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A NEW SPECIES, *HOMO NALEDI*, FROM THE SITE OF RISING STAR

Francis Thackeray

On 10 September 2015 an extraordinary announcement of a new hominid species – *Homo naledi* – was made from Maropeng, adjacent to the Cradle of Humankind World Heritage Site. The announcement was made by Professor Lee Berger and his international team of scientists and explorers, who had made a remarkable discovery of more than 1 500 fossils from the Rising Star cave situated a few kilometres from Sterkfontein.

Only two years ago, a small group of explorers had ventured into an underground dolomitic solution cavity and, after getting through tortuous back-bending passages, had discovered a few bones on the surface of a chamber at the very end of the cave system. Now known as the Dinaledi chamber, the area was very difficult to access. To enter this 'Chamber of Stars', it was necessary to pass through an opening only 15 cm wide, which meant that only the smallest of the explorers could enter. Photographs were taken. One of them was relayed to me by Pedro Boshoff and I immediately recognised the image of a hominin cranium. I there and then recommended that it be passed on to Lee Berger at the Evolutionary Studies Institute (ESI). I sent Lee an SMS on 1 October 2013 reading: 'Hi Lee. Pedro reports a hominin. A SAHRA permit will be needed to explore further. Can you please help him? Thanks. Francis.'

Fig. 1: Dinaledi skeletal specimens. The figure includes approximately all of the material incorporated in this diagnosis, including the holotype specimen, paratypes and referred material.The 'skeleton' layout in the centre of the photo is a composite of elements that represent multiple individuals. (With acknowledgement to eLife and Berger, LR. 2015. Homo naledi*, a new species of the genus* Homo *from the Dinaledi Chamber, South Africa. http://dx.doi.org/10.7554/eLife.09560).*

The photograph I saw did not have a scale, but it showed what appeared to be the outline of a cranium, reminiscent perhaps of the famous KNM-ER 1470 skull discovered by Richard Leakey in the Turkana Basin in Kenya in 1972, later described by Bernard Wood as *H. rudolfensis*.

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OTHER FEATURES IN THIS ISSUE

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

Within a short period, Lee and his explorers confirmed the discovery of hominins, and plans were made to record the context before recovering them. Paul Dirks (formerly at Wits' School of Geosciences and now based in Australia) was summoned to assist. The problem of accessing the Dinaledi Chamber, with its exceptionally narrow entrance, was addressed by making an open call for applications from speleologists of slender size. Wilma Lawrence, Lee's secretary, received applications from all over the world. Not having been briefed beforehand as to why such a call was being made, Wilma was surprised at first, wondering why Lee was interested in the waist diameters of young women! Eventually six women were selected as part of the Rising Star team.

The recovery of the fossils was analogous to lunar exploration, with a tented 'Mission Control' centre outside the cave. Only part of the Dinaledi chamber with a concentration of hominin material including skull fragments, teeth and postcranial bones was explored. There were no carnivore or antelope fossils of the kind often associated with assemblages at caves such as Sterkfontein, Swartkrans and Kromdraai.

An international team was assembled to analyse the fossils. Two papers were eventually published in the online journal, *eLife*. The impact was immediate. The news of *Homo naledi* was transmitted globally through all forms of media, including newspapers (on the front pages of *The Times* in London and *The New York Times*), television and radio, Facebook, Twitter and, notably, through a prominent article in *National Geographic*, which had supported the project.

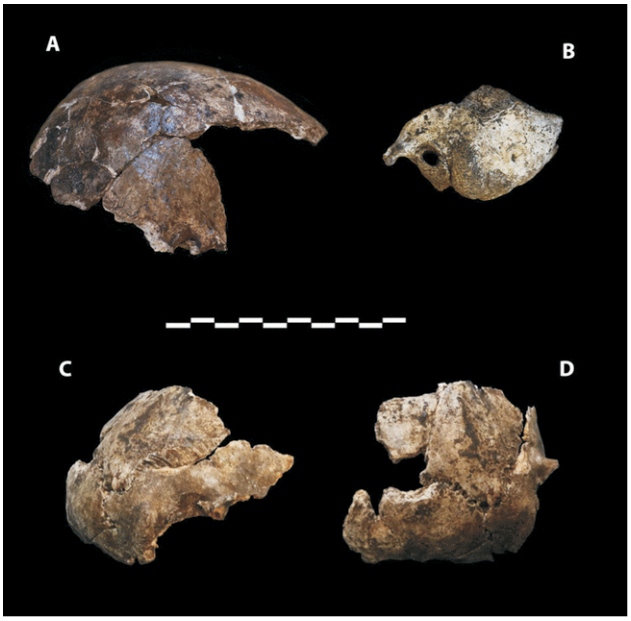

Fig. 2: Cranial paratypes. (A) DH2, right lateral view. (B) DH5, left lateral view. (C) DH4, right lateral view. (D) DH4, posterior view. Scale bar = 10 cm. (With acknowledgement to eLife and Berger, LR. 2015. http://dx.doi.org/10.7554/eLife.09560)

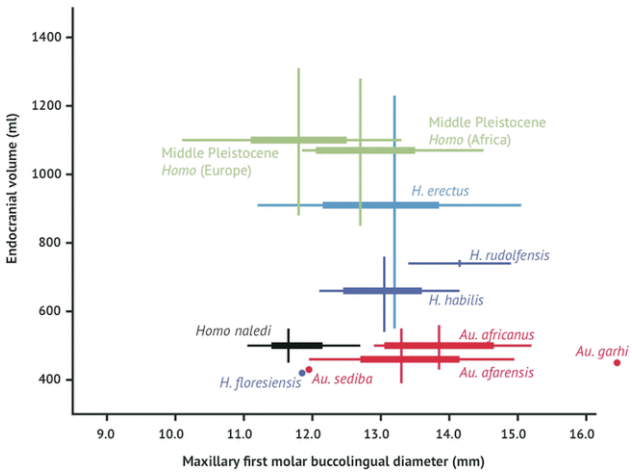

Fig. 3: Brain size and tooth size in hominins. The buccolingual breadth of the first maxillary molar is shown here in comparison with endocranial volume for many hominin species. H. naledi *occupies a position with relatively small molar size (comparable to later Homo) and relatively small endocranial volume (comparable to australopiths). The range of variation within the Dinaledi sample is also fairly small, in particular in comparison with the extensive range of variation within the* H. erectus sensu lato. *(With acknowledgement to eLife and Berger, LR. 2015. http://dx.doi.org/10.7554/eLife.09560)*

I was in London at the time of the Maropeng announcement, to attend the opening session of a conference of the European Society for the Study of Human Evolution (ESHE). One of the speakers was Dr Fred Spoor, whose paper dealt with specimens of early *Homo*. At the end of his lecture he put up a slide of Big Ben, with the clock pointing to 10:00 am. Fred said: 'Well, now that the time of the release of a press embargo has been reached, I can show you this'. He then brought up an image showing an impressive view of all of the Rising Star fossils laid out together. Fred said: 'And here we have the newest species of early *Homo*. It has been called *H. naledi*, from South Africa'. With that he ended his lecture and sat down.

Using their cell phones, some of the delegates were monitoring the announcement live from Maropeng. But many others were anxious to learn more about this amazing discovery and during the tea interval I, as the only South African palaeoanthropologist attending the ESHE conference, was at the receiving end of a barrage of questions: 'How old is *H. naledi*? What are its affinities? How did the blessed fossils get into the cave? Were carcasses really brought into the back of the cave and deliberately deposited there? Was there not perhaps another opening to the cave?' Answers to these questions were not readily available.

Although Lee and his team had decided to place the entire fossil assemblage into the genus *Homo*, some of the fossils also had australopithecine features. Notably, *H. naledi* had a small skull, with a cranial capacity of about 500 cc or less (John Hawks commented that it had a brain 'about the size of an

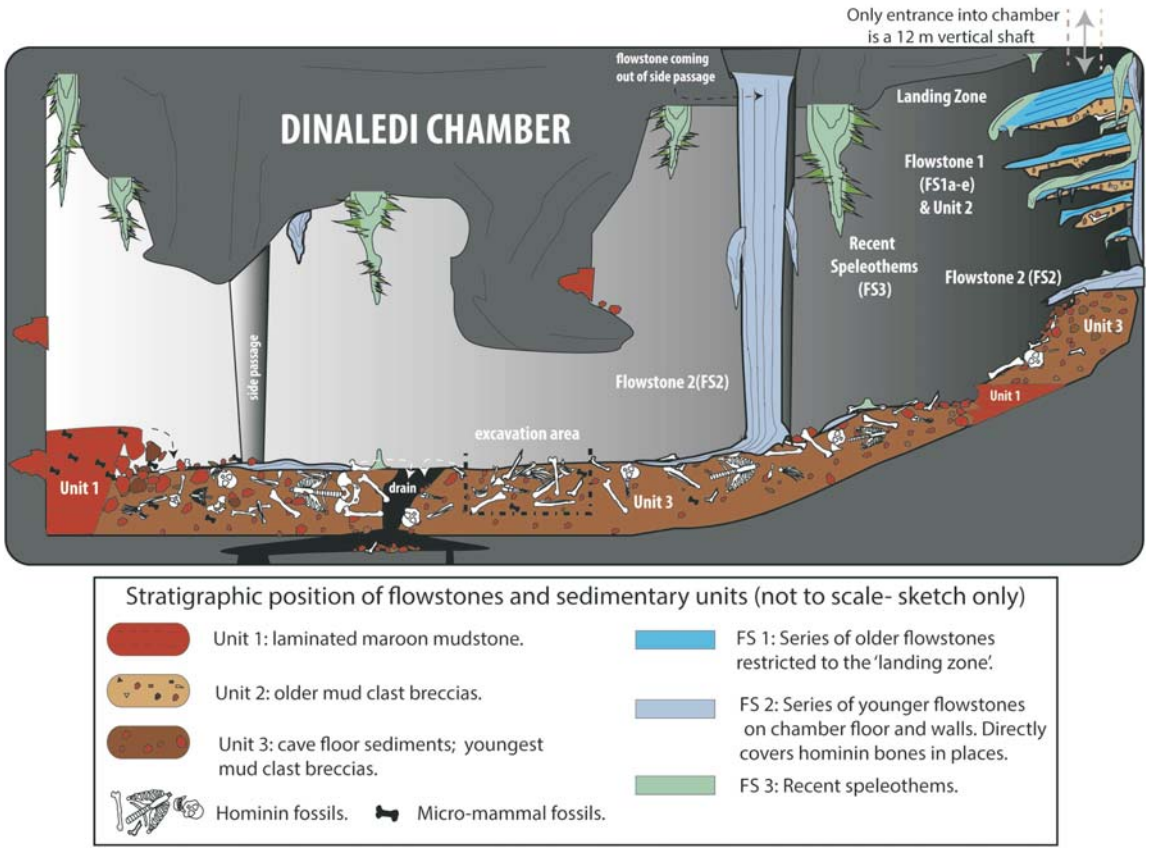

Fig. 5: Illustration of the geological and taphonomic context and distribution of fossils, sediments and flowstones within the Dinaledi Chamber. The distribution of the different geological units and flowstones is shown together with the inferred distribution of fossil material. (With acknowledgement to eLife and Dirks, P et al. 2015. Geological and thaphonomic context for the new hominin species Homo naledi *from the Dinaledi Chamber, South Africa. http://dx.doi.org/10.7554 /eLife.09561)*

orange'). Phillip Tobias would have been fascinated. After all, it was he who had described an assemblage of early *Homo* fossils from Olduvai Gorge in Tanzania, discovered by Louis and Mary Leakey in the early 1960s. *H. habilis* was thought to have had a cranial capacity of about 600 cc and there had been earnest debate between John Robinson and Tobias as to whether this was significantly higher than the cranial capacities of South African skulls attributed to *Australopithecus africanus*. At one time it was thought that 600 cc was a 'rubicon' for the emergence of *Homo*, as distinct from australopithecines. But now it

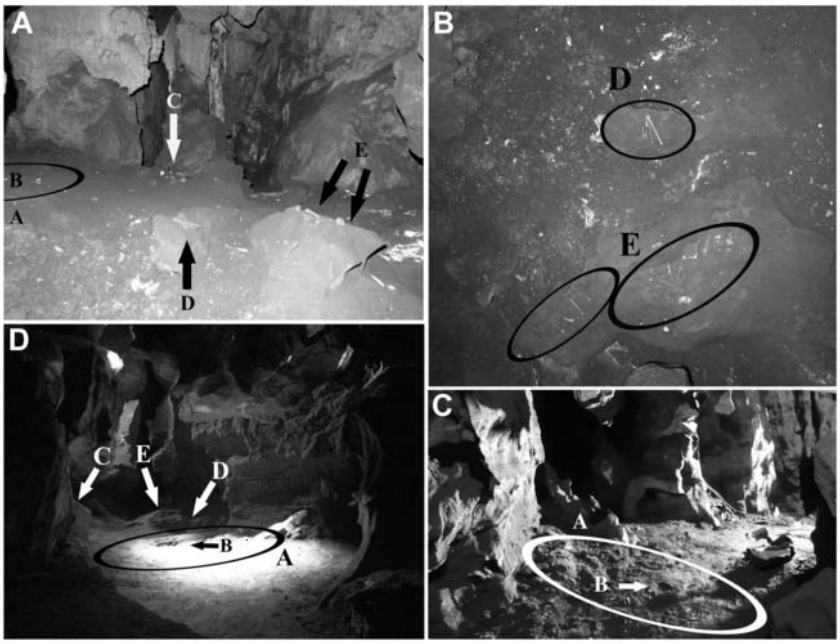

Fig. 6: Views of the Dinaledi Chamber. Clockwise from top left: (A) Photograph taken during initial exploration of the chamber. 'A' indicates the area where most of the hominid material was excavated. 'B' shows the location of the cranial fragment that was one of the first pieces removed from the chamber. Arrows 'C', 'D' and 'E' indicate areas of concentrated surface material. Block E is ~ 50 cm across. (B) Pre-excavation view of the chamber floor. 'D' and 'E' included hominid teeth, (intrusive) bird bones and several long bone fragments that had been 'arranged' on rocks by an unknown caver prior to discovery by the caving team. (C) View of the primary excavation area prior to excavation. (D) The excavation area at the end of the first round of excavations. (With acknowledgement to eLife and Dirks, P et al. 2015. http://dx.doi.org/10.7554/eLife.09561)

would seem (especially from the discoveries of *H. naledi* and *Australopithecus sediba*) that there is no clear boundary between *Australopithecus* and *Homo*.

Tobias could have been taken aback by the description of hominin species such as *H. naledi* with cranial capacities well below those of East African fossils that he had attributed to *H. habilis*. Perhaps he might have said to Lee (as he had said to me when I claimed that there is no clear boundary between australopithecines and early *Homo*): 'You have given us something to think about!'

Many palaeoanthropologists have been critical of the fact that Lee and his team have not yet succeeded in estimating the age of *H. naledi.* However, efforts continue to be made in this regard.

Features of the foot, studied by Bernhard Zipfel of the ESI and colleagues, show that in some respects *H. naledi* is astonishingly like *H. sapiens*. But the cranium and other elements indicate primitive features. Tim White of the University of California, Berkeley, has raised the question as to whether *H. naledi* is simply an early form of *H. erectus*. As the debate continues, I have applied my morphometric technique to ask the question: 'Is *H. naledi* warranted as a distinct species?'. My answer to this, based on a 'dissimilarity index', is a resounding 'yes' (see the *South African Journal of Science* (November/ December 2015).

The next question that I have attempted to answer is 'what are the affinities of the specimens attributed to *H. naledi*?' Using my morphometric technique (of the kind described in *The Digging Stick*, August 2015), it appears that although *H. naledi* is different from other taxa, it is most similar to specimens attributed to *H. habilis* and *H. rudolfensis* (and to a lesser extent to *H. erectus*). Based on the morphometric analyses applied to crania, I believe that *H. naledi* is in the order of two million years old, ±500 000 years.

Lee Berger and his team are to be congratulated on the discovery and description of this new material. Lee has again demonstrated his ability to take on a huge challenge and co-ordinate a mission that involved many researchers and explorers, including Pedro Boshoff, who has spent more than 20 years looking for hominin sites in the Cradle of Humankind.

The project was supported by *National Geographic* and the Department of Science and Technology through the National Research Foundation. Credit is also given to the Palaeontological Scientific Trust (PAST), which funded much of Lee's earlier explorations, fieldwork and research.

DEFENDING CULTURAL PROPERTY AND WORLD HERITAGE
From Islamic State to travesties at Mapungubwe

Cynthia Kros

Beheading of Khaled al-Asaad

I begin this article with reference to an atrocity perpetrated by Islamic State (IS) as a way of leading into a consideration of the concept of cultural property, which arguably owes both its origins and its particular limitations to war. In recent times, cultural property/heritage has had to contend not only with armed conflict, but with attacks that are just as vicious launched by corporate interests advancing 'development' – as often as not with support from local states.

In a year that has seen IS stage a series of bloody attacks, most recently those in six locations in Paris that killed 130 people, it is almost difficult to recall the bizarre beheading in August 2015 of Khaled al-Asaad, an eminent Syrian scholar of antiquities, that cast its shadow over the first draft of this article. Allegedly, 82-year-old al-Asaad was murdered by members of IS for, among other things, refusing to disclose the whereabouts of valuable artefacts connected with the ancient oasis city of Palmyra that once linked Persia, India and China with the Roman Empire.

In his opening remarks on his weekly show on HBO, made in the wake of the Paris attacks, satirical commentator John Oliver articulated the revulsion felt by most of his audience for IS's methods, and by refusing to countenance its ideology as anything but 'bankrupt', effectively put the lid on any further contemplation of its motives (Oliver 2015). It is certainly not my intention to exonerate IS. However, I think by probing circumstances surrounding the execution of al-Asaad and its impact, we might gain some understanding of the importance of cultural property both for us (meaning broadly those who are outraged by his murder) and for those who committed it.

We might start, as more than one commentator has, by asking why al-Asaad's recalcitrance became a capital offence, why he was prepared to pay the ultimate price in defence of ancient artefacts and why his murder had a visceral impact on people like the readers of this article half a world away – as did the Taliban's destruction of the giant 6th century Bamiyan Buddhas in Afghanistan in 2001, the destruction of the mausoleums and the forced opening of the door of the 15th century Sidi Yahia Mosque in Timbuktu in 2012 by insurgents associated with Al Qaeda, and the video footage released by IS earlier in 2015 of assailants wielding sledgehammers and drills to

Still from YouTube propaganda clip (IS destruction of artefacts in the Mosul Museum) via flickr user Eupalinos Ugajin

destroy artefacts in the Mosul Museum in Northern Iraq, some of which were many thousands of years old (Shaheen 2015).

In the case of Mosul, it is probable that many of the most valuable artefacts had already been removed and sent to Baghdad for safekeeping, and that the casualties of the wrecking party were replicas. But even knowing that somehow does not ease the pain, and of course IS made and distributed the video in anticipation of it causing psychological harm to its enemies. According to researcher Graciela Singer (2015), IS evidently raises about $200 million annually from looting cultural items that make their way to lucrative markets through Mafia-like networks. Smashing artefacts in the Mosul Museum that were too large to be comfortably smuggled for the purpose of generating revenue to cover running costs, as one theory has it, was a premeditated, offensive strike aimed at both the local 'infidels' and the international community that has been taught to regard the sites of IS's attacks as the 'cradle of civilisation'.

The Director-General of UNESCO (UN Educational, Scientific and Cultural Organisation), Irina Bokova, could hardly be accused of exaggerating when she used the chilling phrase 'cultural cleansing' to describe the deliberate destruction of cultural property (Neubert & Smith 2015). Of the four divisions of the Mosul Museum, it was the Hatrene and Assyrian Halls that bore the brunt of the attack, the latter being associated with the religious and linguistic Assyrian minority that has also been the victim of considerable persecution by IS in Iraq, and latterly in Syria. Some commentators object that we should care more about the people who are the victims of IS and other terrorist groups than about non-sentient artefacts. On hearing rumours that the Mosul Central Library had been destroyed, with perhaps the loss of 10 000 books and manuscripts, US-based Iraqi poet Dunya Mikhail quoted what was apparently a common saying: 'May the books be a sacrifice for the people' (Qualey 2015). But we know this to be wishful thinking. IS has not shown a marked interest in Faustian pacts and the chairperson of the US-based Antiquities Coalition,

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Deborah Lehr, more realistically observed: 'This isn't a choice between people and stone' (Westcott 2015). Perhaps in the way that Robert Bevan (2006) observed of the *Kristallnacht* in Nazi Germany, flagrant destruction of property associated with a particular ethnic or religious group may even be said to provide a 'genocidal prototype'.

No IS monopoly

IS and its counterparts are not the first or the only ones to destroy cultural heritage, either in pursuit of war or as one of its by-products. The Ancient Romans destroyed much of Palmyra in the third century as an act of revenge because of an Assyrian rebellion, leaving the city in ruins. Witness too, the trophies that surviving members of Napoleon's army brought home from the Egyptian campaign, sustaining a wave of Egyptphilia in France that successfully diverted attention from military setbacks. The commander of the French army, deserted in Egypt by Napoleon, was finally forced to capitulate to the British in 1801. Subsequently, he was obliged to hand over a substantial number of the Egyptian antiquities collected, including the Rosetta Stone, which then made its way to the British Museum, where it has remained ever since.

Florentines in hiding in their city as the Nazis rampaged through it in a last-ditch effort to slow down the Allies at the end of the Second World War, according to an article by Ilaria Brey (2014), tried to judge from the sounds of explosions which of their treasured monuments were being destroyed. The famous Renaissance Ponte Santa Trinita was not spared. Florentine author and politician, Piero Calamandrei wrote: 'They called it the most beautiful bridge in the world, a miraculous bridge by Ammannati that seemed to summarise in the harmony of its lines the apex of a civilisation' (Brey 2014).

Post-war conventions

Unsurprisingly, the foundation of current international treaties that try to define cultural property or heritage, and to establish mechanisms for its protection, was laid as the extent of the damage inflicted on the built environment during the Second World War sank in. The wording of the Convention for the Protection of Cultural Property in the Event of Armed Conflict, more commonly known as the Hague Convention, enacted in 1954, was revealing of considerable post-war trauma, observing as it did that 'cultural property has suffered grave damage during recent armed conflicts' and anticipating that 'it is in increasing danger of destruction'. With an idealism that is still invoked, it was averred that damage to cultural property 'means damage to the cultural heritage of all mankind' (UNESCO 2015a).

The Hague Convention defined cultural property to encompass both moveable and immoveable objects. Although it began its enumeration with monuments and architecture, art and history, thus favouring a 'western' notion of cultural property, it did go on to include archaeological sites, books of artistic, historical or archaeological interest, and significant collections and archives. Cultural property was to be listed in a register maintained by the Director-General of UNESCO and would be marked with a conspicuous shield emblem to signal to hostile parties that it enjoyed special protection. The First Protocol signed in the same year as the convention itself was designed to prevent the export of cultural property during armed conflict and to regulate the custody of cultural property sent for safekeeping to third parties.

The long-delayed decision by the US government to ratify the Hague Convention – only some years into the 21st century – is attributed to the public outcry over what happened to the Baghdad museum in the course of the Iraq War and the widespread looting of Iraqi archaeological sites. The US has often been blamed, justly or not, for failing to protect the national museum of Baghdad in the opening stages of the war, with the consequence that several thousand archaeological artefacts associated with the history of Mesopotamia were looted, including the 4 000-year-old Golden Harp of Ur – one of the earliest string instruments, the 5 000-year-old alabaster Warka Vase and the 4 500-year-old stone statue of the Sumerian king Entemena of Lagash (all of which were later recovered).

The reconstruction of the Ishtar Gate in the Pergamon Museum in Berlin. Photo by Rictor Norton via Wikimedia Commons

The Americans also came under fire for constructing a military base for about 2 000 personnel on the ruins of Babylon, later passed over to Polish forces. At the invitation of Iraqi antiquities experts, a specialist curator from the British Museum investigating the site found that a 2 600-year-old pavement had been damaged by military vehicles and that sand for sandbags had been collected from the archaeological site, causing irreversible contamination. It appeared that there had also been an attempt to take out bricks

from the famous Ishtar Gate (McCarthy & Kennedy 2005). Later a report released by UNESCO revealed more structural damage and the extent of the contamination of the site (International Coordination Committee 2009).

Some critics observed that these travesties were a result of the US's failure to sign the Hague Convention. There appeared to be a distressing failure to follow up in the spirit of General Dwight Eisenhower, who had forbidden looting during the Second World War and had issued orders for the protection of monuments, thereby facilitating the work of a special unit of the Allied Armies – the real Monuments Men (and women) – who worked to safeguard cultural and historical monuments, and, when the war was over, to manage the restitution of cultural property. During preparations for the Iraq War, the Pentagon agreed to enhanced protection of only a fraction of the 4 000 sites proposed by archaeologists.

The approach of the American military establishment was in keeping with a traditional wariness on the part of the US of having 'military necessity' circumscribed. The US (and the UK) absolutely refused to sign the Hague Convention's Second Protocol of 1999 because, besides attempting to establish what are called 'enhanced' forms of protection for cultural property, the notion of 'imperative military necessity' was strictly limited by the caveat that there should be 'no feasible alternative to obtain similar military advantage' before any actions were planned that might occasion harm to registered cultural property.

World Heritage Sites

It was only in 1972 that the protection of heritage was properly addressed outside the context of conflict. The UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage has since been ratified by 191 nations (UNESCO 2015b). The governing body is the World Heritage Committee (WHC), consisting of 21 'States Parties', usually represented by delegates from local arts and culture or environmental portfolios. 'Outstanding universal value' has become the single most important overall criterion for determining, through a process of independent evaluation by bodies mandated by the WHC – with the final decision resting with the committee – of what constitutes heritage worthy of admission to the World Heritage List, along with associated benefits of prestige and potential access to funding, training and technical assistance.

To make the World Heritage List, a site has to satisfy at least one criterion from a list of ten that defines and exemplifies what might be meant by 'outstanding universal value'. South Africa's Mapungubwe site, which incorporates the spectacular remains of an African kingdom that is about a thousand years old, succeeded in being inscribed on the list in 2003 on the grounds that it met four criteria concerning its representation of 'human creative genius', its 'unique or exceptional testimony to a cultural tradition or civilisation', 'an outstanding example of a … landscape which illustrates a significant stage in human history' and an 'outstanding example of a traditional human settlement or representative of a culture' (UNESCO 2015c).

Mapungubwe Hill 2007. Photo: JJ van Zyl. Copyright holder: Laura SA (GNU Free Documentation License).

Mapungubwe is classified as a 'cultural landscape', a concept adopted in 1992 to accommodate the idea of humans interacting dynamically and beneficially with their environment. More recently, the criteria for natural and cultural heritage, which used to exist as two independent sets, have been integrated. These modifications allow for the more congenial accommodation of sites that are not monumental in the 'western' sense. Still, of the more than 900 World Heritage sites, only 91 are in Africa (eight in South Africa), whereas Europe has almost 500. Of the sites on the list of Heritage in Danger, out of 48, ten are in Africa (UNESCO 2015e).

The Temple of Baalshamin in Palmyra being blown up by ISIL in July/August 2015. Shown on BBC News.

A week after the murder of al-Asaad, the Roman-era temple of Baalshamin in Palmyra was blown up. UNESCO's Irina Bokova issued a kind of battle cry, using the Arabic acronym for IS: 'Daesh … cannot silence history and will ultimately fail to erase this great culture from the memory of the world' (UNESCO 2015d). Effectively, she was entrusting the obligation

for the preservation of 'great' cultures to the collective memory, which has a particularly striking resonance for the local heritage environment.

Mapungubwe's fall from grace

In South Africa, events that have unfolded around Mapungubwe show that despite its one-time standing as the jewel of President Mbeki's African Renaissance and its theoretical protection through inscription in the World Heritage List, as well as by local heritage and environmental legislation, the site probably depends for its survival on the resilience of collective memory and the spirit of civil defiance. In 2010, the Australian company, Coal of Africa, was granted a permit by the Department of Mineral Resources to establish the Vele opencast coal mine not 6 km from the border of the Mapungubwe National Park. Despite the loud alarm raised by a number of civil society organisations, which came together under the auspices of the *Save Mapungubwe Coalition* (Bega 2015), as well as by UNESCO, the government a year later agreed that mining could go ahead.

Western section of the open-cast mining area of Vele Mine near Mapungubwe. Photo: Dag Avango. From p. 15 of the UNESCO Mission Report: Mapungubwe Cultural Landscape (South Africa) (c1099) 15-20 January 2012. whc 12/36 com/7B.

Other government departments, as well as South African National Parks, buckled. Deputy Director-General for Biodiversity and Conservation, Fundisile Mketeni, dismissed opposition to the project, saying: 'Studies were done and emotions must be set aside and science put up front' (*Mail and Guardian* 2011). The vagueness of the word 'studies' served to cover up the truth. Cultural heritage sites are supposed to touch the emotions, to inspire awe and wonder, and so to deny that emotions should have a part in deciding the fate of a cultural site goes against the very spirit of the legislation.

In a report on the second of two missions sent by UNESCO, the authors raised questions about the quality of the Heritage Impact Assessment (HIA) that had been conducted, highlighting evidence of its lack of independence from the coal company (UNESCO 2012). The mission team disagreed with the HIA's finding that the impact of the mine on the site would be minimal and judged that the value of an archaeological site in the middle of the processing plant area, which ought to be seen, they argued, in continuum with Mapungubwe and the other adjacent archaeological sites, 'had gone forever'.

They found that there had been no consultation with local stakeholders and evoked a disturbing image of the 'cultural landscape of mining' blotting out the historical, natural and cultural landscape for which Mapungubwe was renowned. In response to self-serving arguments about the benefit of mining to archaeology, the authors of the report admonished: 'Large-scale open cast mining should not be presented as a fruitful way to preserve our World Heritage Sites'. Their conclusion was uncompromising. There are 'no mitigation measures … possible to reduce the impact of open cast mining'. Even though the colliery has since become dysfunctional and is under 'maintenance', some of the damage it created will be difficult to ameliorate. It is worth noting that the UNESCO mission also found signs of lesser, more everyday neglect that threatened to put Mapungubwe on the Heritage in Danger List. For example, the archaeological site known as K2 was 'seriously deteriorated'. They also cited lack of interpretative guidance and an integrated management plan and of proper consultation with local communities.

Conclusion

The post-Second World War discourses on cultural property and heritage have contributed to a consciousness of their universal value, and international machinery has been more finely tuned to provide protection for them. Modifications to the criteria and definitions of cultural property have accommodated 'non-western' forms. The WHC has had some successes in reversing imminent catastrophe by cajoling governments into making interventions to stop proposed developments that threaten heritage sites. But several other international examples, and the fact that the once cherished and theoretically well-fortified Mapungubwe came so close to the brink with the complicity of its supposed local custodians, suggests that, in the end, it is the tenacity of civil society organisations armed with an informed understanding of the singular natural and historical value of sites like Mapungubwe that offers the most reliable form of protection.

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DR BOB BRAIN ELECTED TO HONORARY LIFE MEMBERSHIP OF THE SOCIETY

The Council of the South African Archaeological Society has accepted a proposal by the Trans-Vaal Branch that Dr Bob Brain be awarded honorary life-membership of the society.

Dr Brain is a founder member of the society, having joined in 1947. He has always been a staunch supporter of the society's activities and until recently was a patron of the Trans-Vaal Branch.

Dr Brain is an eminent palaeontologist who has studied and taught African cave taphonomy (the study of processes of burial) for more than 50 years. With a geological background, he studied sediments of cave deposits. He made the first discovery of stone tools in Sterkfontein in 1956. This, as one of his most famous contributions to paleoanthropology, resulted from his working methodology in excavation, which was far more systematic than that of his predecessors.

Dr Brain supervised a 30-year long excavation of the Swartkrans Cave in the Sterkfontein Valley (now part of the Cradle of Humankind World Heritage Site). At this cave the coexistence of robust ape men with early *Homo* was first demonstrated. Swartkrans produced more remains of *Paranthropus* than any other site in the world. Bob Brain's work at this site, arguably his most important, produced 240 000 fossil samples from a diverse fauna. These have emphasised the importance of predation and provided evidence for the earliest controlled use of fire by humans about a million years ago.

Dr Brain realised that most fossil assemblages in the Cradle of Humankind resulted from the accumulation of bones by predators and scavengers such as sabre-toothed cats and extinct forms of hyena.

Dr Bob Brain on receiving his life-membership from Society vice-president Pamela Küstner

He was born in Southern Rhodesia in 1931. He matriculated from Pretoria Boys' High School and went on to obtain doctorates from the universities of Cape Town and the Witwatersrand. He spent most of his career at the Transvaal Museum (now part of Ditsong Museums) and was its director for 23 years.

Dr Brain retired officially in 1996, but remained active as Curator Emeritus at the Transvaal Museum, Honorary Professor of Zoology at the University of the Witwatersrand, Research Associate at the Bernard Price Institute for Palaeontological Research, and Chief Scientific Advisor to the Palaeo-Anthropological Scientific Trust (PAST).

SOCIETY AWARDS

Anita Arnott and Sona Buys receive President's Awards

The Council of the SA Archaeological Society unanimously agreed earlier this year to award the society's President's Award to two worthy and long-standing branch committee members, Sona Buys of the Western Cape Branch and Anita Arnott of the Trans-Vaal Branch.

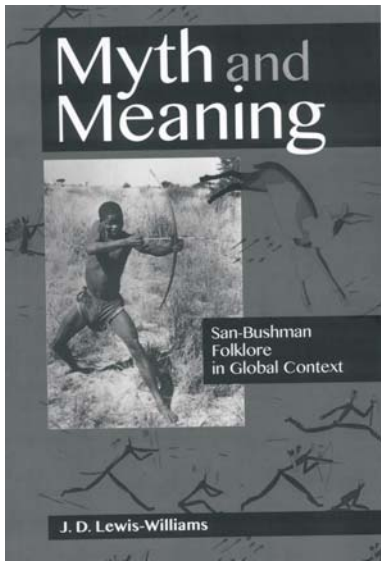
Sona Buys (right) receiving her medal from the Society's honorary secretary, Janette Deacon

About 20 years ago, Tim Maggs, who was then president of the society, donated a number of silver medals to be used as a President's Award. He asked that they be given mainly to non-professionals who had contributed significantly to raising awareness of archaeology through branch activities and encouraging people to join the society. The award comprises a silver medal and a sum of R1 000.

The Trans-Vaal Branch nominated Anita Arnott as a major contributor to the success of the branch over many years, being responsible for many organisational activities relating to lectures and outings. Anita has served on the branch committee since 1999. Sona Buys, who is very involved with the organisation of the One-Day Lecture Series in the Cape each year, was nominated by the Western Cape Branch.

Trans-Vaal stalwart, Anita Arnott

David Lewis-Williams, one of South Africa's leading archaeologists, has excavated meaning from the complex mythological stories of the San to create a larger theory of how myth is used in culture. These 'nuggets' are contained in his new book –



Myth and Meaning San-Bushman folklore in global context

Far-reaching but often unspoken words and concepts that are opaque to outsiders have been extracted and explained by Lewis-Williams to establish a more nuanced theory of the role of these myths in the thought-world and social life of the San.

Megan Biesele, director of the Kalahari Peoples Fund, comments that in this book Lewis-Williams has assembled encyclopaedic knowledge of recorded /Xam San symbolism so readers can journey to comprehensive understanding of the /Xam world.

Myth and Meaning, a paperback by UCT Press, Cape Town, 249 pages, 26 illustrations, is available from ArchFox Books, tel. 011 803 2681, email fox@boers.org.za, at R295 (postage excluded), or from any good bookshop.

LOOKING AT SAN ROCK PAINTINGS

David Lewis-Williams

Many people who encounter San rock paintings are unsure how they should respond to them. Understandably, the images often seem amazingly beautiful and close to them. Yet, at the same time, there seems to be a gulf between them and the world of the paintings. How do we bridge that gap? How do we judge the various suggestions that have been made about the meaning (or meanings) of the images? Is one guess as good as another?

Examining images

The first and most important point is to try to get as close as possible to the beliefs of the artists themselves. If we want to understand why San people made the images, our own, probably Western, beliefs about art will not aid us. This is why researchers should work within the combined fields of anthropology, archaeology and history. I return to this point later.

An equally important point comes into play when we are in rock shelters. Standing back and observing the whole sweep of images in a shelter may be an initial response, but it is insufficient. We must get close to the rock face. Indeed, we must be as close to the images as were the painters themselves if we are to spot small but important details.

Close inspection is especially necessary when we confront panels crowded with many images. It takes much practice and familiarity with the paintings to be able to disentangle these seemingly confused panels. Yet they are our most valuable resource. We can draw a parallel here. Archaeologists seek and excavate promising sites in which they know there is much evidence. The same is true of rock painting sites. It is the complex, crowded panels that hold the most meaning.

After having learned from complex sites we can move back to 'simple' sites. I place the word in inverted commas because there is nothing simple in San rock art. Rather, we have to see the few isolated images that we find in some sites – an eland here, a couple of human figures there – in the light of what we know about the San and their images in general. Similarly, a simple, unadorned cross on a grave should be understood in terms of the whole Christian belief system.

So we need to ask: are beauty and general admiration the 'whole story' of San rock art? Or was there more to the images *for the San themselves*? A moment's thought tells us that all the beliefs and feelings that were in the minds of San painters and viewers – their daily lives, relationships with other people, beliefs, myths and rituals – would have led to responses different from our own. Those original painters and viewers must have noticed things in the paintings and the ways they are arranged on the rock face that we can easily miss. Can we ever find out even a little about what the paintings meant to the San? Or must we merely gaze and guess?

A foundation

In this quest our most important port of call must be the San themselves. If we do not explore San beliefs, we shall inevitably fall back on Western assumptions about 'art' and supposed 'human nature'. But there is a problem. A direct appeal to the people who actually made the images is no longer possible: to all intents and purposes the San ceased painting over a century ago. As a result, what present-day people, even some indigenous people who may live close to the sites, have to say about the images, though of much interest, must be treated with circumspection. Some authentic ideas may have been preserved down the generations, but how close may what people say today be to the beliefs of the San who originally made the images? How have the turbulent intervening years moulded those oral traditions? This is not to say that modern local people (especially those with San ancestry) have no part to play or should be ignored, but to take their views at face value after so many years have elapsed since the making of the paintings would be unwise. Is there any way of finding out what the actual painters of long ago themselves believed?

Fortunately, we are not entirely in the dark. We have records of San life and belief from the decades when the final images were painted. Today the Wilhelm Bleek and Lucy Lloyd Archive of the 1870s is well known (e.g. Deacon & Dowson, 1996; Skotnes, 2007; Deacon & Skotnes, 2014). Nevertheless, there are researchers who fail to study it in its interrelated entirety. Admittedly, its more than 12 000 verbatim manuscript pages are daunting and its columns of phonetic script can be intimidating, but that is no reason to ignore so rich a record. Alongside the Bleek and Lloyd Archive is the much shorter collection of paraphrased myths and comments on paintings that Joseph Orpen collected, also in the 1870s (Orpen, 1874; Lewis-Williams, 1980, 2003; McGranaghan et al., 2013). While Bleek and Lloyd elicited comments on copies of paintings, Orpen recorded comments that a San man offered on actual paintings.

A word of warning. These two 19th century sources are not straightforward, unproblematic explanations of the art. For one thing, we need to know to what extent the colonial milieu and the recorders' personal

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interests influenced the compiling of the texts (e.g. Lewis-Williams, 1981, 2002; Bank, 2006; Wessels, 2010; McGranaghan, 2012). For another, the recorded comments are couched in the language and concepts of the San; they are not expressed in the language and terminology of anthropologists. Nevertheless, whatever their limitations, we should always try to ascertain the degree to which these foundational sources support modern researchers' explanations of San paintings, if at all.

But even the invaluable 19th century records are not the whole picture. As is well known, numerous groups of San people continue to live in the Kalahari desert. Many of their diverse and fluid beliefs and rituals have been recorded. Are they relevant to the painted images? In the early 1960s, when the Marshall family's Ju/'hoan (!Kung) work was becoming available, I thought that it would be rash to draw on this recent Kalahari source for explanations of the 19th century and earlier southern paintings (Lewis-Williams, 1975). Subsequent fieldwork changed my mind. When I was in the Kalahari with Megan Biesele, the American anthropologist who is fluent in the Ju/'hoan language, we found a complex situation: despite temporal, linguistic, environmental, political and economic differences there are some striking parallels between what she was observing in the Kalahari and what I had been reading in the Bleek and Lloyd Archive (Lewis-Williams & Biesele, 1978). At the time, this was a startling find.

Since then much more work has been done on this issue. In tune with what Biesele and I found, Alan Barnard, an anthropologist who has undertaken San fieldwork, concluded that, despite regional, linguistic and temporal differences, 'religion is far more uniform throughout Bushman and even Khoisan southern Africa than are material aspects of culture and society' (Barnard, 2007:96). Barnard is not alone. Mathias Guenther, a folklorist and anthropologist who has studied the Nharo first-hand as well as the 19th century San records, agrees: 'The fact that trance dances are described by all writers who have visited the Bushmen, even 19th century ones, further attests to the ubiquity and antiquity of this key Bushman ritual' (Guenther, 1999:181). When looking at San rock paintings, we must allow that the modern Kalahari records may be used to explicate the 19th century southern ones, not indiscriminately and across the board but rather *in specific areas of belief and ritual where parallels can be demonstrated* (Lewis-Williams, 2015a).

These general statements are not the end of the matter. Because San ethnography is so detailed and the paintings too are highly detailed (at least where they are well preserved) we can be more precise. We can evaluate the degree of 'fit' between the records and the images. Correlations need to be demonstrated point by point, site by site. I exemplify this procedure in the figure opposite, where I juxtapose San beliefs and statements with painted images. Photographs of this panel were first published by Neil Lee and Bert Woodhouse (1970: frontispiece, figs 94, 111, 131, 139, 170).

Reaching conclusions

A fundamental aim of all research is, where possible, to discriminate between mutually incompatible explanations. All hypotheses are not necessarily equal. In southern Africa, explanations that derive from hunches or intuitions cannot match the greater number of instances of fit there are between, on the one hand, San religion and ritual and, on the other, San rock paintings.

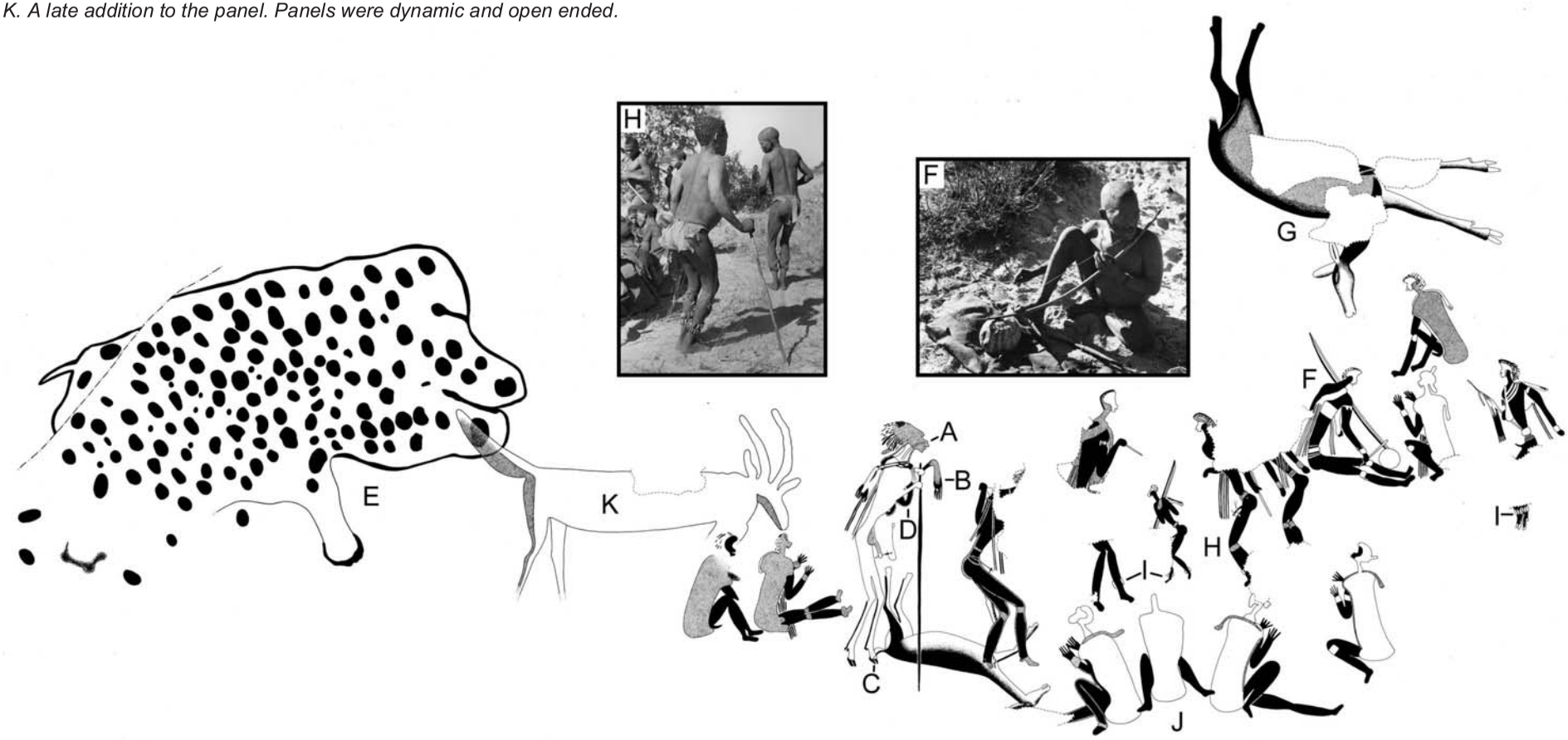
We also need to ask just how coherent an explanation is. Is a supposed explanation for the art a patchwork of personal assertions and unsupported claims? Does it address issues that have in fact already been gone over in other writers' publications, and in doing so does it ignore all the evidence that other researchers have carefully adduced? In the early 1960s it was possible to read in a day, even with a generous lunch break, everything that had been written about San rock art. Now the literature is vast and spread over many journals, international and southern African, as well as books. Unfortunately, people who reject some explanations often do so without having noted the evidence that has been advanced for them in these publications (Lewis-Williams. 2015b). It is a *sine qua non* that researchers familiarise themselves with all this material.

That is why the important next step in the whole research process is participation in the academic tradition of publication. This is where refereed journals play an important role. Prior to publication, referees can usefully draw writers' attention to articles and books that they may have missed or misunderstood. Unsupported claims, reliance on intuition and personal attacks on other writers can be rejected. As debate proceeds, refutations of published but unsupported criticisms can be brought to readers' attention. The journal editor ensures that each successive contribution to the debate contains relevant evidence, not just unsupported re-assertions. This is how academic arguments are refined.

In sum, looking at San rock paintings is much more than just 'looking'. As I have pointed out, the principal aim of *all* research, not just rock art research, is to adjudicate between incompatible, contradictory hypotheses: some have more support than others; some are simply wrong. A prepared mind sees, enjoys and learns much that will escape one that is unfamiliar with San beliefs. We need San explanations of San paintings, not Western guesses. The answers are to be found primarily, though not exclusively, in the 19th century records of San beliefs and their own comments on paintings.

Acknowledgements and references follow on page 14.

Calling up the rain-animal: an Eastern Cape rock art panel. Inset photographs: A Ju/'hoan man playing a musical bow – as in the rock painting, the bow rests on a gourd resonator and the player taps the string with a stick. The other photograph shows Ju/'hoan trance dancers moving around seated, clapping women.
A. 'They are people spoilt [in deep trance] by the — dance, because their noses bleed.' (Qing: Orpen 1874:10; Lewis-Williams & Pearce 2004:171–172; Lewis-Williams & Challis 2011:119).
B. 'Some [dancers] carry the tails of animals in their hands' (Marshall 1969:358).
C. Antelope hoofs are evidence for transformation.
D. Portion of a 'thread of light' (Lewis-Williams et al. 2000).
E. 'Then the water's medicine men [!khwa:-ga !geiten] fetch it [the rain-bull, !khwa:ka xoro] for them, that rain may fall. . . The medicine men really seem to have their hands upon the rain-bull, for you see that the rain clouds come gliding along.' Diä!kwain, 1875 (Bleek 1933:376, 377).
F. '/Kãunu used to strike the bow-string, and then the clouds came up ... it rained there, poured down until the sun set.' /Han≠kass'o, 1879 (Bleek 1933:390).
G. Hunters like to dance next to an eland carcass because it has much potency (Lewis-Williams & Biesele 1978).
H. 'The men dance with knees slightly bent and their bodies held erect or leaning forward, bent at the hips' (Marshall 1969:363).
I. 'The men will tie springbok ears upon their feet; they will dance, while the springbok ears sound … like what we call dancing rattles'. /Han?kass'o (Bleek & Lloyd 1911:351).
J. Women sing and clap medicine songs. 'The hands are usually held tensely upright, finger to finger, palm to palm' (Marshall 1969:365).
K. A late addition to the panel. Panels were dynamic and open ended.



Acknowledgements

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ARCHAEOLOGY IN AFRICA

Lactase persistence alleles reveal Khoe ancestry

Researchers from Uppsala University have shown how lactase persistence variants tell the story about the ancestry of the Khoe. They conclude that pastoralist practices were brought to southern Africa by a small group of migrants from eastern Africa. 'Up till now, routes of human migration in Africa were inferred mostly based on linguistics and archaeology, now we can use genetics to test these hypotheses,' said Dr Carina Schlebusch. Lactase persistence is the ability to digest milk into adulthood. There are a number of different genetic variants associated with lactase persistence and they are heterogeneously distributed in global populations. These variants were likely targets of selection when some populations converted from hunter-gatherer to herder and/or farming lifestyles. The team sequenced the lactase persistence regulatory region in 267 individuals from 13 southern African population groups (including decendents of hunter-gatherers, herders and mixed farmers), providing the first comprehensive study of the lactase persistence regulatory region in a large group of southern Africans.

The indigenous Khoe people in southern Africa have historically been pastoralists and been previously shown to be closely related to southern Africa's San hunter-gatherers. The archaeological record in southern Africa is particularly clear on demonstrating Khoe herding practices and population continuity in the south-western Cape from about 2 000 years ago. Uppsala University and South African researchers now show that lactase persistence variants were at medium frequencies in the Khoe people, but at very low frequencies or absent among San hunter-gatherers. The team was able to show that some 13 per cent of the genomes among Khoe pastoralists trace their ancestry to East African pastoralist groups and the conclusion is that pastoralist practices were brought to southern Africa by a small group of migrants from East Africa and that they were assimilated by local indigenous hunter-gatherers that adopted the pastoralist lifestyle. According to Prof. Mattias Jakobsson of Uppsala it is likely that a small group of migrants had a very strong impact on the way-of-life of the ancestors of the Khoe people. *Current Biology/eurekalert, April 2014*

HUNTER-GATHERERS ON THE MAPUNGUBWE LANDSCAPE

Tim Forssman

In memory of Bronwen van Doornum*

The archaeology of the middle Limpopo Valley, which includes eastern Botswana, northern South Africa and south-western Zimbabwe, is best known for its Iron Age archaeology (Fig. 1). This is perhaps expected because found here is Mapungubwe, a hilltop site that was the capital of southern Africa's first state-level farmer society c. AD 1220 to 1300 (Huffman 2007). However, the local archaeological record extends back quite some time before the appearance of complex societies and the occupation of Mapungubwe. While farming communities arrived at least by AD 900, the earliest evidence of a hunter-gatherer occupation is found to be as far back as 12 000 years ago. This is sometimes overlooked despite the rich cultural material that has been found, the extensive rock art sequence and the intriguing 'disappearance' of hunter-gatherer archaeological remains about the same time that the Mapungubwe state declined.

Studying hunter-gatherer and farmer interactions on this landscape is vitally important. Usually hunter-gatherers encountered incoming communities that had already undergone state formation processes, such as was the case when Europeans arrived in Australia and North America. However, in the middle Limpopo Valley hunter-gatherers witnessed and possibly partook in the political, economic and social activities of farmers that ultimately led or contributed to the establishment of the Mapungubwe state.

The hunter-gatherer techno-complex, or Later Stone Age (LSA), comprises small stone tools often less than 25 mm in length, a wide range of formal tools, bored or digging stones, ostrich egg and land-snail shell beads, various forms of jewellery and ornamentation, grinding stones, evidence of hafting stone tools to handles, ceramics in the later phases, and rock art (Lombard et al., 2012). The hunter-gatherer sequence of the middle Limpopo Valley appears to largely conform to findings made in other parts of southern Africa, and is presently known through finds made in South Africa as well as Botswana. Some work has been conducted in Zimbabwe but these findings have not yet featured strongly in more recent studies. That said, the sequence here does appear to host a rich and substantial archaeological record, including a number of rock art sites. One imagines that the area will reveal interesting finds if it sees some archaeological research in the future. Nevertheless, we have a fair grasp of the local hunter-gatherer material signature.

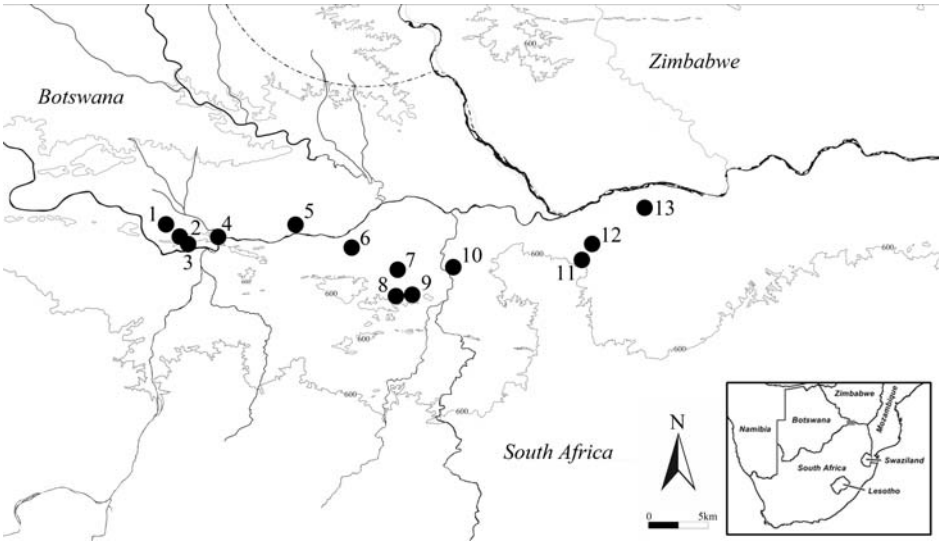

Fig. 1: The middle Limpopo valley with some prominent sites and those mentioned in the text. 1 Dzombo Shelter; 2 Mmamagwa; 3 João Shelter; 4 Kambaku Camp; 5 Mafunyane Shelter; 6 Tshisiku Shelter; 7 Balerno Main Shelter; 8 Balerno Shelter 3; 9 Balerno Shelter 2; 10 Little Muck Shelter; 11 Bambandyanalo (K2); 12 Mapungubwe; 13

The middle Limpopo's hunter-gatherer sequence

Until quite recently, very little was known of the middle Limpopo Valley's LSA sequence, despite the extensive rock art surveys conducted by Ed Eastwood and his team since the early 1990s (Fig. 2). Their findings led Simon Hall and Ben Smith (2000) to excavate Little Muck Shelter (Fig. 3), which has a faded but extensive rock art sequence containing hunter-gatherer motifs as well as a deep archaeological deposit. These excavations revealed an occupation spanning the past 2 000 years marked by several significant changes. At first it seems the site

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* Bronwyn van Doornum was with the KwaZulu-Natal Museum and was killed in a car crash on 19 October 2015.

was used as a residential camp, but around AD 350 when farmers started settling in the extended region it became a part-time workshop. However, when the first wide-spread farming occupation of the middle Limpopo Valley occurred around AD 900, the shelter became an intense craft production site, probably because of increasing trade with farmers. From around AD 1000, Hall and Smith (2000) argue, the site was abandoned and occupied by farmers who wished to gain access to the hunter-gatherers' spiritual power. Their work was the inspiration for Bronwen van Doornum's South African-based doctoral study (2005), as well as my own in eastern Botswana (Forssman, 2014).

The site with the greatest time depth is Balerno Main Shelter (Van Doornum, 2008), a site on a farm now part of the Mapungubwe National Park. Here the earliest evidence of a hunter-gather occupation was recorded at around 11000 BC. However, the site was only occupied for around 5 000 years until about 6000 BC, when it appears to have been abandoned and only reoccupied between 210 and 100 BC. During Balerno Main's occupation hiatus, another site excavated by Van Doornum (2007) was settled around 6000 BC. It is known as Tshisiku Shelter.

While the assemblage attributes at both sites are similar, they revealed different patterns: at Tshisiku the number of artefacts declines over the course of the site's occupation, whereas at Balerno Main they remain consistently high and particularly diverse but fairly unchanging. Van Doornum (2008) suggested that the reason this occurred at Balerno Main was because the site served as an aggregation camp: a site used when different hunter-gatherer communities congregated at specific times of the year to perform rituals, maintain alliance networks, feast and marry. Van Doornum also excavated two smaller shelters on the farm Balerno and argued that these sites were used when hunter-gatherers were not aggregating.

An interesting picture thus emerged at different South African sites. At some it seems hunter-gatherers lived a more traditional life, whereas Little Muck was used as a trading base or workshop, and the smaller Balerno sites served as 'satelite' camps. However, not included in any of the more recent studies was the excavation at Tuli Lodge in Botswana and several other sites in Zimbabwe. This inadvertently created a boundary; on one side of the Limpopo was Mapungubwe and various research programmes, while on the other lay the archaeologically rich but 'research barren' Botswanan and Zimbabwean landscapes.

This became the motivation for a renewed research focus in eastern Botswana. The aim of that study was to excavate small sites that are usually ignored and place them into the broader sequence. As perhaps expected, some of these sites yielded little useable data. However, others provided interesting insights into the region's hunter-gatherer sequence. Dzombo Shelter offered the greatest depth of time at a few centuries beyond 2 000 years ago. While the assemblage largely conforms to the regional sequence, it provides evidence of shifting behavioural patterns in hunter-gatherer lifeways. At the site, backed tools, which possess steeply flaked edges opposite a sharp edge to facilitate hafting, increase from AD 350 and decline slightly around 900, but still remain proportionately high until about 1220.

The occurrence of fractures in these stone tools consistent with those identified in hunting experiments indicates that the increase in these artefacts may be linked to more regular hunting activities. The fact that this corresponds with the local appearance of farming communities may suggest that the shifts are linked to their relationship with hunter-gatherers living at Dzombo, possibly reflecting increased trade or changing settlement and access patterns. These findings beg the question whether hunter-gatherers across the landscape were responding to contact in the same way, or whether the outcomes of their relations were situational and varied between sites.

These questions have, in part, contributed to renewed interest in the Little Muck assemblage. Here a massive proportion of scraping tools (398) versus backed tools (27) were recovered. This is in complete contrast with Dzombo at 82 and 65 respectively (see Fig. 4). Preliminary investigations into the use of the Little Muck scrapers by studying polish, residue, rounding, edge damage and macro-fractures on the individual tools suggest they were used to work a variety of materials, including wet and dry as well as burnt wood and animal hides. Using tool forms to show this does not necessarily provide the right answers since morphologically different tools might have been used for the same activities or, as Karim Sadr (2015) recently argued, might indicate different ethnic communities. Early indications at Little Muck are promising even though the study is still in its infancy and suggests that it is possible to identify differences in craft, production and behavioural practices between different hunter-gatherer camps if the trace evidence is considered.

Hall and Smith (2000) suggested that the relationship between hunter-gatherers and farmers affected change within the LSA record, a conclusion supported in both Van Doornum's (2005) and my own (2014) doctoral studies. They also argued that Little Muck was appropriated by farmers wishing to incorporate hunter-gatherer spiritual power into their own ritual structures. However, it could be asked whether the replacement of the LSA material culture by a farmer-associated assemblage does perhaps not indicate assimilation.

In Botswana, João Shelter is an open-air farmer settlement with a rock shelter occupied by hunter-gatherers at the 'back' of the settlement. It seems both were used at the same time. This might have occurred

Fig. 2: Koaxa's Shelter, one of Ed Eastwood's favourite rock art sites in the area, has over 200 images and more than 16 different species painted in the 25 m long shelter. Open to the public by appointment.

during periods of exchange or at specific times of the year. One could also speculate on the rules that may have existed, for example with hunter-gatherers being restricted to certain areas of the settlement such as the rock shelter, but with limited data it is not possible to say anything for certain. João dates to between AD 1000 and 1220, which is around the same time that Hall and Smith (2000) propose Little Muck was appropriated by farmers. Therefore, in other parts of the landscape, hunter-gatherers were spending periods of time in farmer settlements. This may represent the process of assimilation. Little Muck could also be an example of this; after all, farmers are not known to occupy rock shelters.

It might be difficult to imagine hunter-gatherers becoming 'farmers' but it is certainly possible. At Kambaku Camp, also in Botswana, a farmer settlement was excavated that possessed a small stone-tool assemblage. They were found in a small midden at the back of the settlement near a shallow overhang in what may have been the residential area. Another assemblage was recovered from within the cattle kraal along with Icon (1300–1450) and Khami (1450–1820s) ceramics. A radiocarbon date places the site's occupation between AD 1480 and 1650, which is in the early phase of the Khami period. Thus, if the stone tools were produced by hunter-gatherers, and they do indeed appear morphologically similar to examples from rock-shelter excavations, it indicates that by this time some hunter-gatherers were living as 'farmers' or in fixed settlements. Interestingly, when early travellers such as Thomas Elton and Samuel Dornan passed through the region in the late 1800s and early 1900s they noted that hunter-gatherers were living in fixed settlements and cultivating fields. These historical accounts may support the archaeological evidence. Considering these findings, the possible assimilation of hunter-gatherers into a farming system at Little Muck does not seem impossible and warrants further investigation, which is, in fact, currently underway.

It is also possible that some hunter-gatherers chose to continue living a hunting and gathering existence despite contact with farmers. Anecdotally, a Zimbabwean landowner once told me that until the 1950s he and his family would every so often have hunter-gatherer groups live temporarily on their land. The Eastwood's also had informants tell them that until about the same time, hunter-gatherers were present in Bechuanaland and Zimbabwe (Eastwood & Eastwood, 2006). For example, a Venda informant mentioned that hunter-gatherers would appear to trade for goods such as tobacco when traveling through the area. In Zimbabwe there was also a hill known as 'The Hill of the Bushmen' where they would gather to dance, and possibly exchange and feast. After the mid-20th century there are no recollections of Bushmen in the region, possibly because they no longer lived as hunter-gatherers, intermarried or vacated the region.

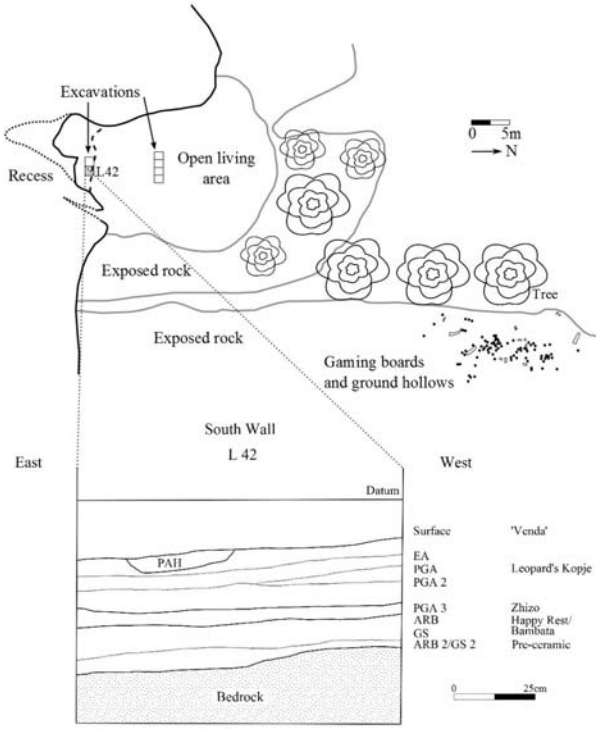

Fig. 3: The layout of the Little Muck site showing the location of the excavated units. Unit L42 is currently under further investigation.

Nevertheless, while archaeologically we have few remains indicating that hunter-gatherers lived in the area after 1300, there is evidence suggesting that at least some did. It might be that those who did not assimilate lived in very small groups, in restricted areas and left little behind. Perhaps even our research focus on rock shelters is creating a bias; we interpret a disappearance but what we are really seeing may be a shift to open-air camps. It is possible that some chose to assimilate, few maintained traditional lifeways and others left the area altogether.

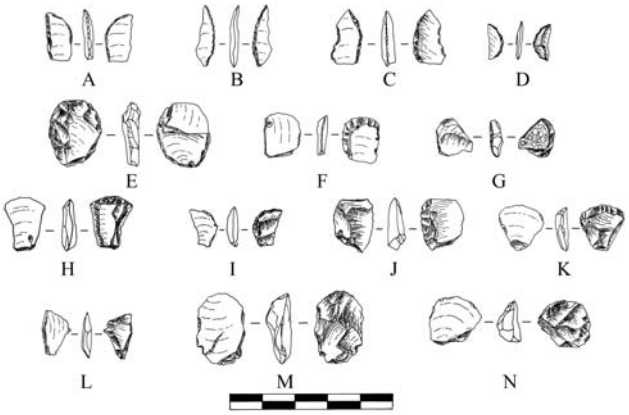

Fig. 4: Examples of scrapers and backed tools from Dzombo Shelter that predate 2000 BP: A-D, I & L, backed tools; E-H, J, K & N, small scrapers (<20 mm); and M, medium scraper (20-30 mm).

Taking LSA research forward

Where to next? We have asked what happened in the Mapungubwe area and looked at it from two angles: the one side investigated larger rock shelters whereas the other attempted to expand this research by studying a variety of different site types. In so doing, a fairly thorough understanding of the LSA has been achieved. However, there are still many questions that need attention. For example, while we have acknowledged the influence farmers had on hunter-gatherers, we have not yet grappled with the complexity of their interaction. How did exchange practices influence craft production? Did hunter-gatherer behaviour change and how is this archaeologically visible? What happens to hunter-gatherers when their material culture 'disappears'?

We have also restricted most of our research to South Africa or (more recently) Botswana, but do not yet know what the archaeology of the Shashe-Limpopo confluence area in south-western Zimbabwe will reveal. Work here will potentially offer further insights into how hunter-gatherers fitted into the farming economy. Since it was here that reports from the 20th century mention the occurrence of hunter-gatherer communities, it might be the area we need to turn to if we want to examine what happened to them in more recent centuries. There is also a need to develop our archaeological methodology. Digging more sites and asking the same questions will not help; we need to start thinking about new and innovative ways of looking at 'contact archaeology'. This is already happening in studies looking at the hunter-gatherer sequence in the east-coast trade corridor, or in linking the Botswanan and South African landscapes in an attempt to determine if social, cultural or political boundaries existed in local hunter-gatherer societies.

The region amply demonstrates the complex sets or arrangements present in LSA projects. Those actively engaged in related research need to study a variety of strands of evidence before piecing together appropriate prehistories. This is not the only area in which such challenges are being grappled with. Settlement change, interaction, technological shifts, subsistence patterns and exchange practices, let alone topics within the field of rock art, are just some of the themes currently under investigation across southern Africa. If anything, LSA research is currently witnessing a diaspora of research topics and agendas, with many scholars employing state-of-the-art and innovative techniques to study the past 20 000 years of hunter-gatherer archaeology. Current debates in the field are becoming highly advanced, such as the examination of ethnographic analogy, the application of various theoretical perspectives and the contribution research is making towards transformation agendas. The LSA archaeology of the middle Limpopo Valley is contributing to this diffusion of research ideas and the results are helping to refine the identity of southern Africa's hunter-gatherer people.

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THE MAGALIESBERG BIOSPHERE
International recognition of a unique landscape

Vincent Carruthers

The Magaliesberg region was designated a Biosphere Reserve by the UNESCO Man and the Biosphere (MAB) International Co-ordinating Council in Paris in June 2015. The proclaimed area is over 350 000 ha in extent and encompasses the mountainous terrain between Pretoria and Rustenburg, including the Cradle of Humankind World Heritage Site (Fig. 1).

The biosphere reserve concept

The biosphere is the mantle of water, soil and air around the planet in which every known living organism exists and from which comes every resource on which life depends. In response to the growing realisation that the human consumption of resources is exceeding the supply available from the biosphere, UNESCO launched the MAB programme in 1971. Through the implementation of natural and social sciences, economics and education the aim of MAB is to find ways to improve livelihoods while simultaneously safeguarding ecosystems.

At the heart of the MAB programme are biosphere reserves. These are designated areas of special significance that can become living laboratories for the primary purpose of integrating sustainable human development with the conservation of natural and cultural resources. Unlike more conventional protected areas, biosphere reserves are not fenced-off exclusion zones with access restricted to visitors who pay at the gate, but rather places where people live and work, the economy develops, businesses flourish and poverty is alleviated, but all within the constraints of maintaining healthy ecosystems and preserving cultural heritage.

To achieve the dual goals of prosperity and conservation, biosphere reserves have a third goal, viz. to conduct research and education programmes and exchange information among the community of 650 reserves world-wide, including eight in South Africa. It is in this context that archaeology in the Magaliesberg region stands to benefit considerably.

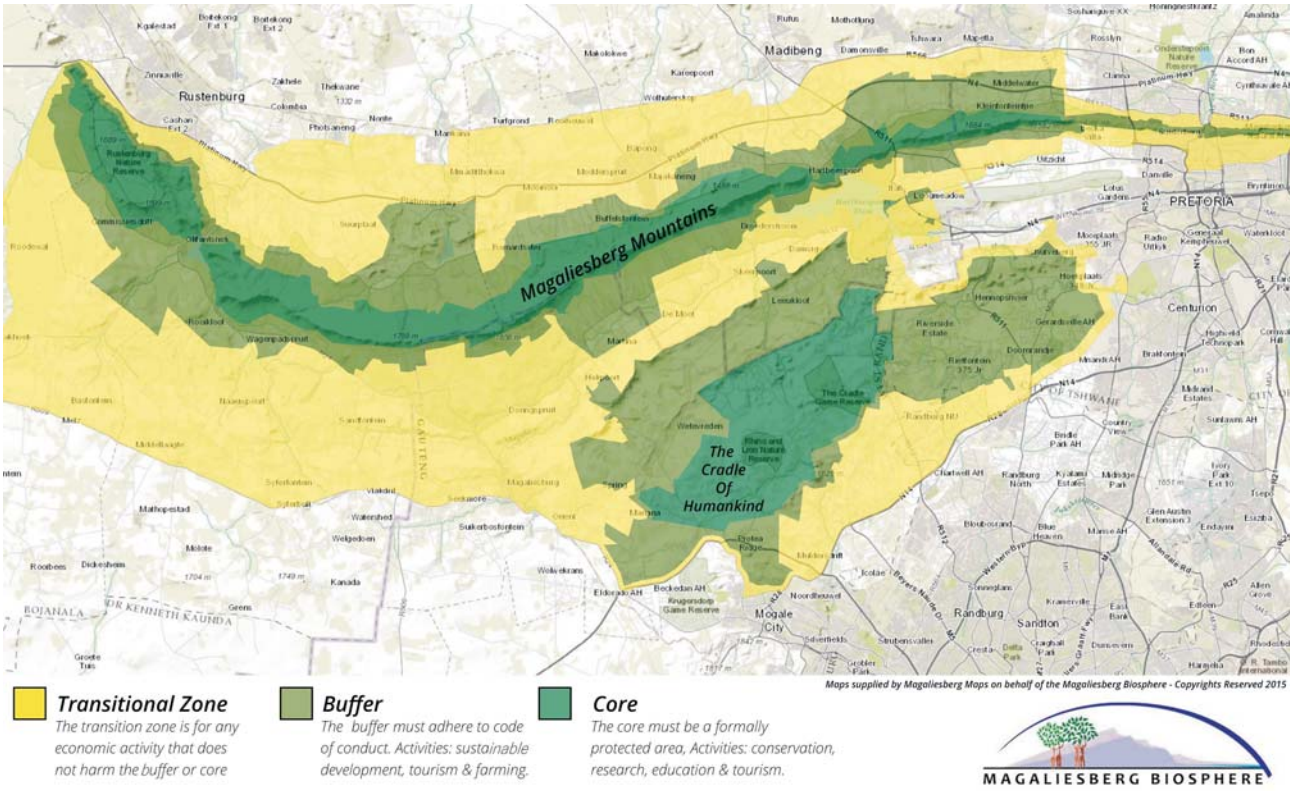

Fig. 1: The region that has been designated the Magaliesberg Biosphere lies across the borders of two provinces, Gauteng and North West, and falls within seven local authorities. It includes palaeological and archaeological sites of considerable importance.

Vincent Carruthers is the author of *The Magaliesberg* and initiated the Magaliesberg biosphere reserve project in 2006. vcms@mweb.co.za

It is a UNESCO requirement that biosphere reserves have exceptional, irreplaceable features. In the Magaliesberg these fall into three broad categories – a rich history, unique geomorphology and outstanding biodiversity. Archaeology spans all three of these categories and the declaration of the biosphere should serve the interests of archaeologists in several ways. Research conducted in the biosphere will be placed on the international stage, the legal protection of sites will be more rigorously imposed, and archaeological and palaeo-tourism, bringing with it greater public awareness, will be stimulated. Moreover, project funding may be facilitated.

Deep-time history

The Magaliesberg Biosphere landscape retains a remarkable assemblage of fossils, artefacts, structures, oral traditions and physical monuments. These record an astonishingly long period of time from revelations of human origins in the Cradle of Humankind through to recent history. The archaeological richness of the area has been recognised for decades. From the 1950s until 1988, Revil Mason pioneered the excavation of many well-known Stone Age and Iron Age sites, including Broederstroom, Kruger Cave and Olifantspoort (Mason 1989).

Other well-known archaeologists – Lyn Wadley, Tom Huffman and others – have subsequently contributed to the establishment of the region as one of South Africa's prime archaeological localities (Mitchell 2002). New discoveries and interpretations continue to be made. Geoff Blundell and his colleagues have recently undertaken further investigations into rock engravings and have made an interesting discovery of a rock gong. The biosphere environment also provides ideal circumstances for the integration of archaeological and traditional historical disciplines as illustrated by Phil Bonner, Amanda Esterhuyzen and Trevor Jenkins's book, *A Search for Origins*.

The area also has an exceptionally rich history. The guerrilla phase of the Anglo-Boer War was bitterly fought in the Magaliesberg and new information about this pivotal historical period continues to be produced. Robert Forsyth, amateur historian and collector of SA War memorabilia, recently published a detailed map of the battlefields and defences in the area, and Andrew Manson and Bernard Mbenga's (2014) book is a powerful revelation of the role of the Bakgatla-ba-Kgafela in the war.

Geomorphology

The second category of unique aspects of the Magaliesberg Biosphere is its geomorphology, which is no less fascinating than its human history. The region comprises two distinct landscapes. One, the Magaliesberg range, is a consequence of titanic seismic disruptions, while the other, the dolomitic cave land in the Cradle of Humankind, is the result of the imperceptibly gradual creation of limestone by microscopic bacteria. Three billion years ago, in a shallow inland sea somewhere between today's Pretoria and Polokwane, cyanobacteria evolved the ability to photosynthesise. They proliferated in vast beds, releasing oxygen as a by-product that oxidised the iron now mined in Thabazimbi and, more importantly, gave us an atmosphere in which terrestrial life can breathe.

Cyanobacteria also secreted calcium carbonate in successive layers similar to those of an onion, forming domed structures that have fossilised into stromatolites. Over time and with further chemistry the calcium carbonate was transformed into dolomitic rock (McCarthy & Rubidge 2005). Many stromatolites retain their original form and these three billion-year old fossils are one of the earliest forms of abundant life (Fig. 2). They can be seen in their thousands in the Cradle of Humankind.

Fig. 2: A cross-section through a broken stromatolite showing layers of calcium carbonate deposited by photosynthesis three billion years ago and subsequently transformed into dolomitic rock. These are fossils of one of the earliest forms of mass-life.

The fossil clues to human evolution that have made the Cradle area famous are far more recent. They are the remains of hominids and other animals that were trapped in caves leached out of the dolomite by mildly acidic water over the past few million years. By a happy coincidence at precisely the same time as the Magaliesberg Biosphere was being proclaimed in Paris, Wits University's Lee Berger announced the discovery of *Homo naledi* (see article in this issue).

North of the dolomitic landscape are the cliffs of the Magaliesberg itself, the elevated edges of a quartzite seabed uplifted by the Bushveld Complex, an upwelling of magma so enormous that it created the largest lopolith in the world, depressing the centre of the seabed and elevating its edges (Fig. 3). It also deposited around its perimeter the richest veins of platinum in the world. A billion years later, the Pilanesberg volcano erupted, pouring rivers of lava into the elevated quartzite rivers and burning out spectacular kloofs and cliff faces (Fig. 4).

Biodiversity

The third category of unique aspects of the Magaliesberg Biosphere lies in its biodiversity. The area – often called the Bankenveld by botanists – is

the interface between the grassland of the South African central plateau and the open woodland of sub-Saharan savanna. The merging of these two biomes brings species of plants and animals from each into one locality and provides spectacular diversity. A glance at field guides to birds or mammals or trees will show how many savanna species are distributed in the Magaliesberg and northwards but no further south (for example, marula trees, African bullfrogs, yellow-billed hornbills) and how many other species are only distributed southwards in the grassland (blue cranes and black wildebeest, for example). The rugged terrain offers a wide spectrum of habitats to accommodate the needs of the various species.

The biodiversity is further enriched by the remnants of a third biome, Afrotemperate forest in the deep kloofs. From the early 19th century, explorers and naturalists such as Andrew Smith, William Cornwallis Harris, Joseph Burke, Carl Zeyher, Johan Wahlberg, Carl Mauch and others were drawn to the area by tales of the extraordinary wildlife. A number of South African plants and animals are named in honour of them, many of which were collected in what has become the Magaliesberg Biosphere. Their discoveries and descriptions brought the area to the attention of the scientific world almost 200 years ago.

Geographic zones in the biosphere

Biosphere reserves comprise three interrelated zones (see Fig. 1). First there are the core areas, which are existing legally protected areas, namely the Magaliesberg Protected Environment and the Cradle of Humankind World Heritage Site, both of which are protected under the National Environmental Management: Protected Areas Act 2003. Second are the buffer zones that surround the core areas and are places in which appropriate human activities, such as farming, tourism, education or small-scale home and farm industries can take place in harmony with ecological sustainability. Buffer zones lie at the heart of the biosphere reserve philosophy. In the Magaliesberg the buffer zones almost all comprise conservancies – voluntary associations of neighbouring landowners who collectively subscribe to the biosphere reserve principles.

Third and last are the transitional zones, the outer areas of the biosphere where any economic activity can take place provided it does not impact adversely on the core and buffer zones. In the Magaliesberg these zones include highways, formal and informal settlements, commerce and many types of industry.

Management of the Magaliesberg biosphere

UNESCO requires that biosphere reserves are nominated by government. However, the initiative and drive to have the area nominated came from a group of concerned citizens in the area who formed the Magaliesberg Biosphere Initiative Group (MBIG). The process began in 2006 and the next three years were spent tirelessly trying to persuade the North West government to become involved. Public meetings were held, funds were raised, websites and social media accounts were opened and operated. In 2009 the province, with financial assistance from the government of Finland, appointed a consultant to prepare the nomination documents. By 2012 an extremely comprehensive nomination dossier had been prepared using inputs from MBIG and other sources. In the final three years government submitted the nomination to UNESCO annually. Each year it was referred back for minor alterations until 2015, when it was finally accepted.

Fig. 3: Two billion years ago the weight of magma in the Bushveld Complex (to the right of this picture) depressed the centre of an ancient quartzite seabed, uplifting the edges to form the Magaliesberg range. The tilt of the quartzite ridges is clearly visible. (Photo: Kevin Gill)

Now that it has been nominated and designated, the Magaliesberg Biosphere will be managed by a registered non-profit company named the Magaliesberg Biosphere NPC. The board of directors is currently being elected by stakeholders and should assume office in January 2016. The board will represent 16 stakeholder groups, namely nature conservation, heritage, culture, tourism, industry, mining, property development, Cradle of Humankind, consultants, education, research, landowners, land occupiers, conservancies and benefactors (Magaliesberg Biosphere website 2015).

The board will be responsible for building public awareness and understanding of the global necessity to live within our environmental means. It will also co-ordinate initiatives and projects, and raise funds for its own operations. Very importantly, it will work with local municipalities to help them to understand how the Biosphere can help them with spatial planning, delivery of services and the marketing of their municipalities as environmentally responsible regions.

Biosphere reserves are not the object of a binding international convention but are governed by a 'soft' law – the Statutory Framework for Biosphere Re-

serves – adopted by the UNESCO General Conference and which all countries are committed to apply. The UNESCO Secretariat does not have a policing function and it is the responsibility of each country to ensure that the biosphere reserves fulfil the criteria and function properly. For this it is not necessary to enact special national legislation for biosphere reserves but rather to use the existing legal frameworks for nature protection and land and water management more effectively (Pool-Stanvliet & Clüsener-Godt 2013). This is currently the situation in South Africa, but new legislation is being considered to give biosphere reserves a special legal status.

Fig.4: A little over a billion years ago a series of eruptions of the Pilanesberg volcano spilled rivers of lava into the Magaliesberg, burning deep kloofs through the solid quartzite. Today these are part of the spectacular scenery in the region.

Although the past nine years have been difficult, the next nine may be almost more so because in 2025 UNESCO will require a ten-year review of the success of the biosphere assessed according to a set procedure. A site can be deregistered from the biosphere network if it does not satisfy the stipulated criteria.

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ARCHSOC NOTICES

Annual General Meeting

Notice is hereby given in terms of section 8(a)(i) and (ii) of the Constitution that the Annual General Meeting of the Society will be hosted by the Western Cape Branch on Tuesday,10 May 2016 at 18:00, at the SA Astronomical Observatory lecture hall in Observatory, Cape Town. The meeting will be followed by Professor Innocent Pikirayi's Presidential Address.

Members should submit items for the agenda in writing to the Secretary, PO Box 15700, Vlaeberg, 8018, or to archsoc@iziko.org.za, before 10 March 2016. Proposals must state in specific terms the resolution to be put to the meeting and the reasons therefor.

Janette Deacon, Honorary Secretary, 4 January 2015

Corrections

The August 2015 issue of *The Digging Stick* 32(2) contained a number of mistakes, for which the editor apologises. The more significant omissions or mistakes were the following:

Page 2, para. 3, line 8: the website address omitted is https://farminginafrica.wordpress.com

Page 3, subheading, first line after subheading and last line in para. 4: Engakura should read Engaruka

Pages 7 and 8: figures 1, 2 and 3 are not identified as such.

Page 19: in six instances your editor changed hyperlinks into standard text with the result that these 'disappeared' in the layout programme used.

Under African Skies

The Western Cape Branch of ArchSoc and the Friends of the Stellenbosch Museum held their annual one-day lecture series in Stellenbosch on 30 August 2015. The theme was 'Under African Skies'.

After an introduction by Andrew Smith, Emeritus Professor of Archaeology, University of Cape Town (UCT), John Parkington, Emeritus Professor and Senior Scholar in the Department of Archaeology at UCT, followed with a talk entitled *Shared sky and Karoo cosmos* on the exhibition of art works that was recently hosted by the Square Kilometre Array (SKA) Initiative at the Iziko National Gallery to celebrate the award of a huge radio-astronomy project to South Africa and Australia. Art works by |Xam San and Australian Aborigines in the regions where the telescopes will be built reflect the somewhat fractured continuity of stories about the sky in the two very dry, isolated regions.

Janette Deacon, an Honorary Research Associate of the Rock Art Research Institute at the University of the Witwatersrand and Honorary Secretary of the South African Archaeological Society, followed with a talk on |Xam beliefs about stars above the SKA Astronomical Reserve. By an amazing coincidence, this new reserve in the Northern Cape is situated in a larger territory that, for tens of thousands of years, was occupied by indigenous hunter-gatherers who were knowledgeable astronomers themselves. Their most recent descendants spoke |Xam, a language that has not been in regular use for a century or more. The |Xam memories and folklore written down by Wilhelm Bleek and Lucy Lloyd in the 19th century describe beliefs of the |xam that would have been impossible to reconstruct, either from visible traces in the landscape or from the data that is to be accumulated by the SKA. The presentation referred to the role played by stars in some of the |Xam beliefs.

Simon Hall, an Associate Professor in the Department of Archaeology at UCT, gave a talk entitled *Heartsore for the old days: |Xam and the loss of their land*. This talk also drew on the remarkable archive recorded by Wilhelm Bleek and Lucy Lloyd on |Xam beliefs and their lifeways. It gives a glimpse of the deep and complex relationships these people had with the land and provides a yardstick against which the trauma of losing independent use of that land can be 'measured'. Simon used archaeological traces in the Karoo to make that loss starkly palpable but in doing so also drew attention to other traces that indicate that beliefs and values about the land still persisted, even though use of that land was denied. He also drew attention to work done by José De Prada-Samper and others who had interviewed Karoo storytellers, and whose stories show that some of the beliefs about land recorded by Bleek and Lloyd persist in the present day.

José de Prada-Samper next introduced his film, 'Contemporary Karoo storytellers and their stories', and showed a clip of it. The video 'Cosmic Africa: a true story of an extraordinary journey that unveils the deep connection humans have with the cosmos' produced by Damon and Craig Foster was also shown.

Professor John Parkington, Dr Janette Deacon, Sona Buys, Dr José de Prada-Samper, Professor Andrew Smith and Professor Simon Hall

Lunch was followed by an outing that continued the Western Cape Branch's exploration of early Cape farms on the road to Paarl. Natte Valleij was granted in 1715 to the ex-soldier, Jurgiaan Hanekom from Germany, and includes five buildings in a row extending over 150 m, as well as a charming fowl house, four enclosed brandy stills and a prominent hill to the west aptly named De Klapmuts (Balaclava).

Reinoud Boers

ARCHAEOLOGY IN BRIEF

Volcano painting linked to ancient eruption. A 9 000-year-old painting of an exploding volcano, the oldest ever found, can now be linked to a real eruption in Turkey. The towering Hasan Dag volcano erupted 8 970 years ago, ±640 years, Axel Schmitt of the University of California has reported. The volcano is about 130 km from the ancient village of Çatalhöyük, a proto-urban village settled during the Stone Age. The mural was painted in red-coloured ochre on the wall of a shrine, showing what appears to be a map of the settlement and the double peaks of Hasan Dag

Livescience, 30/10/13

WORLD ARCHAEOLOGY

Kennewick Man a Native American after all

The long-running debate over a skeleton known as Kennewick Man has been reignited. The discovery of the skeleton along the shores of the Columbia River in Washington State in 1996 sparked a bitter legal battle. For its age, the skeleton was one of the most complete ever found, and scientists said it could provide an unprecedented insight into America's early inhabitants. However, local Native American tribes, who call the skeleton the Ancient One, said the remains should not be studied. Under the Native American Graves Protection and Repatriation Act they asked government to seize the bones and return them for reburial. This in turn prompted a lawsuit, with researchers arguing that the specimen had European features and could not be closely related to Native Americans. In 2004, the scientists won – and began to study the remains. These studies revealed that while Kennewick Man had similarities to Europeans, he also shared features with groups such as the Ainu in Japan and Polynesians.

Genetic advances have now shed new light on Kennewick Man's ancestry. DNA was extracted from a hand bone and compared with genetic data from around the world. Prof. Eske Willerslev, from the Centre for GeoGenetics at the Natural History Museum of Denmark, University of Copenhagen, then reported as follows: 'It is very clear that the genome sequence shows that Kennewick Man is most closely related to contemporary Native Americans. We got Ainu genome-wide data from a Japanese chief and we also had Polynesian [data] for comparison, as well as what is available across the world, and Kennewick Man did not show any significance in terms of having more Ainu or Polynesian DNA than other contemporary Native Americans.' Further detail revealed that the genome was most closely related to DNA from the Confederated Tribes of the Colville Reservation, one of the five tribes who originally claimed Kennewick Man as an ancestor.

It is not yet clear what will happen to the remains. They are currently held by the Burke Museum at the University of Washington, which was designated as a neutral place to keep them.

BBC News, 18/06/2015

The South African Archaeological Society

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

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

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The Society produces the following publications:

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