



AS THE SPINDLE TURNS: A RESEARCH JOURNEY

Natalie Swanepoel

'... [T]he warp just looks like thread, thread, and more thread,' that is how pioneering textile archaeologist Elizabeth Wayland Barber (1994: 9) describes the process of dressing a loom. She is not wrong. Depending on the density of the textile, even a relatively small 1 m x 2 m length of cloth requires kilometers of thread. Importantly, prior to the development of early spinning wheels, likely towards the end of the first millennium AD, the later development of spinning 'mules' and finally full automation, all thread was spun by

hand, mostly with a spindle. If we consider the degree to which human life is saturated with textiles, we can appreciate the scale of industry required from hand spinners. Textiles, which are, by definition, woven, might be used for clothing, curtaining, bedding, kitchen and table linen, sacking, sails, tents and a host of other items. Until relatively recently in some parts of the world, the weaving of these items was entirely based on the ability of hand spinners (with spindle or wheel) to meet the demand for thread for the looms. We should thus never underestimate the importance of the spinner in the history of textiles.

While this importance is global, there is tremendous regional variation, which makes it necessary to explore how regional spinning traditions arose, endured and/or changed over time. For archaeologists working in sub-Saharan Africa, this is a crucial topic as ceramic and stone Spindle whorls are some of the few items of material culture related to African textile manufacture that survive in the archaeological record; loom components and many other textile tools (including spindle shafts) are made almost exclusively of organic materials. Textile fragments survive rarely, usually only under exceptional preservation conditions (see Huffman 1971 and Magnavita 2020 for some

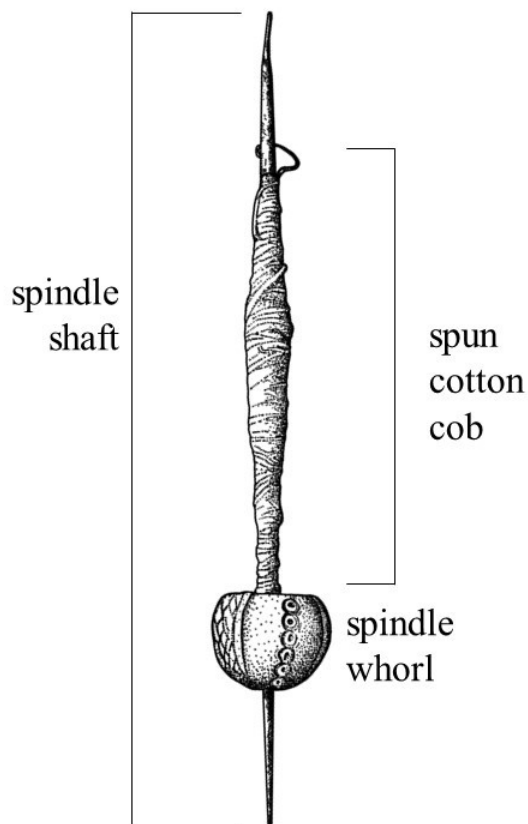


Fig. 1: A typical example of a West African supported spindle. The average shaft length varies between 20 cm and 35 cm (Drawing: S Fairhurst).

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Fig. 2: Supported spinners in Sierra Leone ~1900. The spinner on the left is preparing her distaff while the spinner on the right spins. Note the misidentification of spinning as weaving in the postcard caption (Lisk-Carew Brothers, nd).

examples). Spindle whorls, in contrast, are common on sites associated with farming communities in the second millennium AD in certain areas, including western, eastern and south-eastern Africa.

As has been well documented, weaving, particularly in areas of West Africa, has long been a central economic activity for many communities. Historically, it was also important in other areas. It is therefore imperative that we understand how spindles were used in their task of producing (primarily) cotton thread in sub-Saharan Africa. Despite the survivability of Spindle whorls, however, there have been surprisingly few dedicated studies of Spindle whorls in sub-Saharan Africa that bring together physical descriptions of the archaeological artefacts with discussions of how they were used (Antonites 2019 is an exception). My current research involves exploring these issues more deeply, largely with reference to West African practice, but also including other regional spinning traditions in Africa as part of a larger historical archaeology of African textiles. In his foreword to Colleen Kriger's 2006 book *Cloth in West African History*, Graham Connah calls on African(ist) archaeologists to devote more attention to the possibilities of retrieving archaeological evidence of cloth manufacture despite our limited ability to see this facet of the African past archaeologically. Some archaeologists might read this as a call to seek evidence for the origins or early centuries of African textile work, but as noted by Sonja Magnavita (2020: 183) in her excellent review of the early evidence for cloth making in the West African region: 'Exploring the onset of weaving technology in prehistoric West Africa is comparable to fishing in the dark. At a certain point in time, full light falls on to an already developed weaving tradition, focused

mainly on the production of cotton textile for various purposes.'

That is to say that it is quite difficult to have a dedicated research programme to look for archaeological evidence of cloth production as it is largely reliant on chance finds and, when such finds are made, they are usually few and geographically dispersed over a large area. One is hunting the proverbial needle in the haystack. I, however, argue that one of the ways in which we might better delineate the trajectories of African textile and cloth manufacture is by developing an historical

archaeology of the craft that brings together lines of evidence from archaeology, historical documents, illustrations and photographs, ethnography, ethno-archaeology and textile studies. This would allow us to build an archaeological understanding of the role of the craft in communities in more recent centuries, in addition to building models of what we might expect to see archaeologically in earlier time periods.

In my view, one of the factors hampering progress on this topic is the general ignorance of archaeologists in matters pertaining to textile work. Archaeologists cannot identify what might be evidence for cloth-making if they do not have a good understanding of what evidence might exist. Ethno-archaeology, the recording and study of modern practitioners to generate analogies, by itself is not enough as many of the older traditions are no longer extant. One therefore needs the tools and sources to investigate practice over the last few hundred years.

In this short article, I use West African spinning as a case study to explain my approach. I highlight the ways in which West Africa can be regarded as having a unique regional spinning tradition that can be compared to other traditions in south-eastern Africa and elsewhere. Understanding the existence of unique technical traditions opens up further opportunities to ask broader questions about the introduction and dissemination of spinning as a craft in West Africa.

But first, what is spindle spinning? A spindle is a hand tool composed of a shaft and whorl that helps a spinner to create twist in unspun fibre, turning it into yarn or thread (Fig. 1). The spinner drafts the unspun fibre to the desired thickness and holds it in one

hand while turning the spindle with the other. Spindle whorls play an important role in this composite tool as the added weight allows the spindle to spin for longer once the spinner has set it into motion. When enough twist has been introduced to stop the now spun fibre from drifting back apart, the yarn is wound onto the spindle and the spinner continues with a new section of raw fibre. There are a wide variety of fibres that require spinning but in West Africa cotton, wool and silk are the main ones (Picton and Mack 1989). Other fibres used in the region, such as raffia, can be woven as is or tied/rolled together by hand.

Historical archaeology as methodology

The roots of this project lie in the fact that I took up spindle spinning as a hobby during the COVID-19 lockdown of 2020. When conducting my doctoral research in northern Ghana in the early 2000s, I had excavated five Spindle whorls from a late 19th century refuge site. Re-reading my description and discussion of the finds in my thesis now, I know for a fact that I had only the very vaguest of understandings about how such tools might have been used to spin thread as, at that time, I had never seen anybody spin, let alone done so myself. Therefore, 20-odd years after those excavations, with some spinning experience under my belt, I thought it worth revisiting the question of what archaeologists can do with spindle whorl finds. Do we properly understand how they were used and what different types and weights of whorls might signify about the technological system of which they were a part? To what extent, for example, did the 'drop spinning' I had taught myself during lockdown relate to the way in which northern Ghanaian spinners had spun at the site 150 years ago?

I turned to the literature on the topic looking for answers. Scholars such as Lane (2008) and Smolderen (2019) both discuss spinning in West Africa from an ethno-archaeological perspective, but their observations were quite place specific to Mali and Benin respectively and it was unclear how much variation might be present in West African spinning. Other sources spoke about the economic importance of spinning but did not describe how such tools were used. In general, there is little published on the topic of West African spinning as it is usually just mentioned in passing as a prerequisite to the weaving of cloth, for which weavers in the region are justly famous. I therefore saw an opportunity for a small (now larger) research project that would document the range of spinning practice in West Africa and assist archaeologists in gaining a better understanding of how the whorls they excavate were used in the past.

This presented a methodological challenge, however. Ordinarily, if one was to investigate craft practice you might start by observing practitioners at first hand in a field setting. This was not possible at the outset of this project. First, spinning is not as common in many

West African communities as it once was as many weavers now use industrially spun thread. Second, it would hardly be efficient or cost-effective to conduct such research on the ground throughout the West African region. Lastly, at the time I conceived the project, it was still unclear when international travel and fieldwork would return to normal in a post-COVID-19 world.

I therefore decided to draw on the tools available to me as an historical archaeologist. Historical archaeology is used here in the classical sense: that of comparing and contrasting information from archaeology, documentary, pictorial and oral sources to identify both change and continuity. We currently live in a world characterised by unparalleled access to information in a digital form. Where previously we might have had to consult far flung archives and libraries to access certain material, it is now available at the touch of a button. I have taken advantage of this fact and used numerous digital resources (Table



Figs 3a and 3b: The central elements of the West African supported spinner's toolkit have remained the same for at least 200 years: a container for the raw cotton, a spindle and surface to spin on, a handheld distaff and a container with ash or chalk (3a: De Villeneuve 1814: 181a; 3b: Girard 2013; Attribution-NonCommercial-NoDerivs 2.0 Generic [CC BY-NC-ND 2.0]).

1) to gain a regional understanding of West African spinning over the span of the last half-millennia. In particular, I combed through travel accounts and other written sources from the last 500 years looking for descriptions of West African spinners. I also looked for visual evidence – pictures, photographs and videos – that showed how spinners prepared and spun cotton and which tools they used. Thus far, I have identified over 250 such sources from all countries in continental West Africa (except for Mauritania) that detail aspects of spinning or the preparation of cotton prior to spinning. At the same time, I have started building up a database of spindle whorl finds in the region.

possible into the unspun fibre so that it holds together without slipping apart.

The survey of sources also highlighted the existence of a component toolkit, which was present wholly or partially in descriptions and depictions of supported spinners. This toolkit includes a container to hold raw cotton; a spindle; a distaff (to hold the unspun fibre while spinning); a container or surface to spin on; and a small container of calcined bone, ash or lime chalk that the spinner uses to keep her fingers dry. This toolkit has existed for at least 200 years, as can be seen from the comparison of a pictorial source from 1821 (Fig. 3a) with a photograph from the 2020s (Fig. 3b).

Table 1: Sources consulted for descriptions of West African spinning

Text/documentary	Pictorial/photographic	Video
<ul style="list-style-type: none"> • Travel accounts • Colonial reports • Missionary documents • Ethnographies • Textile research • Archaeology dissertations 	<ul style="list-style-type: none"> • Illustrations/figures in documentary sources • Online photographic databases • Online museum collections • Photo-sharing sites such as Flickr and Pinterest 	<ul style="list-style-type: none"> • Video-sharing sites such as Flickr, YouTube and Vimeo

Having recorded over 100 sources from different West African countries that all concurred that supported spinning was the style used by the spinners in the region, I was quite taken aback to read the following in an account by Laird and Oldfield detailing an expedition up the Niger River in Nigeria (1837: 167–168): ‘The only manufactures carried on in Fundah are cotton cloths, extensive dye-works, and iron and copper utensils. The cotton is spun by everyone, from the king downwards, upon

Styles of West African spinning

While a future publication will detail the variety of data gathered through this survey, what I will highlight here is the relative homogeneity of West African spinning, which makes the presence of heterogeneous aspects even more interesting. As a primary observation, it can be stated that by and large, West Africans spin in what is known as a supported style. Supported spinning is when the spinner rotates the spindle in a container or on a surface, for example in a calabash bowl, potsherd or on a leather mat (Fig. 2). As described by Winterbottom (1803: 95–96) with reference to Sierra Leone: ‘They spin the cotton in a very tedious manner, by twirling a spindle, one end of which is loaded with clay, in a large shell or wooden dish, passing the thread between the finger and thumb of one hand.’

what, I believe, is called a falling bobbin. The spinner carries a quantity of raw cotton in his hand, and with his finger and thumb commences the thread, the end of which he fastens to the bobbin, giving it a rotatory motion, and lets it fall, paying out the cotton with great quickness and dexterity. This is repeated until the bobbin reaches the ground, when the thread is wound up, and he begins again. I have frequently met slaves carrying large burthens on their heads, and spinning in this manner as they walked.’

Based on the sources in the survey, this style of spinning is present in all West African countries. Supported spinning places some constraints on the spinner as they must be stationary while spinning in any of a variety of poses. The advantage, however, is that because the weight of the spindle (which increases gradually with the amount of spun thread wound on) rests on a surface, the spindle can be spun until it is very full before being wound off or swapped for a new one. This is advantageous in the spinning of African cotton as its individual fibres are very short. Twist therefore needs to be introduced as quickly as

Not only did this account run counter to the prevailing evidence of supported spinning as it describes suspended or ‘drop’ spinning, it explicitly mentions male spinners in a context where it is usually assumed that women do the spinning and men weave the resultant thread on a narrow horizontal pedal loom. I thus renewed my efforts to locate photographs and descriptions of other ways of spinning, including broadening my coverage to Cameroon. It quickly became apparent that supported spinning is ubiquitous throughout the region and remarkably similar in its toolkit and actions, barring choices of posture and individual equipment that may be shaped by individual preference or transmission from a teacher. By contrast, suspended or drop spinning (for at least the last 300 years) is more geographically restricted and more diverse. While the majority of suspended spinners use a spindle and distaff similar in size to supported spinners, the male and female Mumuye



Fig. 4: A Mumuye spinner in Zing, Nigeria, spinning suspended with a long spindle and distaff (Drawing: S Fairhurst)

spinners of northeastern Nigeria (Lamb and Holmes 1980: 142), spin suspended on long spindles that are accompanied by extremely long distaffs (Fig. 4). The use of long spindles effectively means that they do not need to wind their cotton off the spindle prior to using it in weaving. Rather, it can be used directly as a bobbin for inserting a weft on a ground loom.

Equally, there is a tradition of suspended spinning amongst the Tamberma women of northern Togo with distinctive spindles that do not look similar to those used in Nigeria and Cameroon. Whereas the bulk of supported spinning is accomplished with small ceramic whorls, suspended spinners use not only ceramic but also calabash sherd and seed pod whorls. Barring some isolated instances of suspended spinning in countries such as Senegal and Ghana, the bulk of such observations were found in the Nigeria/Cameroon region, suggesting that this is an area in which the two different spinning traditions met and overlapped at some point in the past. This is also the area in which both men and women may be habitual spinners whereas women are the habitual spinners in the rest of the region. The case of the Tamberma, who are further west than the other concentrations, requires additional field research as they are known to have migrated to Togo at some point in the past and may have thus brought the tradition of suspended spinning with them from elsewhere.

I have highlighted the issue of spinning techniques here because I want to emphasise the point that when one finds a spindle whorl, one needs to look beyond its physical properties to the spinner behind it. That spinner is wound up in a technical system that is culturally shaped by tradition and taught techniques. The whorl implies a spindle, and the spindle implies a spinning technique, and a technique may imply the presence of spinning accoutrements as well as a history of practice. We therefore need to develop our understandings of such techniques and their implications for, for example, the introduction and dissemination of the craft of cotton spinning through long-distance trade. In particular, the existence of two spinning techniques means that we must consider the fact that there may have been more than one route of introduction of cotton and cotton spinning into West Africa.

Conclusion

Although this short article has focused on spinning in West Africa, the project will eventually encompass other aspects of African cloth production, including non-woven, felted bark cloth. Given the paucity of evidence and our reliance on what are really chance finds, one might wonder why an African textile archaeology is necessary. To my mind, given the importance of cloth in African life, we cannot afford not to study it archaeologically. The social, cultural and economic importance of textiles cannot be underestimated. Whether made from cotton, wool, silk, raffia or bast, cloth featured from cradle to grave, it served as currency, tribute, dowry item and burial shrouds, and in many cases was an active trade item. Even today, when many cloth traditions have fallen away, traditional cloth is still required or desired for ritual and ceremonial occasions in many instances. Because of these roles and others like them, we cannot afford not to think of new ways to investigate African textiles archaeologically.

I am also hoping to illustrate the role that historical archaeology can play in such an endeavour. All too often we are focused on uncovering the origins or the earliest examples of particular types of behaviour. Given the importance of cloth, we should not be focused solely on the early record. We should be equally concerned with understanding the role that the various processes involved in such manufacture played in the daily social and economic life of African communities in the more recent past. Such a focus would help to shed light on gender dynamics, household activities, innovation and experimentation, apprenticeship and training, as well as dress and identity. To achieve such insights, there is a need to look more closely at the available, albeit more recent, sources such as European travel accounts, contemporary photos and videos, as well as the material information included in the work of ethnographers and textile scholars. By

looking at these with an archaeological eye, we arrive at a better place to review the existing archaeological datasets and to follow up with dedicated field studies. I have made a start but much of the hard work still lies ahead.

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SA ARCHAEOLOGICAL SOCIETY

Notice of Annual General Meeting

Notice is hereby given in terms of section 8(a)(i) and (ii) of the Constitution that the Annual General Meeting of the Society will be hosted by the KwaZulu-Natal Branch on Monday 15 April 2024.

Items for the agenda should be submitted to the secretary@archaeology.org.za before 16 March 2024.

Janette Deacon, Honorary Secretary

10 January 2024

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'Adderley Street,
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Mixed media on canvas
74,5 cm x 108,0 cm

Lizelle Kruger's artwork will feature in the Reminisce Exhibition at The Cape Gallery from 5 to 29 February 2024. Reflecting upon the past through the eyes of the present, the participating artists, be they humanists, classicist or neither of these, will be on a quest to discover 'Who we are, where we come from and where we are going'.

'HOMININ SPACE FLIGHT' QUESTIONED BY THE SOUTH AFRICAN ARCHAEOLOGICAL SOCIETY

Irreplaceable fossil fragments from South Africa were rocketed towards the outer edge of the earth's atmosphere on 8 September 2023, before being returned to the planet. The selected portion of *Australopithecus sediba*, a collar bone, and a *Homo naledi* thumb bone were sent on this mission with a temporary export permit from the South African Heritage Resources Agency (SAHRA). Immeasurable risks attended this exercise whose justification has been questioned in a clamour of

international commentary. The Council of the South African Archaeological Society took great exception to this exercise, which was justified as promoting the science of human origins. In an open letter of 20 September (reprinted below), under the signature of SA Archaeological Society (ArchSoc) President, Dr David Morris, the society expressed its dismay and embarrassment to the CEO of the South African Heritage Resources Agency (SAHRA). No formal response to the letter has been received.

Open letter to the CEO of the South African Heritage Resources Agency (SAHRA)

The Council of the South African Archaeological Society is dismayed to learn of the recent 'Hominin space flight' in which two irreplaceable fossil fragments from South Africa were rocketed towards the outer edge of Earth's atmosphere, 88 km up, before being returned to Spaceport America, New Mexico, on 8 September 2023¹. Immeasurable risks attended this exercise whose justification, to promote the science of human origins, has been questioned in a clamour of international commentary².

The selected portion of *Australopithecus sediba*, a collar bone, and a *Homo naledi* thumb bone, were sent on this mission with the blessing of the South African Heritage Resources Agency (SAHRA), which issued a Temporary Export Permit. In response to criticism received, SAHRA has since defended its issuing of the permit, as per a letter by Mr Ben Mwasinga (for SAHRA), on 14–15 September 2023. The costly excursion to the edge of space, initiated by Professor Lee Berger, with billionaire and Virgin Galactic customer-astronaut Timothy Nash scheduled to carry the fossil pieces, was endorsed by Wits University Vice Chancellor Professor Zebulon Vilakazi, Sir Richard Branson, Head of Virgin Galactic, and Dr Ian Miller, Chief Scientific Officer at the National Geographic Society. This much we learn from the application made to SAHRA (6 July 2023) and the permit that was granted (28 July 2023).

Our chief concern is with the process and mechanism by which the permit application was reviewed and approved by the heritage authority. In the past, SAHRA has called on a panel of specialists with expertise across the wide spectrum of heritage work to assist and advise Agency staff as they evaluate applications. This procedure having been discontinued, we would be interested to know to what extent relevant stakeholders were consulted on the risks and benefits involved in this particularly high-profile instance. In the backlash from several commentators from around the world, reported in the media, important questions address the absence of scientific justification for this promotional jaunt; the ethical issues that may pertain for ancestral remains; the ease of access by the applicant to these singular fossils; and the image which this reckless stunt projects to the detriment of palaeoanthropology as field of study. It has been asked whether the sending of 3D printed copies of the fossil bones might not have better mitigated the potential loss of priceless heritage. What were, we ask, the merits and grounds for SAHRA's decision to approve this permit application? What exactly are the outcomes and benefits anticipated to accrue from the project? And, looking to the future, what kind of precedent has been set by this case, where SAHRA's temporary export policy and transit protocols may have been applied selectively?

Members of the South African Archaeological Society have been embarrassed by reports in international journals and the media that have justifiably queried the process that SAHRA followed in assessing the application for a temporary export permit. In the apparent absence of professional consultation, SAHRA appears to have naively believed Professor Berger's untestable assertion that it would 'assist in using this once in a lifetime opportunity to bring awareness to science, exploration, human origins and South Africa and its role in understanding Humankind's shared African ancestry'. Based on the negative media publicity emanating from this event internationally, we believe that the intended outcomes of the permit have not been achieved. In fact, they have highlighted the gaps present in the management of South Africa's highly significant heritage resources.

¹<https://www.livescience.com/archaeology/i-am-horrified-archaeologists-are-fuming-over-ancient-humanrelative-remains-sent-to-edge-of-space>

²<https://www.nature.com/articles/d41586-023-02882-1>

We welcome SAHRA's stated intention to review its permitting policy, indicated in its reaction to the controversy. We also take note of its seven criteria that were considered prior to the issuing of the permit – essentially a tick-box checklist – and that in addition there were (unnamed) external parties reportedly consulted. However, their approach may have favoured approval of the application, we argue, and some of the criteria deserve closer scrutiny. One of them asserts that: 'No direct harm would be done to the fossils' whose 'safe return... [was expected]... within a tight timeframe, i.e. by no later than 31 October 2023'. Given that the flight to space was only the fourth Virgin-Galactic mission of its kind (and the third commercial trip), the level of confidence in it could hardly have been high; only upon their landing intact, and with the comfort of hindsight, could one be quite certain that the fossils were protected from harm.

A further criterion refers to there having been 'no objections...received prior to issuing the permit'. It is true that permit applications are submitted transparently in SAHRA's online public domain system, SAHRIS, enabling comment or critique. However, the sheer volume of cases processed daily requires a level of around-the-clock vigilance that few members of the public, let alone busy professionals in the field, could sustain. Thus, to a large extent, SAHRA's 'no objections' criterion relies on a passive reception of comments (if any) from potentially relevant sources based on chance online encounters. What is lacking is a system that actively alerts relevant stakeholders to make their considered inputs.

We are interested to know specifically which external parties provided feedback. As this was a promotional exercise for science and understanding human origins, it is also surprising that little or no information appears to have been released to, or covered by, the media in the run-up to this remarkable event – a perhaps deliberate ploy by the applicant to avoid objections being raised?

In the aftermath of this heritage-in-space incident, we urgently request that SAHRA, as part of its policy review process, should proactively reinstate its erstwhile system for the review and evaluation of permit applications, and ensure participation and comment from specialist referees, registered conservation bodies and interested and affected parties before proceeding with decisions to issue permits, especially in cases of such consequence as this one.

Yours faithfully,

(Signed) Dr David Morris

President: South African Archaeological Society

Local and international comment

Daily Maverick: Under the headings 'Bone of contention: SA Heritage Resources Agency defends decision to allow rare fossils to travel with space tourists', Shaun Smillie on 28 September 2023 wrote, amongst other:

Archaeologists are demanding an apology from the South African Heritage Resources Agency, the administrative body that rubber-stamped approval for two rare fossils to be sent on a space tourism flight. For almost three weeks, renowned palaeo-anthropologist Lee Berger has been criticised by scientists around the world for allowing two fossils to be sent into space on a flight that cost nearly half a million dollars. Smillie reported that businessman Timothy Nash, who owns a chunk of the land on which the Cradle of Humankind lies, joined two other paying customers on board Virgin Galactic's VSS Unity for a trip to the edge of space. Along with Nash were a two-million-year-old clavicle from an *Australopithecus sediba* and a 250 000-year-old *Homo naledi* thumb bone, which he carried in his cargo pants pocket. The clavicle happened to be the first *A. sediba* fossil

discovered by Berger's son Matthew back in 2008.

Berger had applied for the temporary export permit in July, stressing in the application that it would be an opportunity to promote science and bring global recognition to human origins research in South Africa. 'This would make these fossils the first extinct humans into space and act as a sign of respect by humanity to our African ancestors who gave us the technology, skills and mind that allow this perhaps greatest expression of human technological achievement – the exploration of space,' Berger wrote in the permit application.

But not long after Nash touched down in Spaceport, it was realised that the PR exercise had gone horribly wrong. Scientists around the world questioned the point of the mission. There were questions over why rare heritage objects were sent on a risky flight to space. There was also concern that radiation in space might have altered the microstructure of the fossils. Other scientists went so far as to say it smacked of colonialism, harking back to a time when researchers showed little regard and respect for the human

remains of indigenous populations. 'Normally, the permit applications for handling fossils are extremely tight. To export fossils out of the country, you have to have a very good motivation why the fossils should leave,' said Nicholas Wiltshire, treasurer of the SA Archaeology Society. Society president David Morris referred to the Kathu Pan handaxe, a million-year-old artefact that is kept in the McGregor Museum in Kimberley, in the Northern Cape, as an example of how such objects should be looked after. 'It has been in quite high demand for exhibitions around the world and SAHRA states that when it travels, it does so with a professional officer from the museum, so that would be a baseline requirement which I think was not honoured in this case.'

Members of the Archaeological Society are not the only people to have written to Sahra about the space venture. Lyn Wadley, a respected archaeologist and an honorary professor of archaeology at Wits University, also penned a letter to the regulatory body. 'I am now deeply ashamed to be an archaeologist in South Africa,' she wrote. 'I am ashamed of my country, of Sahara and of all the heritage practitioners who have been party to the exploitation of our priceless heritage for the sake of a media spectacle.'

The Observer, London: Under the heading "Grand gesture" condemned as an unethical publicity stunt that risked the loss of 2m-year-old human remains', Robin McKie, Science Editor, on 22 October, wrote, amongst other:

It was meant to be a grand gesture that would raise the profile of South African science – by allowing fossil bones found at the nation's Cradle of Humankind site to be flown into space on a Virgin Galactic flight last month. The result was very different. A wave of global condemnation has since engulfed the research team – led by the palaeoanthropologist Lee Berger – that allowed the ancient bones to be used this way. Some scientists raised initial doubts about the fossils' spaceflight. However, these have since swelled into a tidal wave of criticisms, with leading experts and academic institutions denouncing the incident as 'callous', 'unethical', 'extraordinarily poorly thought-out', 'a publicity stunt', 'reckless' and 'utterly irresponsible'.

Now pressure is mounting to ensure that national and international regulations are strengthened to prevent ancient bones and artefacts of humanity's predecessors being exploited in this way again. The use of fossils for promotional purposes must never be repeated, say researchers. 'At least six national and international bodies have since criticised the space venture, and hopefully nothing like this will ever happen again,' said Prof. Chris Stringer of the Natural History Museum in London. This point was backed by Prof. Mark Collard, Canada research chair in

human evolutionary studies. 'Remains of ancient human species are a very limited resource,' he told the *Observer* last week. 'There are very few of them, and the only justification for putting them at risk has to be scientific. That cannot, in any way, be said for this incident.'

South African scientific rules – like those of other countries – dictate that fossils can only be allowed to travel for scientific purposes and should be securely packed. The two bones, it transpires, were kept in a tube that Nash kept in his pocket as he floated around the cabin of the Virgin Galactic spaceship. 'They flew these precious specimens into space, where they could have been destroyed fairly easily,' said Collard. 'It was extraordinarily irresponsible. This was done for showmanship, and Berger has got a track record for this sort of thing. However, the really worrying thing is that the authorities allowed this to happen. They didn't talk to other people in the field and find out how they would have reacted, and that is the most worrying part of this affair. Individuals make mistakes but you should have a system that prevents that happening. This has to be put right as a matter of urgency.'

Berger has since claimed that the decision to send the fossils into space followed careful consideration and in-depth discussions with guiding and regulatory agencies. 'All the necessary permissions and permits were acquired, and great care was taken to ensure [the fossils'] safety,' he said. Human origins expert Prof. Andy Herries of La Trobe University, Melbourne, disagreed. 'This event should trouble anyone worried about the blurring of the lines between legitimate science and using precious fossils for entertainment and promotional purposes,' he told the *Observer*. Herries said he was particularly concerned because one of the fossils – the collarbone of *Australopithecus sediba* – was a type specimen.

A type specimen acts as a reference against which other pieces of fossil can be compared, and its loss would have been particularly serious, he said. This point was backed by Stringer, who added that Berger deserved great credit for the central role he played in the discoveries of *Australopithecus sediba* and *Homo naledi*. 'But to risk sending fossils from these species to the edge of space was reckless.'

Berger is no stranger to controversy. Earlier this year, he claimed that finds in South Africa's Rising Star cave system suggested *Homo naledi* displayed sophisticated behaviour almost a quarter of a million years before modern humans began making graves and art, even though the species had brains little bigger than those of chimpanzees. However, subsequent reviewers later denounced these claims as 'imprudent and incomplete', while others dismissed them as being 'largely assumption-based – rather than evidence-based'.



TRACING THE 1922 RAND REVOLT

Sarel de Klerk

In Fordsburg, passersby hurry through a nondescript market square bordered by Albertina Sisulu, Dolly Radebe, Mint and Central Roads, quite unaware it marks the final stronghold of an armed uprising by strikers during the 1922 Rand Revolt. Also known as the 1922 Miners' Strike or even the Red Revolt, it remains the greatest violent political upheaval on the Witwatersrand. Although the Rand has changed almost beyond recognition, many of the historical sites still exist to provide a glimpse of that seismic event.



Sandbag barricade at the Town Hall, Johannesburg

Accounts vary, but the Report of the Martial Law Inquiry Judicial Committee listed the fatalities of the strike and subsequent armed revolt as 43 soldiers, 29 policemen, 11 revolutionaries, 28 suspected revolutionaries and 42 civilians. A further 133 soldiers, 86 policemen, 45 revolutionaries, 73 suspected revolutionaries and 197 civilians were wounded. Once the revolt had been quelled, 4 692 men, 62 women and four children were detained for questioning. Altogether, 853 people, including nine women, were charged with various contraventions, from murder and treason to minor infringements under the martial law regulations.

Ten trade unions established the Transvaal Strike Legal Defence Committee to raise funds for legal representation of those appearing in court. Forty-six people were charged with murder and 18 were sentenced to death. Only four persons, namely Carel Stassen, Taffy Long, Herbert K Hull and David Lewis,

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were ultimately executed between 5 October and 17 November 1922. Vehement public protests forced the government to backtrack and recommend clemency to the Governor-General for the remaining 14.

Run up to the Rand Revolt

The severe post war economic recession lasting from 1920 until the beginning of 1922 is the underlying reason for the strike. The declining gold price, from £6,37 to £5,20 per fine ounce, which placed marginal gold mines at risk, is a contributory reason. The Chamber of Mines (the Chamber) employer body tabled three proposals at the 1922 gold industry's wage negotiations. The first to reduce the wages of mine workers since the cost of living was decreasing, the second to change underground working arrangements to reduce costs, and the third to modify the Status Quo Agreement to lower the ratio of white to black miners.

In July 1921, EJ Way, president of the Institute of Engineers, commented that 50 per cent of white miners could be replaced by skilled black miners, saving the industry £1 000 000 annually. He said further that the gradual removal of the 'sentimental colour bar' would also bring lasting prosperity to the mining industry as it would permit the restarting of marginal gold mines. The South African Industrial Federation (SAIF), which represented the (white) unions, rejected the Chamber's proposals, arguing that it would be unfair to reduce all miners' wages to a rate the marginal mines could afford, since many gold mines remained profitable.

The colour bar dated to the 1911 Mines and Works Act, when certain occupations were reserved for whites. To ensure the gold mines operated without disruption during wartime, the Chamber and the SAIF implemented the Status Quo Agreement in 1918. It prohibited the replacement of whites by blacks in occupations traditionally performed by whites. By 1920, 32 occupations employing 7 000 people were reserved for whites, based on a ratio of one white for every 8,2 black workers. The SAIF feared that 4 000

whites would lose their jobs if this agreement was modified.

The Transvaal coal mines were also in dire straits. During the First World War they prospered because of increased exports. But by 1921 exports had dried up because of the availability of cheaper British coal. Hence, the Chamber proposed to reduce coal miners' wages by five shillings per day. Although the Chamber's arguments were valid, so were the fears of white miners. Thousands of poorer Afrikaners had drifted from the farms to the mines and

because of the recession there was little alternative employment. The Rand trade unions had been formed by British immigrant workers specifically to protect whites from competing against cheaper black labour. Initially refusing to interfere, the government felt the Chamber and SAIF should resolve the matter themselves.

Coal, gold and power strikes kick off

Nevertheless, monitoring the coal mining negotiations the government cautioned the SAIF in December 1921 that it would ensure essential public services continued during a strike. This warning applied specifically to the Victoria Falls and Transvaal Power Company (VFP), the main electricity provider on the Rand. Without electricity, the deeper levels of gold mines would flood, causing lasting damage. Unsurprisingly, the SAIF felt that government was siding with the mine owners. On 21 December 1921, Patrick Duncan, Minister of Foreign Affairs, met with the SAIF to discuss the coal dispute. The SAIF's proposal of arbitration, which Duncan conveyed to the Chamber, was rejected, the Chamber citing the precarious state of the coal mines. Convinced that the Chamber intended to force matters, the SAIF supported the coal miners' strike, which commenced on 1 January 1922. All coal mines in the Eastern Transvaal and along the Vaal River ceased production.

A strike on the gold mines also seemed imminent after the Chamber informed the SAIF on 28 December that it held to its three proposals and the VFP advised that further negotiations would be fruitless as it intended to freeze existing wage rates. The affected unions formed an Augmented Executive to coordinate the pending strike. All nine trade unions supported a strike, with 12 192 workers voting in favour and 1 336 against from a white workforce of just over



Strikers congregating at the Rissik Street Trades Hall (Wikipedia)

20 000. The gold miners' strike started on 10 January 1922, halting all gold mining activities from Springs in the east to Randfontein in the west and causing 200 000 black and white miners to stand idle. The power stations of the VFP, which supplied electricity to most gold mines and municipalities also shut down for a while. Initially, only the Rosherville Power Station was allowed to operate on a reduced basis, providing just enough electricity for underground pumping and lighting operations. Although having its own power station, Johannesburg remained vulnerable because its coal came from strike-affected mines.

The government tried hard to get the Chamber and SAIF to resume negotiations. Several meetings and even a lengthy trilateral conference chaired by Justice Curlewis from 14 to 27 January took place. The Status Quo Agreement remained the stumbling block to resolving the strike. Demonstrating against the proposed modification of this agreement, strikers coined the bizarre slogan, 'Workers of the world fight and unite for a white South Africa!', which placed the socialists in a predicament. While not supporting it, they hesitated to repudiate it for fear of alienating the Afrikaans mine workers.

Strike situation becomes ominous

As the strike continued into February 1922, the situation became ominous. Strike commandos were formed, supposedly to maintain order, but seemingly more concerned with intimidating scab labour. A rumour that shopkeepers were no longer granting credit to strikers caused widespread concern as many strikers relied on emergency relief because they lacked savings. Strikers also marched on Crown Mines in an aggressive mood, warning officials of the consequences of continuing to work the mine. A leadership vacuum also developed between the Augmented Executive and the Central Strikers'

Committee that was responsible for coordinating the activities of all local striker committees. This gave the extremists of the militant but fringe mine workers body, the Council of Action, the opportunity to take over the strike for their own purposes. Some of the Marxist members of the Council of Action were Percy Fisher, William Wordingham, Ernest Shaw, FW Pate, A McDermid, D McPhail and Henry Spendiff.

At a Johannesburg meeting on 7 February, Fisher warned strikers against any local meetings to discuss terms with employers. He said that the first man to return to work should be smashed until not a breath was left in his body. The following day, the police arrested Fisher, Spendiff, Shaw and Wordingham at the Trades Hall in Rissik Street for inciting public violence. The magistrate refused to release them on bail. Government aggravated the tense situation by announcing on 11 February that the police would protect those strikers returning to work. By mid-February, there were strike pickets at every mine shaft on the Rand. Upon their release from custody on 22 February, Council of Action members immediately preached violent action. Two days later, Shaw told a crowd that all great political and social changes had been achieved only through militant action.



The Railways and Harbours Brigade (Internet)

The first group of Special Constables, the 'Blues', assumed duty on 27 February. The role of this force of about 700 armed constables was to protect the mines, thereby relieving the regular police for other pressing duties. The first serious clash between the police and strike commandos happened on the same day. Captain John Fulford, District Police Chief of the Eastern Rand, saw 50 mounted members of the Boksburg and Driefontein Hill strike commandos near the Witwatersrand Deep Gold Mine, between Germiston and Boksburg. After the strikers had delayed a train at the Angelo Crossing, the police ordered a dispersal. When the strikers refused, a

scuffle broke out in which three policemen and eight strikers sustained injuries. More than 20 strikers were arrested and detained in the Boksburg prison.

The next day, Captain Fulford observed about 250 strikers marching from Boksburg North to the Boksburg prison in Commissioner Street, supposedly to serenade their imprisoned comrades with the Red Flag. Convinced they intended to free the prisoners, Fulford twice ordered the crowd to disperse. When they continued to disobey the instruction, the police fired into the crowd, killing three strikers. Their funeral procession in Boksburg on 2 March stretched for 3 km, while at the Union Grounds in Johannesburg 5 000 people gravely listened to the mournful sounds of the Last Post.

Strike politics

Now the strike reached a turning point, paving the way for the subsequent collapse of law and order. Strike commandos started attacking not only scab workers but also police contingents. Concerned at the escalating violence, the Augmented Executive wrote to the Chamber on 4 March, proposing an urgent meeting to discuss terms to resolve the strike. In a tactless letter on the same day, the Chamber rejected the request, stating that it would no longer recognise the SAIF for collective bargaining purposes as it no longer considered it to represent the bulk of employees in the gold and coal mining industries. Presumably, the Chamber felt it had the upper hand and that a forceful response would rapidly scupper the strike. In fact, it only aided the Council of Action to hijack the strike and turn it into an armed revolt.

The Augmented Executive met throughout the night to discuss the Chamber's response, announcing in the morning that a strikers' ballot would be held to decide on whether to continue with the strike. The Council of Action was dead set against this ballot and decided to take over the strike with the backing of the strike commandos. It set up a Committee of Action to take quick decisions. Andrews, Fisher, Spendiff, Mason, Wordingham and Shaw, who were known for their radical views, were appointed. Its immediate plan was to thwart the ballot and force a general strike across the Rand. The Central Strikers Committee called a meeting of the district strike committees where Bill Andrews of the Council of Action eloquently argued against the ballot and for a general strike as being the only means of defeating the employers. His proposals were soon adopted.

On 6 March, thousands of strikers congregated at the Rissik Street Trades Hall where delegates from the union executives were discussing the strike situation and the proposed ballot. They were being agitated to a fever pitch by the Committee of Action. In the late afternoon, Joe Thompson, acting president of the SAIF, announced the decision to embark on a general

strike that would commence immediately and be coordinated by a Council of Five. However, this council abdicated shortly thereafter and unconditionally handed over authority to the Committee of Action.

The striker commandos now started arming themselves. Police reports described strikers armed with bicycle chains, old swords and bayonets, poles barbed with spikes and a variety of firearms. The strikers also intensified their activities, marching everywhere, recruiting more workers to the strike and intimidating non-strikers.

Strike turns into an armed revolt

Overnight, striker violence seemed to spread across the Rand. On 7 March, strikers stopped employees at the Braamfontein, Kazerne, Johannesburg, Germiston and other railway stations from working. When the police arrived outside the New Law Courts at Von Brandis Square to control a crowd of several thousand, they were stoned and fired upon. Later in the day, strikers were seen attacking black people in Vrededorp. Lieutenant Colonel Godley, Deputy Commissioner of Police for the Witwatersrand, believed the racial attacks were instigated by the Council of Action to embarrass the authorities and intimidate citizens.

The next day, the railway line near Driefontein on the East Rand was sabotaged and a train and a worker fired upon. In the afternoon reports were received of fighting between strikers and blacks in Ferreirastown. Further racial violence occurred on the Primrose Mine. It became clear the police were no longer able to control the strike, which was now developing into an armed revolt. Hesitant to declare martial law for political reasons, the government, as a precautionary measure, nevertheless requested the Governor-General to issue a proclamation on 9 March calling up several Active Citizen Force (ACF) units. They were the Transvaal Horse Artillery, Transvaal Scottish, Imperial Light Horse, Pretoria Regiment, two companies of the 1st Infantry Battalion – Railways and Harbours Brigade, and the 1st Field Ambulance – SA Medical Corps.

The same day, the police obtained alarming information. Strike commandos were planning to attack the Newlands, Fordsburg and Auckland Park



Cape Times headline, 11 March 1922 (Wikipedia)

Police Stations as well as the Cottesloe Camp of the Special Police before marching to the Johannesburg Town Hall to take full control of the city. Three troops of police were accordingly deployed to the south of the Brixton Ridge overlooking the main road between Brixton and Newlands, with a fourth troop on a smaller ridge overlooking the Auckland Park Racecourse. Although surrounded by strike commandos, they managed to prevent the various commandos from linking up and marching onto the city.

On Friday 10 March, 'Black Friday' as it was subsequently called, fighting occurred from Newlands to Springs, excluding only Germiston and the West Rand. For a while it seemed the strikers' revolt would carry the day. In the early hours, striker commandos attacked the Newlands Police Station and at 07h50 the beleaguered police surrendered. The Police Charge Office at Fordsburg and the barracks some 400 meters away were also attacked. Lieutenant McDonnell and nine men held out at the Charge Office until about 18h00, when their ammunition ran out. They then fled to the nearby barracks, where the strikers were held off until the end of the revolt. One of the fleeing constables was assisted by a shopkeeper called Pieter Marais. The following day Marais was seized by the strikers, tried as a police spy, sentenced to death and summarily shot against one of the walls of his shop. Prior to dying, Marais was able to say that he had been shot by a striker called Long.

Martial law is proclaimed

At 09h00 the same day, the government finally proclaimed martial law on the Rand and in adjoining districts. Simultaneously, additional ACF units and 26 burgher commandos were called up. The ACF

units were the Durban Light Infantry, Railways and Harbours Brigade (Headquarters and two infantry battalions), Witwatersrand Rifles, Rand Light Infantry, two units of the SA Service Corps, and the 1st Sanitation Section – SA Medical Corps. The burgher commandos were drawn from the Eastern and Western Transvaal and Pretoria to Middelburg Military Districts. General Beves was placed in charge of the Johannesburg area. Generals J van Deventer and Coen Brits were to lead the offensive on the East Rand, while Colonel Hussey was given charge of the West Rand, where the revolt had largely fizzled out. A strong police contingent now surprised and arrested several delegates of the Council of Action at the Trades Hall, among them Bill Andrews, George Mason, Ernest Shaw.



Whippet tank approaching Fordsburg (Internet)

The strike commandos soon struck back. As the air force flew sorties from the Swartkops aerodrome over Benoni and Brakpan, Captain WW Carey-Thomas, acting as an observer on a DH9 aircraft was killed by ground fire. The Brakpan strike commando attacked a small armed garrison at the offices of the Brakpan Mine, killing the Special Police Commander Lieutenant Brodigan, three special constables and four mine officials. At Benoni, the police were besieged in their barracks in Bedford Avenue. A Transvaal Scottish contingent of 200 men were railed by special train to relieve them. At Vogelfontein Station, police cautioned them that the line had been interfered with at Avenue Halt. As the train slowly approached the Dunswart Crossing at about 14h00, 15 mounted men were seen galloping away. Four platoons immediately detained to cover the train. At the Crossing, they came under fire and the remainder of the battalion rushed to assist. In the ensuing skirmish, 12 members of the Transvaal Scottish were killed and 30 wounded.

The mayhem continued on Saturday. The Langlaagte Police Station was surprised and captured with one constable killed and 18 taken prisoner. The Jeppe and Booyens Police Stations were besieged but managed to hold out. Then the Imperial Light Horse (ILH) was caught napping. From the Drill Hall, the general mobilisation centre, ILH recruits were

sent to the Regimental Headquarters at Ellis Park. There they were hastily equipped and formed into dismounted squadrons. The choice of this site was a grave mistake, for the exposed camp lay on an old football field 7 m below the surrounding roads. At 13h30 about 150 soldiers gathered on the field, their rifles stacked some distance away. Suddenly, the Jeppe and Denver strike commandos, having crept to the perimeter of the field behind a high hedge, opened fire. Another body of strikers fired on the camp from houses along Park Lane overlooking the camp. In moments the ILH lost eight men killed and 15 wounded.

Government forces take the offensive

On Sunday 12 March, government forces were finally ready to take the offensive. At 06h30 in Benoni, a combined military and police force under Lieutenant Colonel Burne linked up with the 1st SA Mounted Rifles and two police units near the Indian and African townships. Advancing towards the centre of town, it came under heavy fire from the Dunswart Iron and Steel Works where a large force of strikers was ensconced. Using the sole cannon at their disposal, the military dislodged the strikers. Burne's forces pursued them along Main Reef Road even though heavy losses were being sustained from sniper fire from roadside gardens and nearby rooftops. By 13h30 the relieving forces had occupied the Brakpan Mine and an hour later Brakpan itself was in Van Deventer's hands. The process of rounding up the strikers began. The revolt on the East Rand was over for all practical purposes.

Simultaneously, an attacking force consisting of the Durban Light Infantry, Witwatersrand Rifles, Rand Light Infantry, Imperial Light Horse, Transvaal Scottish and SA Mounted Rifles advanced from Milner Park due west towards the Brixton Ridge. From the corner of Jan Smuts Avenue and Empire Road, 13-pounder guns of the Transvaal Horse Artillery (THA) shelled the north-eastern ridge and the Cottesloe School, where a strong force of strikers had gathered. A section of the Transvaal Scottish advanced parallel to the northern boundary of the Braamfontein cemetery on terrain offering little cover. It ran into deadly fire from the ridge, the Milner Park Junior School and a dilapidated cottage near the cemetery and in no time suffered three dead and 29 wounded.

Two companies of the Durban Light Infantry (DLI), approaching via the Johannesburg Country Club, relieved the police on the ridge without suffering any losses. Demoralised by the advancing troops, shelling by the THA and bombing by the air force, the strike commandos either surrendered or fled. Some 1 700 prisoners were taken and both sides' casualties were temporarily buried at Milner Park. Lieutenant Colonel Thackeray established his headquarters at the Johannesburg Country Club in preparation

for attacking the striker stronghold at the Fordsburg Market Square the next day.

Assault on the strike stronghold

Shortly after daybreak on Tuesday 14 March, a military aeroplane dropped thousands of pamphlets over Fordsburg, warning all well-disposed civilians to evacuate the area via the Fordsburg subway before 11h00. The assault was almost due to be launched when an envoy from the strikers' headquarters reached General Beves to ask for terms, only to be told to surrender unconditionally. At 11h00, one field gun of the THA commenced firing from Sauer Street, its observer placed on the roof of Corner House. The remaining two artillery pieces fired from Brixton Ridge above the Auckland Park Camp. For seventy minutes almost 140 shrapnel shells rained down on Fordsburg. Then the order to cease fire was given for fear of injuring captive policemen held in the Market Square building.

The DLI, having bivouacked in Brixton, advanced on Fordsburg from the north with the Transvaal Scottish approaching from the north-east. The left flank of the Transvaal Scottish linked up with Lieutenant Colonel Godley's force attacking from the south-east and south. Godley's force, consisting of police and special police also had a Whippet tank. Although this broke down in the Fordsburg subway, the strikers nevertheless found its appearance very unnerving. Shortly after noon, elements of the DLI and Transvaal Scottish had captured the Fordsburg Railway Station and were advancing on the square. They encountered heavy rifle fire from barricades across the major roads running west to east. Major Adams and Lieutenant Gregorowski of the Transvaal Scottish were both killed in Main Road (now Albertina Sisulu Street).

Changing tactics and infiltrating through adjoining properties, the DLI entered a bottle store with frosted windows directly opposite the square. Surreptitiously placing a Vickers machine gun in this shop, they commenced firing at point blank range at the surprised strikers. A massed bayonet charge then carried the square. Inside the Market Square building they found the bodies of Fisher and his aide Spendiff, both having apparently committed suicide. The policemen held captive in the building following the surrender of the Langlaagte Police Station were freed. By 14h00 the Fordsburg Market Square was secure and even though sniping continued, the revolt was over. The captive strikers were marched off to the old Wanderers ground, next to Park station. Here the thousands of strikers were screened and either charged formally and imprisoned or released.

End of the strike

During the next two days the ACF units fine-combed Fordsburg, Brixton, Vrededorp, Turffontein and Rosettenville for revolutionaries and arms. Unfor-



Sandbag barricade in Johannesburg during the Rand Revolt of March 1922

unate incidents occurred on 16 March that placed the Transvaal Scottish Regiment and government in a poor light. WE Dowse, a member of the Rosettenville strike committee, was arrested at his home for allegedly molesting Mrs Adams, the wife of a scab worker. While being taken to company headquarters, Dowse allegedly tried to escape and was shot and killed by two soldiers. Then three Hanekom brothers and MW Smith were arrested by the Transvaal Scottish in connection with the cutting of telephone wires (which they said they were forced to do by the strikers) and concealing arms and ammunition (which they denied). Taken down a secluded valley south of Rosettenville to point out hidden arms caches, all four were shot and killed, also while allegedly trying to escape. There is a lingering suspicion that this act was in retaliation for the casualties suffered at the Dunswart Crossing and Brixton Ridge, although the subsequent commission of enquiry exonerated the regiment.

At midnight on 17 March 1922, the SAIF called off the strike. Strikers anxiously reported for work in the hope that their jobs had been held open for them, but the hopes of many were dashed because of their activities during the revolt. Almost 3 000 mine workers were left unemployed following a review of the labour force. Even those who retained their jobs were subjected to lower earnings.

Realising that the prevailing legislation failed to effectively conciliate labour disputes, the government enacted the Industrial Conciliation Act shortly prior to its defeat in the 1924 general election. During the election the opposition made great political play of Smuts' hands supposedly dripping with blood as a result of the violent suppression of strike, the Bulhoek Massacre of the Israelite sect near Queenstown and the forceful suppression of the Bondelswarts Rebellion in the then South-West Africa. The mine workers deeply resented the government's handling of the strike and voted for either Barry Herzog's National Party or Colonel Creswell's Labour Party, which had entered into an election pact. The National Party won 63 seats (18 more than previously), the



Fordsburg Market Square after the revolt. In the foreground the trenches dug around its edges and in the background McIntosh's store damaged by artillery fire (Wikipedia).

Labour Party gained nine seats for a total of 18. The South African Party obtained merely 53 seats.

The subsequent Pact government created the Department of Labour in August 1924 to implement the provisions of the Industrial Conciliation Act. It also enacted the Mines and Works Act No. 25 of 1926 to reinforce the colour bar on the mines. Unfortunately for future race relations, this legislation remained in force for decades to come.

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!AITSA SCIENCE, KAROO AND ASTRONOMY FILM WINS MANY AWARDS

The film documentary *!Aitsa*, discussed by Neil Rusch in his article 'Cosmic differences resound in a new science, Karoo and astronomy film' in the August 2023 issue of *The Digging Stick* (pp. 5–7), has been presented with the following awards in the past six months:

- *Best of the Fest* at the Encounters South African International Documentary Festival in June.
- *Grand Prize* at the Pärnu International Documentary and Anthropology Festival, Estonia, July.
- *Best Composer for the Future, Best Space Research Film, Best Indigenous/Native Peoples Film*, Cannes World Film Festival, France, September.
- *Best International Feature* at the Planet in Focus International Environmental Film Festival, Canada, October.

Errata

Unfortunately, the article contained the following errors. Apologies are extended to Neil Rusch.

- The illustrations of Figs 1 and 2 were transposed. The map should have appeared on p. 5 and the photo on p. 6. The captions for Figs 1 and 2 are in the correct positions.
- *!Aitisa* in para. 2 on page 5 should read *!Aitsa*.
- In the last paragraph on p. 7, third last line, the word 'entity' should read 'identity'.
- The following *footnotes* to the article were omitted:

i 'Animism' is projected in the literature as simple religion and a failed epistemology to a large extent because it has hitherto been viewed from modernist perspectives. Bird-David, N. 1999. *Current Anthropology* 40:S67–S91.

ii Walker, C & Chinigò, D. 2018. Disassembling the Square Kilometre Array: astronomy and development in South Africa. *Third World Quarterly*, 39(10):1979–1997.

iii Chinigò, D. 2019. From the 'Merino Revolution' to the 'Astronomy Revolution': land alienation and identity in Carnarvon, South Africa. *Journal of Southern African Studies*, 45(4):749–766.

iv Legassick, M. 2007. Reflections on practicing applied history in South Africa, 1994–2002: from skeletons to schools. In *History Making and Present Day Politics: the meaning of collective memory in South Africa*, Hans Erik Stolten (ed.), pp. 129–147, Uppsala: Nordiska Afrikainstitutet.

v Ahlskog, J. 2017. RG Collingwood and the presence of the past. *Journal of the Philosophy of History*, 11(3):289–305.

vi Parkington, J, Morris, D & De Prada-Samper, J. 2019. Elusive identities: Karoo IXam descendants and the Square Kilometre Array. *Journal of Southern African Studies*, 45(4):729–747.

SAN PAINTING OF POSSIBLE SÃO GONÇALO SHIPWRECK FLOTSAM AT PLETTENBERG BAY

Andrew Paterson

I was asked to evaluate an unusual rock art painting near Plettenberg Bay in October 2023 by Kei Heyns, the conservation manager of Robberg Coastal Corridor Protected Environment. The site is situated in the vicinity of the Robberg Peninsula and is within a radius of 1 200 m from the campsite of the survivors the *São Gonçalo*, which sank in Plettenberg Bay in 1630 (Storror 1988; Hall-Green 2023). The rock painting is just 50 m from the shoreline (Fig. 1).

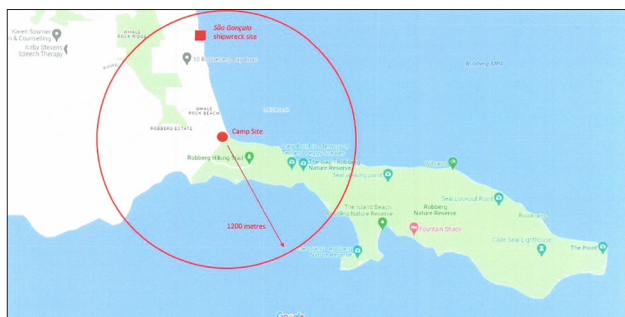


Fig. 1: Map of the Robberg Peninsula showing the locations of the *São Gonçalo* survivor's camp and the shipwreck

The rock art site is situated at the base of a cliff south-west of the Robberg peninsula. It consists of an exposed small vertical rock face, about 2,0 m off the ground and 1,5 x 1,5 m in area. The artist could have reached the painting surface by standing on a small ledge or a piece of wood wedged into the horizontal crevice below the painting (Fig. 2). The image was painted on a smooth sandstone outcrop of the Mesozoic Robberg Formation. As the rock surface faces due south and is in the shadow of the cliff face for most of the day, the painting has little exposure to the sun. Some of the lines in the painting have an organic overlay that could be related to the medium used in the paint.



Fig. 2: View of the Robberg Peninsula (left) and the rock art site

The site can be regarded as a San parietal rock art site rather than a recent graffiti event. The painting subject matter is very specific, which suggests that the artist must have had something 'in mind' during the execution of the artwork. It has been painted in the traditional San fine-line technique with a very fine brush. No apparent attempt to mass in the subject matter of the line drawing was made. The paint is a dark brown-red ochre and the paint consistency must have been fluid enough to 'flow off' the brush onto the rock to produce single straight lines. The artwork had to have been done by an accomplished artist and was probably done 'alla prima', in other words painted directly in one session and possibly completed in a matter of hours (Fig. 3).

An important feature of this painting is that no painted San figures or animals are present. One's attention is initially drawn to four unusual, geometric 'A shapes', followed by three apparent 'crystal features'. Interestingly, these unusual shapes have varying lengths but similar widths. The shapes are made up of parallel, deliberately drawn, straight lines (Fig. 4).

On looking closely at the 'A' shapes in the painting, it becomes evident that they are not letters of the alphabet as they are not closed at the apex; some are open and others have been extended beyond the

apex. On the other hand, the crystalline shapes, on close inspection, are composed of diagonal parallel lines drawn intentionally to connect with the same shape on either side of each cluster. These clusters appear to be random arrangements. My inference is that we are looking at something like planks of wood of similar width but randomly different lengths. The 'A' shapes have the appearance of being part of a

Andrew Paterson is presently working on the rock art of the Plettenberg Bay area with Dr Charles Helm and Dr Renee Rust of the African Centre for Coastal Palaeoscience, Nelson Mandela University, Gqeberha, South Africa. andypat@iafrica.com.

framework or structure, while the 'crystal' shapes have the appearance of individual planks of wood piled randomly on top of one another (Figs 4 and 5). The randomness of the images is important and interesting in that they give the impression of planks that had possibly been washed up on the shore.

Why would a San artist paint these specific images in this manner? San hunter-gatherer artists often painted exactly what they saw and experienced. Such paintings are often executed in detail and with remarkable accuracy. My sense is that, in this instance, the San artist painted something of considerable interest that he had encountered on the shoreline. The artist's encounter with these unique objects could well have been 'site specific', i.e. the objects might have been close to the painting site and may have been lying there for a relatively short time before being washed away.

Interpretation

What was the San artist looking at and what was on his mind? While absolute certainty is elusive, this does not prevent conjecture on what the artist had in mind. I interpret this San painting as a probable

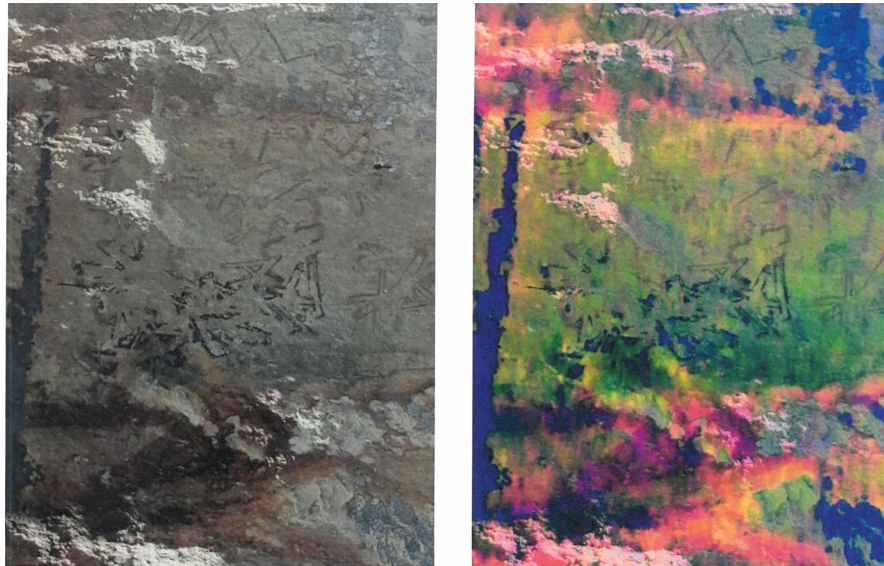
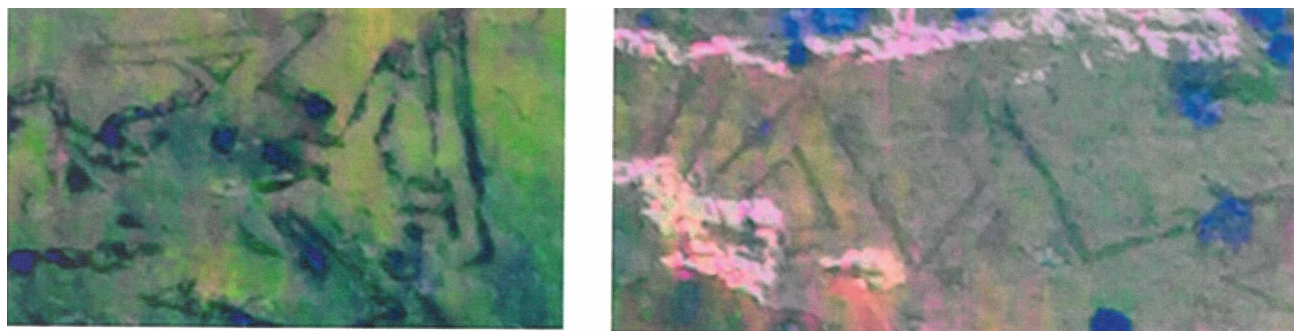


Fig. 3: The original image (left) and the D-Stretched enhanced image of the artwork



'A' shapes



'Crystal' features

Fig. 4: Enlargement of the 'A-shaped' and 'crystal- shaped' features in the artwork



Fig. 5: Present-day planks of wood laid out in a similar fashion to the images in the painting

rendition of what the artist saw lying on the shore near the painting site, namely remnants of shipwreck debris. It is reasonable to surmise that such flotsam could have come from the Portuguese carrack, the *São Gonçalo*.

The records indicate that some 100 survivors of the shipwreck spent eight months camping on the southern extremity of Robberg main beach, up against the peninsula (Fig. 1). During this period, they rebuilt two small boats from the original wreckage of the *São Gonçalo*, which must have been strewn along the shoreline by the Agulhas Current. One boat with survivors sailed up the coast to Lourenço Marques while the other boat set sail for Portugal. The survivors on the second boat were picked up by a passing Portuguese carrack on its way to Goa in India. After a journey of about seven months, they finally sailed for home but, tragically, this returning carrack sank in a storm while entering the Tagus River and this group of *São Gonçalo* survivors died within sight of their homeland.

Significantly, it has been recorded that the survivors 'befriended the indigenous Khoisan people' during their stay at Plettenberg Bay, or Baia Formosa as it was known by the Portuguese (Storrar 1988). This confirms that there were indigenous people in the area at the time. One can imagine that the San

may have watched with interest from a distance as the people from 'another world' established a camp, collected the debris of their ship, cut down trees for additional wood and built two new boats. The San artist would have known exactly what he was painting and realised its significance. He must have known that the unusual 'A' shapes he was painting were related to the framework of the two boats being rebuilt on Robberg beach (Figs 4 and 6).

The question can be asked whether a San artist would have had the ability to draw a carrack, or parts of the shipwrecked carrack, accurately. This is affirmed by a painting of a Portuguese carrack in the Cederberg (Fig. 7) nearly 100 km inland from the Saldanha Bay coastline, where the artist must have seen carracks sailing down the coast. The San artist would have walked inland and rendered this painting from memory. There is a second San rendition of a sailing ship at a site in the Attakwasberge, 50 km inland from Mossel Bay (Fig. 7) (Leggatt & Rust 2004).

Leggatt and Rust suggest that the San artist saw this ship at anchor in Mossel Bay as the rudder in the drawing is shown above the water level. The charcoal

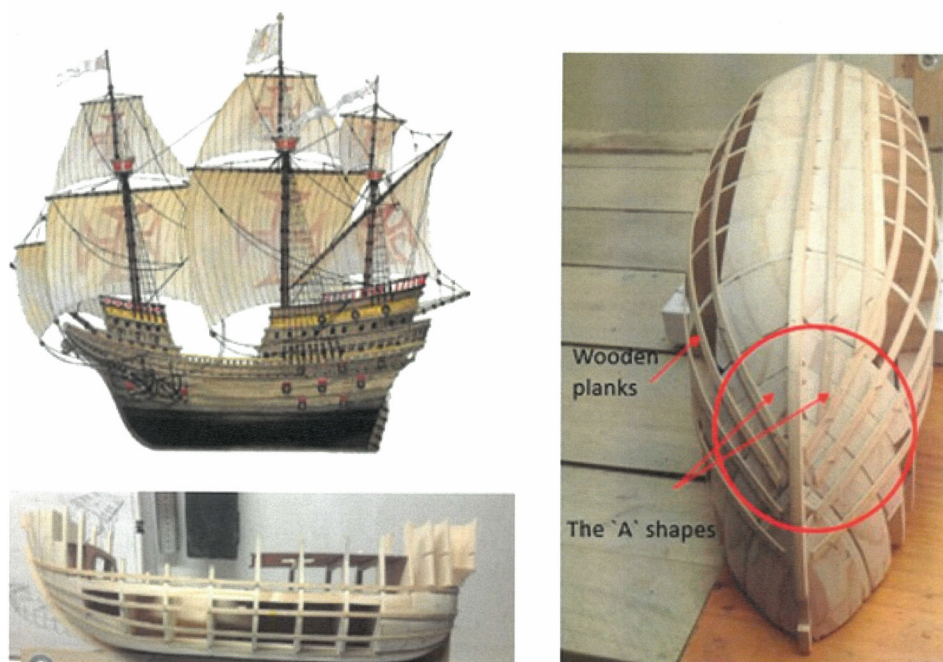


Fig. 6: On the left, a Portuguese carrack like the *São Gonçalo*. The model on the right shows the hull structure with 'A' shapes in the bow portion of the boat.

drawing has been overlaid with superimposed handprints and finger dots in ochre paint. The drawing suggests that the artist rendered a spontaneous freehand drawing, from memory, of a passing carrack. The later superimposed handprints and finger dots, specifically over the bow of the boat, and the dots over the raised stern of the boat, running up and over the mainsail, imply that the original, or possibly a later artist, regarded this boat as a

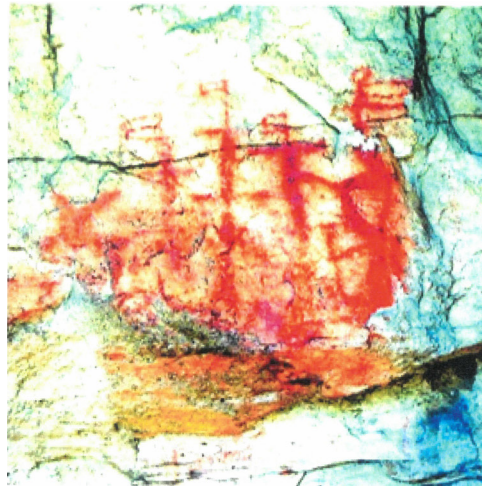


Fig. 7: A San painting of a Portuguese carrack at Rock Haven in the Cederberg (left) and a sketch of a San painting of a carrack at Attakwaskloof (right)

most important image. Handprints and dots are often associated with the San's concept of *n/om*, which is a vibrant energy that animates all living things. This suggests that the San knew that the boat was being sailed by people and was driven forward by the wind.

Conclusion

It is proposed that the rock painting at Plettenburg Bay (Fig. 4) is a San artist's rendition of flotsam from the *São Gonçalo* shipwreck encountered on the coastline near Robberg, nearly 400 years ago. The Portuguese sailors recorded this tragic shipwreck on a stone tablet in 1630 that was found in Plettenburg Bay in 1980 inscribed with the words: 'Here was lost the ship *São Gonçalo* in the year 1630'.

It is of interest that the survivors left behind an engraved stone tablet and not an inscribed 3 m high *padrão* stone pillar with cross. A *padrão* would have meant that it was their intent to establish primacy and possession over the land around Plettenburg Bay. Instead, the survivors only wanted to record the dramatic event of *São Gonçalo* shipwreck, which makes this small stone tablet all the more unique and special. Both San and Portuguese recordings were therefore 'set in stone' and left for us to appreciate this seminal cross-cultural incident in Plettenburg Bay's history.

Acknowledgements

I would like to thank Kei Heyns of the Robberg Coastal Corridor Protected Environment (RCCPE) for taking me to the site and Charles Helm, Renee Rust and Jan de Vynck from the African Centre for Coastal Palaeoscience (ACCP), Nelson Mandela University, for their comments and assistance.

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ARCHSOC NORTHERN BRANCH

Guidelines for applications for grants for research or educational purposes

Applications must be made in writing and include the following:

1. Name and contact details of the applicant.
2. An outline of the research or education proposal, and anticipated project results or benefits.
3. The project implementation schedule.
4. The amount of the grant being applied for. A breakdown of the amount applied for into discrete expenditure categories must be given to permit an award to be made for specific cost items.
5. If the project to be funded forms part of a larger project, the details of how the funded part relates to the whole must be provided.
6. The resources and facilities available for implementing the project.
7. Biographical details of the applicant(s), including professional qualifications and experience.
8. References from two suitably qualified people attesting to the quality of the project.
9. Plans to publish the research results.

Successful applicants will be required to provide six-monthly progress reports and a final project report. On completion of the project, an article on the project must be supplied for publication in the SA Archaeological Society's journal, *The Digging Stick*.

Applications should be submitted to John Wright, the chairperson of the grants subcommittee of the Northern Branch. Email: johnbwright99@gmail.com. Mobile no.: 060 3355 104.

PITFALL TRAPS AT HLABENI FOREST IN THE KWAZULU-NATAL MIDLANDS

Craig T Symes

I grew up on a farm adjacent to Hlabeni forest in the Polela District of KwaZulu-Natal in the 1970/80s. My grandfather moved to the 260 ha farm in the 1920s and spent much of his youth becoming familiar with the forest. As a boy I joined him on trips into the forest and remember him explaining to me the difference between a number of pits, in the north-east section of the forest (Fig. 1) that were quite different to the saw pits of early European settler loggers. The pits were often aligned in a series, were generally squarish in shape and ranged in depth from waist depth to a barely visible depression in the ground. In contrast, saw pits were single lone holes, more rectangular in shape and often deeper (Fig. 2).



Fig. 1: North-east section of Hlabeni forest with plots of all recorded pits (Google Earth, 2023)

Hlabeni refers to both the forest and a 1 702 m high flat-topped mountain about 12 km north-west of Creighton village in southern KwaZulu-Natal. The name in isiZulu apparently means 'at the aloes' (Raper 2014). However, I was informed by my grandfather, who was fluent in isiZulu, that the name referred to 'stabbing', a probable reference to the time Shaka's Ufasimbe moved through the area in the early 1800s. Therefore, an alternative derivation could be from 'hlaba', giving a meaning of 'the place of slaughter (or stabbing)'.

The story stayed in my mind for years, including a period of time when I spent many hours each month on a research project and during numerous trips in subsequent years while studying the Cape Parrot *Poicephalus robustus* (Wirminghaus et al. 1999). An assessment of Hlabeni pits fell outside the scope of my biological work of the time. However, I decided to pursue this further and on 6 August 2015 visited the north-east section of forest where I remembered seeing the pits. An assistant and two forest guards and I searched sections of the forest and all the pits

found were GPS mapped (Garmin). The following data was recorded: Depth ranges (<10 cm, 10–20 cm, 20–40 cm, 40–60 cm, 60–80 cm and >80 cm).

- Approximate width and length to the nearest metre.

A total of 83 pits were documented. They varied in depth, with some being prominent depressions in the ground while others were shallow (Table 1). The pits are plotted in Fig. 1, which gives a spatial understanding of the layout of these pits.

Table 1: Number of pits from different depth classes recorded in eHlabeni forest (pit altitude range = 57 m; 1 365 to 1 422 m asl)

Pit depth range (cm)	Number of pits
<10	3
10 to 20	29
20 to 40	22
40 to 60	13
60 to 80	12
>80	4
Total	83

I suggest that further investigation will no doubt reveal that they are man-made (Hall 1977). While Fig. 1 shows the layout of these pits, a better understanding by someone with more knowledge on this topic visiting the site would be worthwhile. It would be interesting to investigate the surroundings, including caves at the base of the cliff line (Mitchell 1998). While I am not

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Fig. 2: A colleague stands in a pit that is deeper than most others

aware of any archaeological work in the immediate area, I do recall a story my grandfather recounted. During a thunderstorm one afternoon he sought shelter in one of the overhangs beneath the cliffs bordering the north of the forest, and found a large animal

tooth. This was taken to the KwaZulu-Natal Museum in Pietermaritzburg and my recollection is that it was identified as a rhinoceros tooth. My efforts to retrace this possible accession to the museum were not successful.

Acknowledgements

Permits to visit Hlabeni forest were obtained from the Department of Agriculture, Forestry and Fisheries. Sibusiso Zama at the Nkwezela forestry offices (Donnybrook) was particularly helpful in this process and assisted in providing field guards during my visit to the site.

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YVONNE VILJOEN AWARDED THE SOCIETY'S PRESIDENT'S MEDAL

On 7 September 2023, the Council of the SA Archaeological Society welcomed Yvonne Viljoen, who had retired from the Council and the Western Cape Branch committee in April. The vice-president, Dr Antonia Malan, presented her with the President's Medal for her outstanding contribution to the Society over the past 20 years. Yvonne served on Council from 2003 to 2023, as vice-president of the Society from 2018 to 2020, and as chairperson of the Western Cape Branch from 2004 to 2023.

The silver medals were commissioned by Dr Tim Maggs in 1995 after his term of office as president of the Society from 1992 to 1994. They are awarded at irregular intervals to members who have made significant contributions towards the organisation of archaeology in southern Africa.

Yvonne is greatly admired for her infectious energy and for registering relatively late in life as an archaeology student at the University of Cape Town. Her academic studies began in 1966 in Cape Town at UCT. After her marriage in 1967, she settled in Pretoria where she completed her BA degree at UNISA in 1970 (French and English). In 1973 she moved to Johannesburg and joined ArchSoc in 1989, frequently attending meetings and outings. After moving back to Cape Town, she joined the Western Cape Branch in 1994.



Council members, from left to right: Janette Deacon, Tim Maggs, Yvonne Viljoen, the President's Medal recipient, Jean Gray, Antonia Malan, Carole Goeminne, Lyne McLennan, Patricia Groenewald and Nic Wiltshire. Sonia McGregor took the photo.

In 2001 she registered at UCT to complete a major in archaeology. Arising out of the 2022 UCT Field School in Clanwilliam, she commenced research curating the accumulated artefacts from the excavation site. She was awarded an MPhil degree in historical archaeology in 2011 with a thesis on the history and archaeology of a late 19th and early 20th century farm in the Western Cape. A summary, entitled 'A contested Clanwilliam farm: the history and archaeology of Warmhoek 1873–1933', was published in 2014 in the *South African Archaeological Bulletin* 69: 59–71.

OBITUARY

ARCHSOC's longest-standing member Bob Brain dies

You have to have fun with science, Bob Brain would tell colleagues. It was that joy that led him to give science a picture of our ancestors as evolving individuals seeking a technological edge. By 1981, Bob Brain's palaeo whodunnit was ready to be published and it was going to change palaeoanthropology forever.

Bob had studied the wear patterns and breakages on the fossilised bones he had found at the Swartkrans cave in the Cradle of Humankind for a decade and a half. Besides fossils, his study into how bones decay was wide-reaching. He had even carefully observed how captive cheetahs fed, noting the traces their fangs left on the bones. In 1981 Bob revealed his findings in the book, *The Hunters or the Hunted? An introduction to African cave taphonomy*.

The book was the death knell of the Osteodontokeratic hypothesis – the belief that the fossilised bones found in cave sites across the Cradle of Humankind were the implements used by our ancestors to kill and satisfy their 'hyper carnivore' diets. Long bones were clubs and skull caps drinking vessels, this hypothesis by Prof. Raymond Dart suggested. But Bob, through his pioneering work in taphonomy, proved that the bones were the remains of victims that had been taken to the caves by the predators that shared the prehistoric landscape with our earliest ancestors. 'He was one of the founders of the science of taphonomy and a great person,' recalls British anthropologist Prof. Chris Stringer. 'South Africa has lost one of its greatest and most admired scientists.'

Bob died in Pretoria on 6 June 2023 aged 92. Those who knew him remember him as the determined scientist with the eye and resolve of a great detective. 'This is a detective story, but rather an odd one,' is a line Bob used to introduce his book, *The Hunters or the Hunted?* Being a good detective, Bob even compiled a lineup of likely suspects that he suggested feasted on our ancestors all that time ago. They included a long dagger-fanged cat called *Megantereon*, a speedy long-legged hunting hyena, an early lion, a 'false' sabre-toothed cat called *Dinofelis* and the leopard. From the fossil trail, Bob surmised that *Dinofelis* might have evolved into a specialised primate killer, sneaking into caves at night and picking off sleeping hominids. Later he

Bob joined the SA Archaeological Society as a schoolboy in 1947 and remained a member until his death. At 76 years, he holds the record for the longest-standing member. That will be hard to beat, let alone equal!



South African palaeontologist Bob Brain
(photo: Jason L Heaton)

would change his mind and say that the most likely suspect was the leopard.

Charles Kimberlin Bob was born in what was then Salisbury in Southern Rhodesia. From an early age, he was known simply as Bob and had an early introduction to natural history through his father, who was an entomologist, and his mother, a botanist. After matriculating from Pretoria Boys High, he headed to the University of Cape Town to read for a BSc degree with geology and zoology. In 1955 Bob married Laura who was then working as a geologist at the CSIR. For the decades to come she had a hand in the research and experiments. By 1968 Bob was the director of the Transvaal Museum, now the Ditsong National Museum of Natural History, which gave him the opportunity to study the fossils being found in the Cradle of Humankind.

Early use of fire

Several years after the release of *Hunter or the Hunted?* Swartkrans was to be the site of Bob's next big discovery. The excavation of burnt bone and charcoal led the palaeoanthropologist on a quest to see if this was evidence of our ancestors using fire. 'It was so typical of how he operated ... he wasn't just satisfied with the find,' says retired palaeontologist Prof. Bruce Rubidge. 'He sectioned the charcoal and tried to work out at what temperature that wood was burnt.' The fire remains were dated to just over a million years old.

'So, he argued that these fires were not the result of natural grass being burned but were probably a matter of hominins collecting burning branches and bringing them into the cave to ward off predators, especially leopards. The controlled use of fire by *Homo* was an evolutionary advantage,' explains palaeoanthropologist Prof. Francis Thackeray, who

worked with Bob for many years and who gave a young Thackeray his first job as a lab assistant at the Transvaal Museum. Here, Thackeray would see Bob's other talent, that of being a skilled museum exhibits designer at a time when he had to manoeuvre around the apartheid regime's anti-evolutionary beliefs. 'So instead of using the word evolution in the museum exhibition displays, Bob Brain called the exhibitions Life's Genesis One and Two. He didn't use the word evolution whatsoever, but he did have evolutionary trees showing the development and the diversification of animals through that particular exhibition,' says Thackeray.

After he retired, Bob embarked on a new adventure. He would head out into Namibia, alone in a 1400 Nissan bakkie, and collect limestone. Back in Irene, Laura would cut and grind the rock samples into thin sections. Then, using a microscope, Bob would hunt for prehistoric multicellular organisms that lived around 700 million years ago. He was looking for the earliest signs of predation and found what is claimed to be the oldest animal fossil that lived between 760 and 550 million years ago. *Otavia antiqua* was an early sponge-like animal, just millimetres in size.

'So, you know, Bob's legacy will go on because he was a very important personality in science in South Africa,' says Rubidge.

Shaun Smillie, *Daily Maverick*, 8 Jun 2023.
Article has been edited and shortened.

WESTERN CAPE BRANCH PROMOTES MOVIE PREMIERE

An unexpected request from the Blue Route Ster-Kinekor cinema complex manager, Armand van Rhyn, led to ArchSoc's Western Cape Branch organising a display of archaeological material to accompany the mid-2023 launch of the final Indiana Jones IMAX movie, *Indiana Jones and the Dial of Destiny*. The SA Iziko Museums staff, headed by Wendy Black, collaborated to provide displays of ancient Egyptian and Khoisan artefacts in secure cabinets, which movie patrons could view as they walked towards the cinema entrance. Patrons were then treated to a display of 'see and touch' replica skulls and stone tools set up by the University of Cape Town Archaeological Field Club, under the direction of Patricia Groenewald. Volunteer student members were eager to answer questions posed by the patrons. The Ster-Kinekor management expressed appreciation for the ambience created.



Patricia Groenewald (centre left), Armand van Rhyn and students Keane Wanza and Chieh-Ya Ho at the hands-on display table

Lyne McLennan, chairperson: Western Cape Branch

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**, biannual scientific publication of current research in southern Africa.
- ☐ **The Digging Stick**, the Society's general interest magazine – three issues a year.
- ☐ **Goodwin Series**, an occasional publication on a specific field of archaeological interest.

Subscriptions for 2024: South Africa: Ordinary – R390; Joint/Family – R435; Junior members – R255. Africa ordinary – R470; Overseas ordinary – R860. Institutions: Local and African – R790; Overseas – R1 725.

The Digging Stick

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