by the society;
- grants to individuals or groups of individuals engaged upon research, the subject of such research to be approved by the society;
- publishing or supporting the publication of the results of research whether or not the research has been financed by the Kent Bequest; and
- awarding prizes for meritorious work in archaeology, especially by young researchers.

The society has appointed a Kent Bequest Committee and invites applications in 2016 for awards in all categories. The members of the committee are Dr J Deacon (Secretary), Mr RC Boers, Professor TN Huffman, Dr T Maggs, Professor I Pikirayi and Mrs L Wynne. Please read the following guidelines and instructions carefully before completing the application form.

Guidelines

1. The work must be conducted in South Africa.
2. The subject matter may include archaeological work of any kind that enhances our 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, archival or bibliographic work.
3. Proposals may also include publications for public education and community awareness projects that popularise archaeology.
4. The Kent Bequest will contribute fieldwork or printing expenses only, not costs involved in analysing results or writing or editing reports or publications.
5. Applications for publication must be accompanied by two quotations from printers.
6. Preference will be given to researchers domiciled in southern Africa and researchers who are starting a career in archaeology.
7. Successful applicants will be required to donate one copy of reports or publications to the society's library, one copy to the *South African Archaeological Bulletin* for review, and, in the case of publications, one copy to each of the society's four regional branches.

Application forms are available from the Secretary, SA Archaeological Society, PO Box 15700, Vlaeberg, 8018; tel. (021) 712 3629; e-mail archsoc@iziko.org.za; and must be submitted **before 31 July 2016**. All applications will be refereed by specialists. The applications and referees' reports will be evaluated by members of the Kent Bequest Committee. The successful applicant/s will be notified by 30 September 2016.

MORE THOUGHTS ON KHOEKHOE ORIGINS

Andrew B Smith

The current state of knowledge concerning Khoekhoe origins in three articles in *The Digging Stick* by Morris (2014), Lombard (2014) and Smith (2014a) was confirmed at the Leipzig Symposium organised by Tom Güldemann in 2015. There appears, indeed, to have been an East African connection, as seen both in the 'Y'-chromosome evidence and the lactase persistence gene, that supports the tenuous linguistic link (Güldemann 2008).

The evidence for stock movement and its dating gives a chronology that indicates sheep were in the northern Namibia area at Leopard Cave by at least 2200 BP (Pleurdeau et al. 2012). These coordinated lines of evidence are further strengthened by the initial appearance of pottery so well made that it comes out of a tradition with some time depth.

I suggested that the reasons for this migration of both people and animals came out of the pressures generated by Urewe farmers on both hunting and pastoralist societies in East Africa sometime between 3000 and 2500 BP. I gave two possible sources in East Africa: a) Elmenteitan (pastoralists) and b) Kansyore (hunter-fishers).

Subsequent to writing the paper and the publication of Smith (2014b), I became aware of the seasonal importance of fish and shellfish to Kansyore groups (Prendergast 2010) and the huge shell middens to be found on the shores of Lake Victoria (Robertshaw et al. 1983), some of which are 90 m across. In addition, Prendergast (2010: 100) states: '… that Kansyore fishers must have been skilled in capture techniques specifically designed to take advantage of the spawning run. One likely scenario would be to build weirs across the river' (one example is 17 m across and 2 m deep). I previously mentioned how the river systems of the northern Kalahari have an interesting social mix, with 'black' Khoe speakers along the rivers and 'brown' hunters away from the rivers (Cashdan 1986). The riverine fishers have fishing technology, including weirs and nets.

The dates for the Later Kansyore, when domesticated caprines were part of the mix, are around 3800 BP, i.e. before the arrival of Iron Age farmers into East Africa. Thus we have a reasonable model for association between East Africa and the northern Kalahari through hunter-fishers who had access to small stock at least by 2200 BP, and possibly earlier at Leopard Cave where the same Layer 6 from which the dated caprine bones came has a date of 2430 BP. At Leopard Cave there are in addition two dates from a lower layer (Layer 7) with a mean of around 3200 BP.

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This conforms to a date of 3100 BP from another northern Namibian site, Oruwanje 95/1, from a level with pottery (Albrecht et al. 2001). This date was rejected by the researchers as being too early because it did not fit the assumed paradigm of the earliest domesticates.

These are not the only sites with aberrant dates. At Die Kelders, Layers 2 to 4 have dates between 2600 and 2000 BP (Schweitzer 1979); at Byneskranskop there is a date of 3220 BP from lower Level 1 (Schweitzer & Wilson 1982). What we also have at Die Kelders is a pottery type, an undecorated black burnished ware, that is possibly earlier than that found at Kasteelberg (Sadr & Smith 1991). Black burnishing is also the early type found at Geduld in northern Namibia (Smith & Jacobson 1995).

While the evidence for the movement of domestic stock is best along the route from the northern Kalahari to the Atlantic Coast, we must not forget other areas that may have been colonised by early ceramic makers along the eastern side of the subcontinent. Different types of pottery to that introduced by farmers are to be found in Kwazulu-Natal. The earlier dates are mostly around 2200 to 2100 BP, thus preceding the earliest agriculture. However, Clarke's Shelter has an aberrant date of 2380 BP, although there was no pottery associated, and Mhlwazini Cave, also in the northern Drakensberg, produced two dates: 2280 BP (layer 5) and 2665 BP (layer 6). Mazel (1992:4) considered the pottery from the earlier date to be intrusive.

The period between 3000 and 2000 BP on the Cape West Coast is the time of enormous shell middens (mega-middens) (Jerardino et al. 2014). Is it purely a coincidence that we also have huge shell middens on Lake Victoria not long before those at the Cape? Into the bargain, we have another anomaly: the appearance of human skeletons that show extreme trauma, probably resulting in death, all of which are dated to after 3000 BP (Morris & Parkington 1982; Pheiffer 2014).

Discussion

Alexander (1984), in his 'moving frontier' model, suggests that pioneering hunter groups could have ranged up to 1 600 km to find tradeable materials. This might mean that distance was not a problem. A phenomenon noted by the capture of modern poachers is that they often carry dried fish in their bags (light and nourishing for movement). The early common denominators between East and southern Africa are fish and shellfish, possibly pottery, and, later, small stock. By extending the timeline for connections between the two areas we are able to resolve some of the anomalies and inconsistencies that exist in the archaeological record.

It is not difficult to see a route from Lake Victoria southwards along which fishing would be viable. The Rift Valley through Tanzania and Malawi (along Lake Tanganyika and Lake Malawi respectively) to the Zambezi is approximately 2 000 km long. The Zambezi westward connects to the river systems of the northern Kalahari and, via the Cunene, to the Atlantic coast of Namibia. The Benguela Current along the Atlantic Coast of Namibia and the west coast of South Africa is rich in fish and shellfish. From St Helena Bay south, large quantities of black mussels could be collected.

The 'Y'- chromosome connection with no concomitant external mtDNA (female) genetics (Barbieri et al. 2014) implies incoming migrant males taking local wives. Shellfish collecting was already women's work. In adjusting to their new area, the immigrants might have worked with their local wives to accumulate enormous amounts of shellfish, resulting in shell middens comparable in size to those on Lake Victoria. But taking local women may have been socially disruptive and resulted in major friction with local hunters that led to fighting and death.

Conclusions

What I have tried to do is to draw together some disparate threads of archaeological evidence to broaden the scope of Khoekhoe origins. The connection is along the lines of Alexander's 'bow wave' model. Alexander was primarily concerned with the movement of Iron Age farmers who, at the time of writing, were assumed to have been responsible for introducing domestic animals to southern Africa. He recognised that the relationship between economic groups offered hunters the space to trade commodities and to range over long distances to obtain these. This would have meant information flow and knowledge of pasture lands over considerable distances from the home territories.

The occurrence of the mega-middens on the southwest coast has always seemed an unusual anomaly. Jerardino et al. (2013) suggest a reason for this was a 'population increase and/or residential permanence'. The dates are coincident with those on the shores of Lake Victoria where large shell middens accumulated as well. Could the population increase have come from immigrants from East Africa, presaging the later arrival of stock keepers as information flow increased about pasture areas and dependable rainfall? As I discussed in Smith (2014b), herders would also have had to adjust to the vagaries of the southern African environment, including poisonous plants. This might have put the brakes on easy initial expansion, similar to what happened with early domestic stock in East Africa where there was a 1 000-year lag between initial introduction and later spread across the grasslands to the south. This may have been due to the herders learning how to avoid infection in their animals from the various vectors (Gifford-Gonzalez 2000).

Thus the assumption that emigration out of East Africa was only by pastoralists may have to be reconsidered. Hunter-fisher-shellfish collectors with ceramics, who were increasingly becoming involved with domestic stock around Lake Victoria (Prendergast 2010), could well have been the vanguard that later stimulated pastoral expansion.

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A 'ROCK GONG' IN THE MAGALIESBERG, GAUTENG

Geoffrey Blundell, Ghilraen Laue, Roxanne Rademeyer, Brent Sinclair Thomson and Melissa Waters

So-called 'rock gongs' (Fig. 1) have been a widely reported and discussed feature of the African archaeological record since the late 1950s (e.g. Fagg 1956, Fagg 1957, Goodwin 1957, Vaughan 1962, Jackson et al. 1965). Most recently, large numbers of rock gongs have been reported in the Fourth Nile Cataract in the Sudan (Kleinitz 2007, 2008, 2010), as well as in the Korannaberg of South Africa (Rifkin 2009). Dora Fock (1972) was one of the first researchers to describe rock gongs found in the South African landscape, including some found in association with rock engravings. The appropriateness of the term 'rock gong' has been debated for this type of archaeological feature in Africa (see, for example, Montagu 2004) as the stones tend to be more musically complex than simply a 'gong' (cf. Rifkin 2009). The possibility that 'gongs' of this nature represent the oldest evidence for music is of great interest to archaeologists. In this article we describe a newly-discovered rock gong from the Magaliesberg mountains, an area in which rock gongs have not previously been noted (for an overview of southern African rock engravings see Dowson 1992).

The Magaliesberg, recently proclaimed a UNESCO Biosphere Reserve (Carruthers 2015), begins just south of the Pilanesberg in the north and stretches some 30 km southward before curving eastward, passing 60 km north of Johannesburg and touching the northern suburbs of Pretoria. East of Pretoria, the range turns south-eastwards, finally tapering out some 10 km northwest of the Bronkhorstspruit Dam (Fig. 2). This 120 km long mountain range was formed 2 300 million years ago when sediments were deposited as part of the vast inland 'sea' that covered much of what is now South Africa. Over time the sediments hardened into what is known as the Transvaal Sequence. At 2 000 million years ago, magma intruded into the layers of sedimentary rocks, producing the metamorphic quartzite rocks so characteristic of the area. Moreover, magma accumulated above the Transvaal Sequence, depressing the layers of sedimentary rock and causing the edges to lift to form the ridges of the Magaliesberg. The magma solidified into various igneous rocks, today known as the Bushveld Sequence (see Carruthers 2014).

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Fig. 1: A rock gong from the Korannaberg, Northern Cape Province. Image courtesy of Riaan Rifkin.

Some 2 000 million years after these events, Iron Age (IA) peoples arrived in the Magaliesberg and used dolerite boulders to construct walled settlements. The earliest-known walled settlement is found at the Early Iron Age site of Broederstroom, which is located some 31 km west of Pretoria and was first settled around AD 350 (Mason 1986). The IA communities that settled here did not arrive in a pristine, uninhabited landscape. For at least 30 000 years, and possibly for much longer, hunter-gatherers had lived in the area (Wadley 1989: 44). Using ethnographic models of contemporary San and archaeological evidence at Cave James and Jubilee Shelter in the Magaliesberg, archaeologists have suggested that the hunter-gatherers in this area followed an aggregation and dispersal way of life, coming together in the summer months of plenty and breaking off into smaller groups during the lean winter months (Wadley 1989). There is clear evidence, in the form of lithic objects at

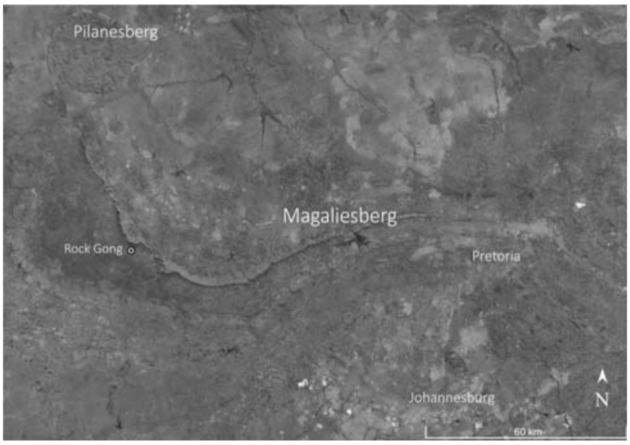

Fig: 2: Google Earth map of the Magaliesberg, showing the position of the rock gong

Broederstroom, that the hunter-gatherers and the IA communities of the Magaliesberg engaged with one another (Wadley 1996).

Both San hunter-gatherers and Bantu-speaking peoples are known to have had rock art traditions, and both groups appear to have created paintings and engravings. It is not surprising then that the Magaliesberg is home to several engraved rock art sites (Steel 1988). The engravings are made on the same igneous rock that was used to create the walls of the IA settlements. Typically, this igneous rock is a diabase that has been eroded into boulders. Some of the finest images of animals and geometric motifs found in southern Africa have been engraved in this area. Depictions include eland, zebra and hippo (Fig. 3). Geometric forms, either depicted separately or as part of animal motifs, are also a common feature.

Fig. 3: Completed tracing of an eland. Note that one of the rear hind legs is incomplete; this is on the original and is not a product of the tracing. See Mason 1962, Fig. 199, for a rubbing of the image.

One interesting aspect of the Magaliesberg region is that at some places, rock engravings are found in association with large IA walled settlements. At one such site – Olifantspoort (Mason 1973) – there are engraved images (Fig. 4) of what have come to be called settlement patterns in the literature (see, for example, Maggs 1995). There are no engraved images of animals, anthropomorphic figures and geometric forms at Olifantspoort. But the settlement patterns and the other images are all engraved by the same technique of fine-line or hairline incision. This technique involves cutting the surface of a boulder with a lithic implement of a hardness greater than that of the boulder (Fock 1979: 18–19). By cutting into the surface, the underlying rock substrate, which is typically lighter in colour than the oxidised surface, is exposed. Over time the incision marks oxidise to the same degree as the rest of the surface. However, if no significant weathering of the rock surface has taken place, the incision marks are still visible as deep cut marks. The use of the same technique to engrave different types of images, one found in close association with large IA walled settlements and the other apparently away from such sites, raises important questions about authorship, meanings and the nature of interaction between the autochthonous hunter-gatherers and the immigrant IA peoples, but these must remain unanswered for now.

Fig. 4: Hairline incised engraving from Olifantspoort. These images are thought to represent 'settlement patterns'.

To date only some 500 engraved images have been reported from the Magaliesberg area (Steel 1988). These are scattered across only a handful of documented sites. By contrast, rock engraving sites found further west of the Magaliesberg can sometimes have as many as 500 engraved images at a single site. The images in the Magaliesberg were first substantially reported as part of research conducted by the Archaeological Survey Unit (ASU) at the University of the Witwatersrand under the leadership of Revil Mason during the 1970s and 1980s. While the ASU focused on IA settlements, such as the one found at Olifantspoort, and Stone Age sites such as Kruger Cave, as part of general survey and research work, it also recorded rock engravings in the Magaliesberg. Some of these were recorded by means of rubbings made by Robbie Steel, which are housed in the Rock Art Research Institute.

At this point of time it is difficult to know whether the apparent paucity of engraved images in the Magaliesberg is simply the outcome of limited survey or if it is an area that, in spite of its long occupation by hunter-gatherers, has very few engraved images. What is known with more certainty is that the Magaliesberg is one of the few places where the hairline incision technique was used to make the images north of the Orange River. Engravings made by the pecked technique are far more common in the areas north and west of the Magaliesberg (Morris 1988: 111). Although hairline incision engravings do occur north of the Orange River, they are far more common in the Karoo, south of the Orange (Morris 1988; cf. Fock 1972). The Magaliesberg engravings appear to be to some extent out of place.

Since the ASU ended its work in the Magaliesberg, little systematic survey for and recording of rock engravings has been undertaken in the Magaliesberg, although sporadic work has been undertaken on selected images or at specific sites (see, for example, Dowson 1992 and James 2000). However, starting in the last quarter of 2014, staff and students of Wits' School of Geography, Archaeology and Environmental Studies, funded by a grant from the Centre of Excellence in Palaeosciences (a National Research Foundation Centre), have begun a systematic survey of the Magaliesberg. The rock gong, which is the subject of this article, was discovered as part of this initiative.

On Saturday 4 October 2014, Ghilraen Laue, Roxanne Rademeyer, Brent Sinclair Thomson and Melissa Waters were following up on rock art sites from the 'Van Riet Lowe list' (Van Riet Lowe 1956). They obtained permission from a farm owner to survey his farm located west of the R24 road opposite the Olifantsnek Dam. Some 35 ha of the property were surveyed. Although no engravings were found, they did identify a rock gong. The next day they returned to trace and photograph it.

The rock gong is on a large diabase boulder, measuring 194 cm on the widest part of its east-west axis and 203 cm on its north-south axis (Fig. 5). The boulder rests on an underlying diabase rock. Because of the way in which the overlying boulder has eroded, there is a 2,5 cm cavity between the overlying boulder and the base rock roughly in the middle of the boulder's north-south axis. This cavity allows for the overlying boulder to resonate when it is struck and thus produce cadence. The northern end of the flat boulder shows considerable human agency and there are numerous hammer marks on this end. The boulder is not, however, engraved with any visible images, either representational or geometric.

A common feature of many engraved boulders in the Magaliesberg is that they show significant, what we assume to be, post-image usage marks. These include cut marks, clusters of peck marks and areas where the rock surface has been polished. These usage marks were not recorded by the ASU and, indeed, this feature of rock engraving was not widely observed in southern Africa until Sven Ouzman (2001) published on this aspect of rock art. He makes a compelling argument that rock engraving sites were far more than just locales of imagery but were places where the tactile and auditory senses played as much of a role in the ritual production and consumption of the site as the visual. The widespread usage marks on the rock engravings of the Magaliesberg, which include cut and peck marks and rubbing, link the rock gong described here to that corpus. The rock gong and the engravings in the mountain range show similar usage marks and it is unlikely that the rock gong is an isolated archaeological feature with no connection to the rock engravings, even though there are no engraved images nearby or on the rock gong itself.

Fig. 5: From left: Roxanne Rademeyer, Brent Sinclair Thomson and Melissa Waters tracing 'hammer' marks on the rock gong.

It is likely that there are more rock gongs in the Magaliesberg, and certainly a number of inhabitants of the area recall such rock gongs when questioned. However, they remain to be located and mapped before it can be ascertained whether or not they are a common archaeological feature of the Magaliesberg.

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ARCHAEOLOGY IN AFRICA

Two new hominin fossils from Sterkfontein

Two new hominin fossils have been found in a previously uninvestigated chamber of the Sterkfontein Caves in the Cradle of Humankind. The two new specimens, a finger bone and a molar, are part of a set of four specimens that can be associated with early stone tool-bearing sediments that entered the cave more than two million years ago. 'The specimens are exciting not only because they are associated with early stone tools but also because they possess a mixture of intriguing features that raise many more questions than they give answers,' says Dr Dominic Stratford, a lecturer at the Wits School of Geography, Archaeology and Environmental Studies and research coordinator at the Sterkfontein Caves.

The first fossil specimen, which is a very large proximal finger bone, is significantly larger and more robust than any other hand bone of any hominin yet found in South African plio-pleistocene sites. 'It is almost complete and shows a really interesting mix of modern and archaic features. For example, the specimen is markedly curved – more curved than *Homo naledi* – and is similarly curved to the much older species *Australopithecus afarensis*,' says Stratford. The level of curvature is often linked to arborealism, but the fossil lacks the strong muscle attachments that are expected to be present. 'The finger is similar in shape to but much larger than the partial specimen from Olduvai Gorge that has been called *Homo habilis*.'

The other fossil is a relatively small, nearly complete adult first molar tooth that also has striking similarities to the species *Homo habilis*. 'In size and shape it also bears a resemblance to two of the 10 first molars of the *H. naledi* specimens, although further and more detailed comparisons are needed to verify this.' The shape of the tooth and particularly the shape and relative sizes of the cones on the surface of the tooth suggest this specimen belonged to an early member of the *Homo* genus and can be associated with early stone tools recently dated to 2,18 million years ago.

'The two other hominin fossils found are still being studied and further excavations are planned in the hope of finding more pieces and expanding our understanding of who these intriguing bones belonged to and how they lived and died on the Sterkfontein hill more than two million years ago,' Stratford said.

Sterkfontein remains the richest *Australopithecus*-bearing locality in the world and continues to yield remarkable specimens. The underground network of caves at the site extends over 5 km and the caves are filled with fossiliferous sediments that have been deposited underground over a period of more than 3,67 million years. However, very few of these deep deposits have been systematically excavated and so remain largely unknown. The Milner Hall, where the four new hominin fossils were found, is one such chamber where several large deposits have been identified but never excavated. The excavations that yielded these new hominin fossils were being conducted as part of a new phase of exploratory excavations away from the known hominin-bearing areas. *University of the Witwatersrand, March 2016*

10 000 year-old structure in Israel

Archaeologists have unearthed the oldest dwelling to date in the Judean Shephalah 25 km west of Jerusalem, along with a temple and artefacts including a cluster of flint and limestone axes, some of which date to around 10 000 years. The house dates to a time when humans were only first beginning to live in permanent settlements. Associated temple remains are more than 6 000 years old. The temple appears to have been used for ritual purposes. Within it was a 1,3 m tall standing stone, which had been smoothed on all sides and erected to face east.

Ancient Origins, 06/11/2013

NOTES ON THE INSTALLATION OF A DRIPLINE AT BHLENDLENI SHELTER

Annie van de Venter Radford and Celeste Rossouw

Wainwright (1985:15) states that, 'Few methods can prevent the natural weathering of rock art sites,' especially deterioration caused by water action. He further eludes that since it is not possible to eliminate water from rock art sites, weathering will take place continuously.

South African rock art sites, like many of those in the Maloti Drakensberg Park World Heritage Site (MDP WHS), are often entirely exposed to the elements and to water in particular. Sites located at higher elevations are in addition regularly covered by ice or snow in winter. Precipitation results in increased acidity since water acts as a carrier of weathering products, resulting in the formation of superficial accretions in the form of salt. These accretions are initially invisible to the naked eye as they bond the pigment layer to the substrate, but as their thickness grows they start to obscure the paintings. Eventually cracks develop in the accretions, which cause flaking, detaching the pigment. A related problem of runoff water is that it becomes surrounded by moss and algae, resulting in bio-films developing around the runoffs.

The insertion of artificial driplines to prevent waterflow damage has been a contested topic for some time as poor-quality attempts at site protection and the use of inappropriate materials have a negative human impact on sites (Agnew et al. 2015). Even so it is believed that the control of surface water flow at rock art sites will slow down the deterioration of both the parent rock and the paintings (Loubser & van Aardt 1979). Since salt deposits occur when water runoff is inactive, it can be argued that the diversion of active flow by means of a dripline can actually initiate salt formation. Accordingly, the unique hydrogeology at each site should be examined carefully before an attempt is made to stop or reduce water runoff. In addition, the impact of a dripline on a site's appearance should be considered carefully.

This installation of driplines is by no means a particular or common activity in South Africa. Kakadu National Park, Australia, has highlighted that this practice is fairly common elsewhere. Australian rangers, not trained rock art conservators, regularly install silicon drip-lines around paintings to redirect water flow away from the paintings. Kakadu's rock art (or *gunbim* in the local language) represents one of the longest historical records of any group of people in the world and is one reason why the park has received World Heritage status. The paintings provide a fascinating record of Aboriginal life over a period of at least 20 000 years. But Kakadu is not the only example of drip lines being inserted. It is a common practice in other national parks in Australia, e.g. Uluru.

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While still an uncommon practice in South Africa, it has been used at several sites, at some more successfully than others. The insertion of a dripline at the Bhlendleni rock art site in the Buffer Zone of the MDP WHS is the focus of this discussion. It is located in the Amangwane Traditional Authority Area in the Mweni Valley, northern Ukhahlamba Drakensberg, KwaZulu-Natal. The art is located under a protruding parent rock that provides a natural dripline and protection against adverse weather. The rock face under the overhang is 4 m in length and the height of the roof is about 2,5 m over a level floor. It contains a therianthrope painting whose head is turned to the left, mimicking the image of a mountain rhebuck represented at its right.

Fig. 1: The dripline at Bhlendleni Shelter

There is clear evidence of surface runoff over the main panel (Townley Bassett 2013 and personal observations). Stephen Townley Bassett, a rock art conservation practitioner, was instructed by Amafa to stabilise the environment via the insertion of a dripline above the paintings. The need for such direct intervention became necessary to limit further deterioration of the art as a result of chemical reaction and fading. Townley Bassett (2013: 2) provides the methodology for the installation of the dripline with putty in late 2012 (Fig. 1). According to best-practise guidelines, putty, which adheres well to rock, is an intervention that is both reversible and has minimum impact.

A decision was taken not to use metal to create the dripline. Metal reacts with the parent rock, resulting in clearly visible rust discolouration of the rock surface, as is clearly visible at the Beersheba Shelter (Fig. 2) in the southern uKhahlamba Drakensberg. A metal dripline was installed 40 years ago when the National Building Research Institute of the CSIR investigated methods to protect and preserve rock art sites. This initiative was supported by the then National Monuments Council. Part of the experimental process was the installation of a metal dripline at Beersheba Shelter. The authors Loubser and Van Aardt (1979) enumerated the following aims of the experiment:

Fig. 2: Dripline inspection at Beersheba Shelter, 2015

- To establish the effectiveness of flow control
- To establish whether drier conditions can be created in a shelter by controlling water flow
- To evaluate the practicality of inserting driplines
- To research the best type of equipment to be used

Beersheba Shelter was selected as it is very wet during the austral wet season and water flowed over the paintings. Other practical considerations included vehicular access and visitor control. Laboratory investigations and experimentation indicated that a metal plate placed inside a groove cut in the rock would be the best solution. Staining from corrosion was considered and it was decided to use stainless steel strips (type 316) that were wedged into position by stainless steel wedges and cemented with epoxy resin, type 372. The insertion of this dripline was meant to be a long-term experiment (Loubser & van Aardt 1979), but virtually no review and/or monitoring was done (Deacon, pers. comm.). However, Amafa staff inspected the site in 2011 (Fig. 3) and 2015 (Fig. 2), when the dripline appeared to be intact and still effective.

Currently driplines are not permitted within the Maloti Drakensberg Park World Heritage Site as more research needs to be done into their long-term effects. For example, the disturbance of the water flow pattern might lead to the collection of water elsewhere. One of the biggest problems of rock art management, as identified by Australian and southern African rock art managers during a workshop held in Australia in 2014, which one of the authors (Radford) attended, is the 'failure to review and monitor past conservation efforts ...' (Agnew et al. 2015).

It is anticipated that the dripline at Bhlendleni Shelter will serve as an observation site. Townley Basset (2013) has recommended quarterly monitoring, especially during periods of heavy rainfall. It is also very important to record management actions as part of a site's history (Agnew et al. 2015:34). The first monitoring visit took place in 2014 and the following was noted:

Fig. 3: Dripline inspection at Beersheba Shelter, 2011

- The dripline was still in place
- The dripline was damaged
- The damage did not influence the functioning of the dripline

The damage to the dripline (Fig. 4) is of concern to Amafa for both conservation and financial reasons. Accordingly, Bhlendleni Shelter was compared to Cow Cave, the only other site where the same practitioner also inserted a dripline to prevent and limit mineral seepage and chemical deterioration of the rock art (Fig.5). At present the dripline at Cow Cave is still in a good working order and this may be as a result of several factors not present at Bhlendleni Shelter.

Firstly, access control at Cow Cave is well managed by local custodians and no unaccompanied visits are allowed, while evidence of people visiting and overnighting at Bhlendleni Shelter was present. Mealie bags on the floor of the shelter, which possibly functioned as sleeping bags, were recorded in 2011. The dripline may thus have been vandalised during an uncontrolled visit. Although Bhlendleni is not officially open for public visits, it is situated close to a road and the local community know the site.

Second, it is likely that the dripline at Bhlendleni did not break because of its physical and chemical properties (comprising putty and a catalyst-mixture),

Fig. 4: Vandalism to the dripline at Bhlendleni Shelter, 2014

since the dripline installed in the same year at Cow Cave, using the same materials, is still in good working order.

Lastly, if we compare the location and environment of Cow Cave (on Ptn 3 of the Rood farm in the Central Buffer Zone of the Maloti Drakensberg Park) with Bhlendleni Shelter in the Northern Buffer Zone it becomes clear that the dripline of Cow Cave is afforded much more protection against storms and adverse environmental conditions such as snow, hail or torrential rains. The natural dripline of Cow Cave's roof extends further outwards than the roof at Bhlendleni, where the shelter has a much smaller overhang. Another natural factor that protects Cow Cave is the presence of a 'vegetation curtain' between the parent rock of the shelter and the surroundings. Many trees and shrubs grow to within 3 m to 5 m of the shelter and a harsh storm will thus not affect the dripline as much as at Bhlendleni where no protection is offered by the surrounding grasslands. Recent storms and floods in Mnweni may, in fact, have damaged the dripline.

Fig. 4 clearly shows that damage was caused by human action. This is worrying, since literature on the importance and conservation of rock art is available at the Mnweni Cultural and Hiking Centre, scarcely 5 km from the shelter. Of further concern is the development of housing close by and a new road that passes next to the shelter. A more serious threat is engraved graffiti. Long vertical scratches and small holes that were not present in 2012 were recorded in 2014. The shelter has been used by the Amangwane Rock Art Custodians and Monitors for tourism purposes, but it has now been agreed that this practice should be discontinued.

Newer techniques

Whilst testing and monitoring artificial driplines, cognisance must be taken of newer techniques in rock art conservation. One such a technique is the application of silica skins. Watchman (1990:21) defines these as: 'surface films or layers, less than 1 mm thick, composed predominantly of silica, which generally form on stable quartzite and sandstone surfaces'. Silica layers covering rock art has been reported worldwide. It is argued that these naturally occurring phenomena protect rock art from graffiti and assist in binding ochre to the rock surface. In 1988, the Australian Institute of Aboriginal Studies supported research into silica layers in the hope of artificially reproducing it for application to rock art as a conservation measure (Watchman 1990). However, it is doubtful that silica skins will ever be an effective conservation measure considering financial constraints, lack of skills and research at local sites, and the debate surrounding such types of intervention.

Fig. 5: The dripline at Cow Cave, 2015

Conclusion

Amafa will continue to monitor and inspect the three sites discussed, in particular the effectiveness of their driplines. It hopes to present a well-recorded long-term record that will stimulate debate on relevant issues and contribute to rock art conservation in KwaZulu-Natal and nationally.

Currently the best-practise guidelines and procedures for the insertion of driplines in KwaZulu-Natal are as follows:

1. Perform an inspection and condition assessment of the site
2. Examine evidence of previous and current water-flow patterns (photograph and sketch)
3. Examine the stability of the rock face
4. Record the entire site by taking photographs at specified intervals (left to right) in 1 m x 1 m or 2 m x 2 m intervals, depending on the number and density of rock art images
5. Clean the affected area by brushing it with a microfibre brush
6. Continue cleaning with a copper-wheel brush

(cordless drill), if necessary

7. Apply small amounts of high-quality epoxide to the rock surface and mould it to the desired shape.
8. Test for stability when dry
9. Document and photograph the entire procedure

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WORLD ARCHAEOLOGY

Indonesian shell has 'earliest human engraving'
Zig-zag patterns found on a fossilised shell in Indonesia may be the earliest engraving by a hominid. It is at least 430 000 years old, which would mean that it was made by *Homo erectus*. The oldest man-made markings previously found are about 130 000 years old. Hundreds of fossilised freshwater mussel shells were excavated and collected in Java in the 1890s, then stored in boxes. In May 2007 Stephen Munro from the Australian National University took photos of them as part of his research for his PhD. The engravings stood out very clearly on the digital photos. Research found that the engravings were made before fossilisation, when the mussel was fresh between 430 000 and 540 000 years ago.

Munro said the discovery could confirm theories that *Homo erectus* had greater cognitive abilities than previously thought. 'When we see this type of behaviour, whether it's art or symbolic expressions, we reserve it for ourselves as something quite uniquely human,' he said. 'With this finding, we might say there are definitely differences between us and *Homo erectus*. But they might be more like us than we previously thought.' Other experts expressed scepticism about the find. John Shea from Stony Brook University said that there was 'nothing like it around ... If this is symbolic behaviour by *Homo erectus* it is the only evidence we have for a species that lived for a million-and-a-half years on three continents.' *Nature, 04/12/2014*

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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.

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