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MIDDLE STONE AGE CHEMISTS
A 100 000-year-old pigment processing workshop at Blombos Cave

Christopher Stuart Henshilwood and Karen Loise van Niekerk

Our species, *Homo sapiens*, has existed in Africa for over 200 000 years. A key question is when our ancestors began to think in the same way as we do now. In other words, when did they become 'cognitively modern'? For most of 20th century, scientists believed that behaviourally modern humans evolved rapidly at around 40 000 years ago in Europe. This event has been described as the 'Symbolic Explosion' and is associated, among others, with the first known abilities to create jewellery, cave paintings and small statuettes of fertility goddesses. In recent years we have come to understand that the modern mind emerged in a more mosaic-like fashion and that development of body and mind are intertwined. New evidence from Africa and from southern Africa in particular shows that modern cognitive abilities emerged slowly, but that by about 150 000 years ago *Homo sapiens* probably behaved in much the same way that we do now. The idea of the 'Symbolic Explosion' is now all but buried.

Blombos Cave

Findings from Blombos Cave in the southern Cape and other similar sites in southern Africa suggest that the human ability to understand and use symbols was in place by at least 100 000 years ago. Since 1991, we, along with colleagues from several countries and disciplines, have spent thousands of hours working on the ancient, densely-packed sand layers in Blombos Cave. Slowly and cautiously we have dug down and across the cave, in 50 cm x 50 cm quadrates, layer by layer, year by year. The small objects that occasionally appear are of major importance so we cannot afford to be impatient.

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We have found small beads made from marine snail shells, bits of ochre decorated with geometric patterns, polished bone tools and long, narrow leaf-shaped stone tools. These findings are from the so-called Still Bay period, which has provided evidence of advanced craftsmanship that still holds an aesthetic beauty. These items have lain below the sand for over 72 000 years and during the last couple of years these

Fig. 1: Karen van Niekerk removing the in situ abalone shell, a component of Toolkit 1, during excavations at Blombos Cave in 2008 (image: G Moéll Pedersen)

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finds have caused a paradigm shift in archaeology and created international debate. They testify not only to skilled and imaginative artisans, but also to people who used and understood symbols. A symbolically mediated culture can be defined as one in which individuals understand that artefacts are imbued with meaning and that these meanings are construed and depend on collectively shared beliefs.

The beads from the Still Bay layers at Blombos Cave are among the oldest known evidence that humans used objects to adorn themselves (Henshilwood 2004). So far we have found 68 beads, all made of shells from one species of estuarine snail, *Nassarius kraussianus,* which was pierced with a bone tool. Wear patterns on the beads indicate that they may have been strung on a cord and worn as jewellery. In order to make such shell beads people must have been able to drill holes, to use some form of line or string, and probably also to tie knots.

But the most exciting aspect is that they must have had the ability to use symbols. The beads may have been used to show status or group affiliation. Bead users must have understood what the beads communicated to others. A symbol that indicates, for example, group affiliation cannot be effective if no one other than the user or wearer can understand its meaning. Such an understanding can hardly have been created in a society without language. The beads from Blombos therefore indicate that the residents must have used a language in which they created sentences out of words – syntactic language – that was probably similar to the way we use language today.

Fig. 2: Cobble being removed from the Toolkit 1 abalone shell showing the ochre compound within the shell (image: G Moéll Pedersen)

Fig. 3: Haliotis midae (abalone shell) from Toolkit 2 in situ with red ochre staining and ochre covered quartzite grinder resting on shell (image: G Moéll Pedersen)

Red ochre is a common finding in archaeological sites dating to the Middle Stone Age (MSA). This mineral can be ground into powder and mixed with other substances to make a paint that can then be used to decorate objects or skin. Ochre is found in many shades, from dark, earthy colours to faded yellow tones, but bright red ochre pieces are most common, suggesting that this colour was the most popular. In hunting and gathering cultures red is often used to symbolise blood or fertility, and it is possible that the colour was used in a similar way at Blombos.

During the excavations of the Still Bay levels at Blombos in 1999 and 2000 we found two pieces of ochre with engraved patterns (Henshilwood 2002). It is probable that these lines engraved on the ochre meant something. Perhaps they relate to beliefs, perhaps they tell a story. In later years we found a further eight ochre pieces with different geometrical patterns, some that were around 100 000 years old. Some of the patterns in the older levels are similar to those found in the 72 000 year old Still Bay levels, perhaps indicating the continuation of a tradition that began at least 100 000 years ago. This suggests to us that the engraved patterns were not random, but designed to communicate a meaning.

Discovery of the ochre processing toolkits

In 2008, while excavating the lower levels at Blombos Cave dating to about 100 000 years ago, we came across an abalone (*Haliotis midae*) shell with a large flat cobble placed neatly inside (Fig. 1). When we gently lifted the cobble out of the shell, we discovered a red compound on the inside of the shell (Fig. 2). Other material associated with the shell and cobble included seal and antelope bones, stone tools and ochre. We found another abalone shell in the same layer, approximately 16 cm to the west of the first one. This shell was broken post-depositionally, but a bright red residue was clearly visible on the nacre of the inner surface and a small ochre-stained quartzite core lay on the shell close to the anterior end (Fig. 3). By then we knew that we had come across something quite extraordinary, and that the shells and associated artefacts probably represented two 'tool kits'. We photographed and recorded the positions of each of the artefacts in three dimensions before carefully wrapping them up for analyses in the laboratory.

Later we applied a number of techniques during our analyses of the artefacts in laboratories of the universities of Cape Town, Witwatersrand and Bordeaux, and the Louvre Museum in Paris. Macroscopic, microscopic, petrographic, mineralogical and elemental analysis of the finds confirmed our thoughts that these individual items were in fact parts of a whole. We had found the elements of two toolkits that these ancient people had brought to the cave so long ago. The quartz sediments that had covered and buried the toolkits were dated to about 100 000 years using optically stimulated luminescence dating. This result is consistent with the thermoluminescence dating of burnt lithics from the site and the uranium-series dating of calcium carbonate concretions on which one of the abalone shells rested.

The first toolkit (Tk1) consists of an abalone shell with artefacts situated above and below it (Fig. 4). The quartzite cobble that fitted within the shell aperture is stained with red ochre and encrusted with trabecular (spongy) bone fragments. It has use-wear marks consistent with its application as a hammer-stone and grinder. A small piece of rubbed red ochre was found on the inner lip of the shell and an ochre-stained quartzite fragment was adhering to it.

The red compound within the shell consisted of microflakes and chips of two types of ochre, fragments of crushed spongy bone, once rich in fat and marrow,

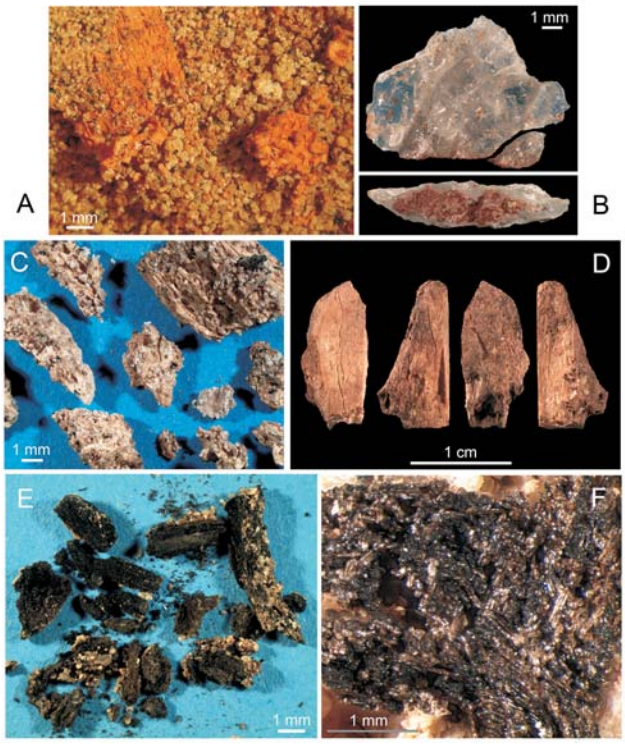

Fig. 5: A – bone fragments inside the spire of Haliotis midae Tk1-S1; B – micro-flake detached from a quartz grinder during pigment crushing; note the ochre powder covering the remainder of the functional surface; C – crushed fragments of spongy bone contained in the Haliotis midae deposit; D – fragment of partially burnt compact bone with traces of crushing; E – charcoal fragments; and F – burnt vegetal material
(images: F d'Errico and C Henshilwood)

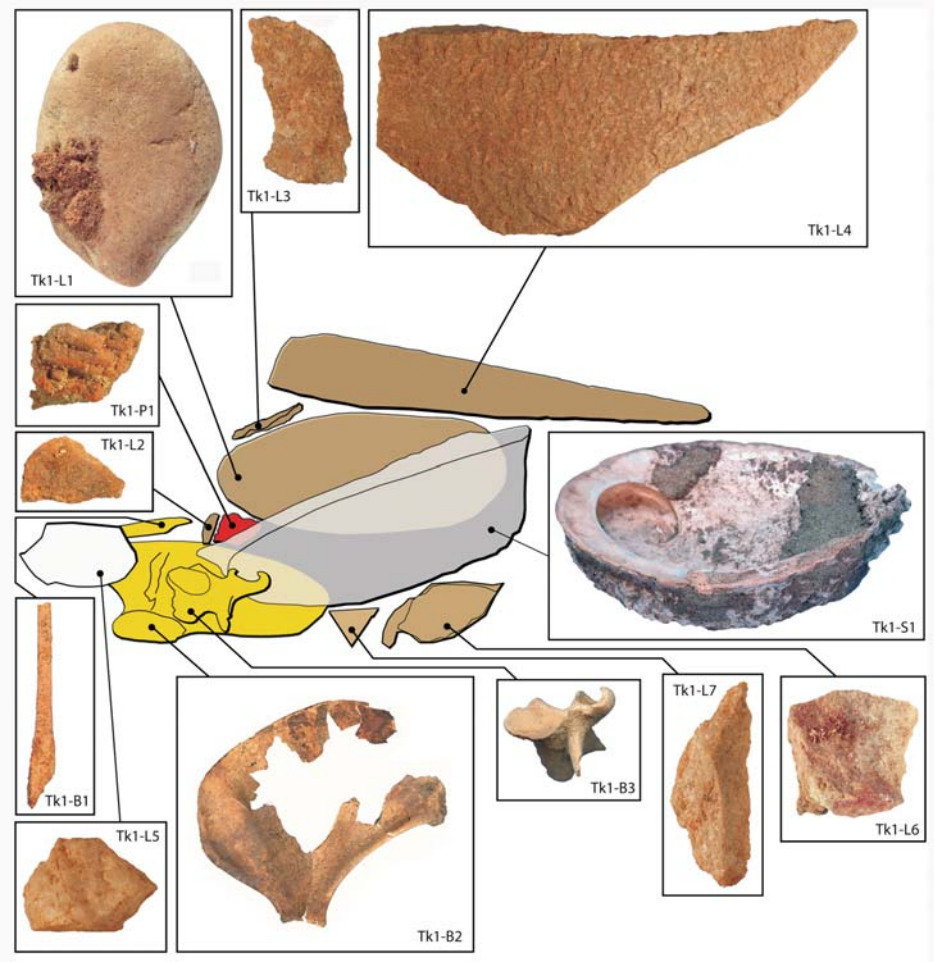

Fig. 4: Artefacts making up Toolkit 1 and their relative spatial locations (image: C Henshilwood and F d'Errico)
(images: F d'Errico and C Henshilwood)

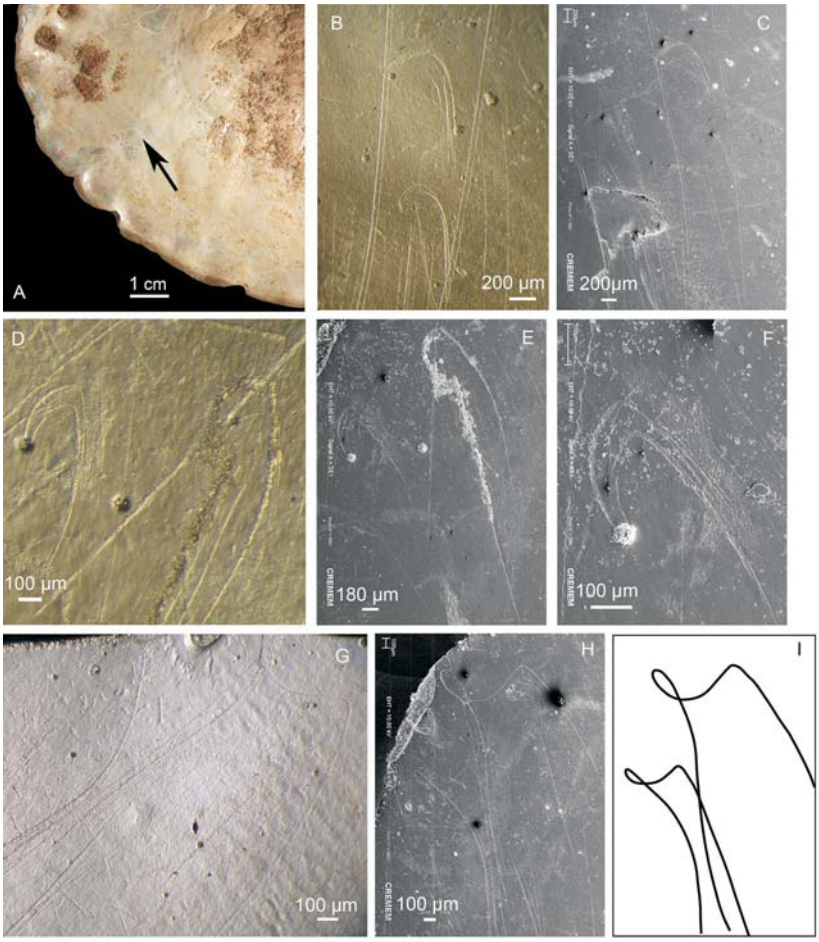

Fig. 6: Microscopic striations on the nacre of Haliotis midae Tk2-S1. These are interpreted as resulting from mixing a pigment that contained some abrasive particles using the tips of fingers. A indicates the location of the striated area. B, E, F & G: transmitted light and SEM photos of three groups of striations. B, C & D, E show similar hook-shaped composite striations produced on the nacre by changing the direction, with a fingertip, of the abrasive particles and then stopping the action; micro-concretions partially obliterating the right striation in D, E confirm its antiquity. F, a close-up view of the left striation in D, E shows an abrasive particle encrusted at the end of its trajectory. G, H, I are loop-shaped striations produced by abrasive particles indicating there was a to-and-fro motion while mixing the pigment.
(Images: F d'Errico and C Henshilwood)

some of which were burnt, and crushed compact bone (Fig. 5). The compound also contained charcoal fragments, quartz and quartzite micro-flakes with ochre on some of the striking platforms, and quartz grains that were coated with ochre powder and in some instances with a micrite (recrystallised 'lime mud') containing hematite, illite/muscovite, quartz and calcium phosphate. Khaki-coloured sand covered the red layer. This sand consists of quartz grains, glauconitic grains, vertebrate microfauna remains, marine gastropods, ostracods, foraminifera, urchin spines, lamellibranches and calcitic worm tubes from annelids. In other words, the sand covering the red layer is distinctly different to the red layer itself. Below the red layer and within the shell an orange ring stain residue consisting of calcium phosphate mixed with traces of ochre and calcite was visible. The ring stain indicates that a liquid was in the container.

Another quartzite flake with ochre on the striking platform lay above the cobble. Below the shell the distal portion of a canid (carnivore) ulna with ochre residue on the tip, a seal scapula with spots of red ochre on it, a quartz flake with red ochre residues and a broken bovid vertebra were found. Two additional quartzite flakes, one covered with ochre powder on the striking platform and the other with ochre on the cortical face, suggesting its use as a grinder, were found below the abalone shell.

The second toolkit (Tk2) consists of an abalone shell with red compound on the nacre of the inside of the shell and a small quartzite core resting on the shell's edge. The core had been used to process two different types of pigment, one red and one yellow. A large fragment of ochre, which had been knapped to produce small flakes and had been rubbed against a hard stone to produce powder, lay 5 cm south-west of the shell. Analysis of the red compound in this shell indicated that it was similar to that found in the other shell, but without the one type of ochre, and with the inclusion of some silcrete grains that probably originate from a grindstone. Fine striations were visible on the nacre inside the shell, which were probably produced when ochre or quartz grains were moved across the surface during mixing of the compound, almost certainly with a finger (Fig. 6). We can see that this action was repeated over and over again, with a little swirl at the end.

Discussion

What these findings tell us is that the artisans who lived in Blombos Cave 100 000 years ago had the capacity for abstract thought, multitasking, long-term planning and an elementary knowledge of chemistry. Evidence for the complexity of the task includes the procurement and combination of raw materials from various sources (implying they had a mental template of the procedure they would follow), and the use of pyrotechnology to facilitate fat extraction, a probable recipe to produce the compound and shell containers for mixing and storage for later use. The only other known evidence of storage containers in the MSA is from Diepkloof Cave on the west coast of South Africa, where researchers found ostrich eggs with small holes made in them. The age of these ostrich egg-shell containers is 40 000 years younger than the Blombos finds. Nowhere else in the world do we have any evidence of container use prior to those used at Blombos.

The remains of the substances we found in the shells and on the tools at Blombos conform with the ingredients that would likely form the basis for a liquid ochre mixture – essentially a pigmented paint. The components included ochre powder and small crushed pieces of ochre, fatty crushed bone that acted as a binder, charcoal, quartz grains and an unknown liquid. We also know that a c. 6 cm long spatula, made from a canid ulna, was used to transfer small quantities of this liquid out of one abalone container. This tool could have acted as paintbrush or palette knife to place pigment perhaps on human skin or on an artefact. It is also possible that this compound was used as an adhesive in hafting, but we found no evidence of any gum-like substance and the paint theory thus seems more likely.

The evidence we can see at Blombos suggests this was a one-time workshop used perhaps for a day or two and then abandoned. We say this because within this stratigraphic level there are very few artefacts that are not related to the toolkits and almost no food waste. It seems the site was abandoned shortly after the toolkits were used and dune sand then blew into the site and encapsulated them. It is possible that the site was only again occupied months or years later as there is no evidence of damage to the toolkits caused by later trampling; in other words, the sand that covered the toolkits was already quite thick and acted as a protective mantle when new inhabitants arrived.

In the past few seasons of excavation we have recovered evidence for several more ochre processing tools in the slightly younger layers above the two toolkits. We have yet to study these in detail but our preliminary findings suggest there is much excitement ahead as we slowly piece together the individual components, and perhaps discover new toolkits, that will add to our understanding of the technological and cognitive brilliance of our own species 100 000 years ago.

One of the toolkits is currently on display at Iziko Museums of South Africa in Cape Town. Further information on our website: http://tracsymbols.eu.

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‘GRAINS NOT BEHAVING WELL’ AND SOME OTHER ISSUES
SASQUA 2012 biennial meetings, Gobabeb, Namibia

Christine Sievers

Celebrating 50 years of Namib Desert Research at Gobabeb, the South African Association of Geomorphologists (SAAG) and the South African Society for Quaternary Research (SASQUA) biennial meetings were held at the Gobabeb Research and Training Centre, 120 km inland of Walvis Bay, from 13 to 16 September 2012. The centre is situated on the Kuiseb River at the point where the dune sands to the south and the gravel plains to the north meet (Fig. 1). Here one also finds the westerly extent of the rainfall zone and the easterly extent of the thick fog that rises and flows inland from Namibia’s Atlantic coast. This extraordinary nexus has produced astonishing flora and fauna that have been the focus of research for half a century under the leadership of the legendary Dr Mary Seely.

Fig. 1: The Kuiseb River separates the dunes to the south and the gravel plains to the north

In the Namib dunefield there are least 295 animal species, of which 156 (53 per cent) are endemic, and 16 plants species, eight of them endemic (Fig. 2). These figures equal those of the Galapagos Islands and are reason enough to hope for success in an application to have the Namib Sand Sea declared a World Heritage Site. More than 100 post-graduate dissertations and over a thousand other publications have been generated by research in the area. Apart from descriptions of the endemics, and the adaptations and interactions in this unique ecosystem, the collection of data over the last 50 years is immensely valuable in showing the great climatic and related variability that has occurred here over the decades.

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Fig. 2: An endemic grass of the Namib dunefield, Stipagrosis sabulicola*, on a foggy morning*

For example, the recorded foraging distance travelled by the sand-swimming Golden Mole (Fig. 3) has varied from 230 m to an astonishing 1 390 m.

Since Namibia’s independence in 1990, the centre has added education as a major component and has made substantial contributions to solving pressing human issues such as the management of scarce water resources. As one delegate to the SASQUA conference put it, people have been ‘living on the edge’ in the Namib for many millennia. Relevant research and the dissemination of information, particularly to those in positions of power, has contributed greatly to a better understanding of the issues involved and sustainability in this arid environment.

The conference – much to think about

The 30 papers and 19 posters presented at the SASQUA conference covered a broad spectrum of topics, techniques and geographical spread. Taken out of context, the implications of some quotes are intriguing: ’oolites at Poachers Point’ and ’grains not behaving well’ had to do with a discussion on megafans and dating respectively, and ’I wouldn’t pay much attention to wobble’ referred to changes in vegetation and MSA (Middle Stone Age) stone-artefact technology at Klein Kliphuis Rock Shelter. Changed conditions and human responses to these were also illustrated by the distribution of more than 600 radiocarbon dates from archaeological sites in the Namib Desert. The patterns differed in the winter rainfall area in the south and the summer rainfall area in the north, and responses to negative trends were marked and more rapid than responses to improving conditions. The effect of changing conditions is often considered,

but, as another delegate pointed out, a case can also be made for the impact of climatic *variability* on human behaviour and adaptations.

Naturally, weather patterns and climate were under the spotlight at a conference titled *Understanding Quaternary Change: Southern Hemisphere Perspectives.* Phrases bandied about varied from 'A hazy shade of winter', dealing with the influence of climatic changes on foraging behaviour in the MSA, to 'How wet is wet?', which had reference to research on the Boteti, an endoreic river (a river with no outflow). Detailed and decades' worth of scouring early travellers' descriptions of weather, converting the information into a grading system and plotting the results across a grid map of the African continent illustrated 200 years of rainfall variability and the extent of heavy droughts in the early 1800s.

Fig. 3: The route of the sand-swimming endemic Golden mole (courtesy M Bamford)

Environmental proxies

A range of other environmental proxies were presented, such as a) fossilised wood from Koobi Fora in Tanzania, charcoal from the MSA layers at Sibudu Cave, and fresh tree ring records from baobabs up to 1 000 years old, with annual rings that can be peeled off with a spatula; b) pollen, particularly from hyrax middens, but also from peat lands, coastal and high-altitude wetlands and hyena scats ('in the poo or out?'); c) diatoms; d) molluscs; and e) phytoliths, silica bodies that remain after plants are burned or decay. Specific shapes and combinations of shapes can be used to identify plant taxa, but often only to family level. Certain taxa are considered characteristic of particular conditions, thus the presence of *Aristida* (grass) phytoliths is taken to indicate arid environments.

The characteristic biochemical pathways, C_3, C_4 and CAM (Crassulacean acid metabolism) refer to the fixation of carbon during photosynthesis by different plant groups and are indicators of environmental conditions. Generally interpretations are made on the basis of the predominance of C_3 or C_4 plants (for example, C_3 grasses occur high in the uKhahlamba-Drakensberg and variation in C_3 and C_4 grasses/plants in archaeological contexts there is used to document environmental change). Evidence provided at SASQUA 2012 indicated that the CAM values overlap with those of both C_3 and C_4 – the delegate stressed that 'we cannot ignore CAM'.

Another interesting plant-based environmental proxy that was explored was the analysis of leaf wax lipids. Long *n*-alkane chain-length distributions can be used to distinguish broadly between biomes and the quote, 'if it gets drier I need to seal myself up more', describes the adaptations made by plants with respect to wax on and within their cuticle or surface covering. The question, 'has anyone ever tried making an experimental soup of alkanes?', presumably referred to the many issues surrounding the proxy and its potential, rather than a pre-occupation with diet. With respect to leaf wax lipids within hyrax middens, the following seemingly bizarre, but quite informative statement was made: 'We don't think hyraxes were urinating waxes'.

As for other animals, the distribution of bones at a brown hyena den in the lower Uniab River had interesting taphonomic implications. Species represented in the hyena diet were seal, whale, oryx, ostrich, springbok, jackal and hyena pups (drowned when the site was flooded). Seal bones were brought from the seashore 4,5 km away and the hyena were also foraging 11 km to 12 km up and down the beach. A study of larger animals, specifically extinct megaherbivore fauna, was made through analysis of the phytoliths in their dental calculus. This has potential for suggesting their diets and past environments.

Fig. 4: The vegetation-fringed Kuiseb River, and the rising sun penetrating the thick early morning fog. Gobabeb Research and Training Centre is to the lower left, out of the picture.

Chronology is a major factor for consideration when comparing proxy records. Age calculations using carbon dating, U-series dating of speleothems and various studies on Optically Stimulated Luminescence (OSL) received attention. We heard about the

age of silcrete formation and of dunes as far apart as the Kalahari and the sterile post-Still Bay layer at Blombos Cave in the southern Cape. Apart from lack of chronological precision, different scales of proxy evidence make comparisons difficult. However, 'there are not good or bad data sets per se … each *analysed appropriately* has a contribution to make in respective temporal and spatial domains'.

Palaeosols, long-term ecosystem dynamics and anthropogenic processes, dune generations and interdigitated aeolian and water-lain interdune deposits, marine geophysics and geological modelling were all discussed. A superbly composed presentation on the sedimentary dynamics and depositional controls of the Hout Bay area near Cape Town illustrated how development of the headland from Hout Bay to Sandy Bay has reduced open areas by 96 per cent since 1930. Because this is the source of sand for beaches such as Clifton, there will, in time, be a serious lack of sand on Cape Town's famous Atlantic seaboard.

Dunes, sunsets, *Welwitchias* and more

Certainly, there is no lack of sand in the Gobabeb area and, sensibly, the conference sessions were broken by two free afternoons enabling delegates to explore the fascinating and varied landscape around the research centre. No visit to Gobabeb is complete without a dawn witnessed from Station Dune (Fig. 4). The few who tried this climb after the first morning were greeted by thick mist and returned soaked but elated, in spite of not seeing the sun rise. The energetic climbed High Dune (an understatement) at sunset and were rewarded with unparalleled sunset vistas. Another afternoon excursion was to see the sunset at Homeb, with a view of the deep green Kuiseb canyon and a glimpse of the conditions in Henno Martin's *Sheltering Desert*.

While most delegates could not resist a trip to view the ancient and fascinating *Welwitschia* plants (Fig. 5), a few die-hard archaeologists went to explore Mirabib Shelter (Fig. 6) and were richly rewarded with the discovery of a wealth of stone artefacts (some crystal-quartz worked pieces elicited groans of delight), a copper bead, pottery including a lug and some faded rock art. The site is famous for an early date for sheep and there was appropriate appreciation of the thickness of the preserved dung layer. The Kuiseb River and surrounds is still home to pastoralists and energetic goats belonging to the local Topnaar people passed by the Gobabeb camp periodically. Mournful donkeys could be heard occasionally, as well as jackals. The barking geckos, with barks reminiscent of bird calls, were heard at night. At times the delegates were also quite vocal, but the campground with comfortable tents and stretchers was distant enough from the communal area for others to sleep well, even though a single powerful solo, duets and sometimes trios of snores carried clearly across the still desert night.

Fig. 5: Fascinating Welwitschia *plants (courtesy M Bamford)*

Fig 6: View from Mirabib shelter, with distinguished delegates discussing the dung layer

Our group ranged in age from eight months to over 80 years and everyone appeared to be making the most of the opportunities provided. Satisfied bellies contributed much to the enjoyment and the excellent fare, particularly the homemade rusks and biscuits, were fully appreciated. But the real meat of the conference was the variety of disciplines brought together by delegates from across the world, providing insights on various aspects of the past, contributing to a richer, fuller picture of ancient and less ancient times, and stimulating further research and connections through serious discussions late into the night.

Acknowledgements

The conference booklet included three obituaries, and here too acknowledgement is made of the role of SASQUA stalwarts who have passed away since the last SASQUA conference: Hilary Deacon, Tim Partridge and John Vogel all made huge contributions to Quaternary Studies and their legacy lives on. With regard to SASQUA 2012, I thank Prof Lyn Wadley for sponsoring my participation and extend thanks to everyone for the interesting presentations, posters and discussions, to the organisers of the SASQUA conference, to the staff at Gobabeb and to those delegates who commented on what I say they have said.

COLLECTION MANAGEMENT AT WITS

Ndukuyakhe Ndlovu

As archaeologists we aim to learn about the past. One of the means of doing so is through the analysis of archaeological collections. This, therefore, puts the management of archaeological collections at the centre of our daily activities. Work does not stop once an excavation has ended. At that point we are only at the beginning of our quest to interrogate events of the past.

In recognition of the important need to coordinate the management of its rich archaeological collection, the division of archaeology of the School of Geography, Archaeology, and Environmental Studies (GAES) at the University of the Witwatersrand has appointed a permanent manager to oversee the process. Prior to this, two students had acted on a part-time basis in this position. These were Nkosinathi Tomose and Justin du Piesanie, and it is appropriate to acknowledge the significant contribution they made in this role. Under their watchful eye a great quantity of artefacts were moved from the Van Riet Lowe Building (now the Palaeosciences Building) to the department's new home, the Origins Centre. Since my appointment over a year ago, this is an opportune moment to reflect on progress made and to provide an insight into future plans.

The problem of space

Collections management at Wits must be considered within the situation pertaining to archaeological collections in the country. One of the challenges of any collections manager is space. In South Africa museums and universities have very limited space to keep archaeological material in a proper condition. Adding to the problem of space is the fact that a fair amount of archaeological collections were collected decades ago when the issue of stratigraphy was not particularly significant. We therefore have a situation that a part of our collection has no context significant enough to be adequately studied. It is also a reality that in the past archaeologists from various institutions exchanged artefacts and that parts of collections are now situated at different museums and universities.

The problem with space is exacerbated by the fact that universities have not stopped their archaeological research activities. Academic excavations have sometimes taken place without coordinated efforts being made to study the archaeological collections that already exist in storerooms. There are various reasons for this, and their discussion falls outside the scope of this paper, but the lack of analysis and non-publication of material already in storerooms is one of the biggest challenges for archaeological collection managers. The situation has been compounded by the enactment of the National Heritage Resources Act (NHRA) in 1999. While contract archaeology was first legalised under the Environmental Conservation Act (ECA) in 1989, the enactment of the NHRA led to an exponential increase in the number of impact assessments conducted prior to approval of proposed developments. Both academic and mitigation or rescue excavations have had a significant negative impact in the proactive management of archaeological collections.

We should not make the mistake of thinking that the lack of appropriate space to keep archaeological collections applies to South Africa only. Spatial challenges in the management of archaeological collections are equally applicable on the African continent and elsewhere in the world. The growth of archaeological collections has led to questions about the level of excavations being undertaken. To highlight the issue of continued excavation on the shortage of storage space, *Archaeological Dialogues* 8(1): June 2011 dedicated a whole issue to the role of excavation in the 21st century. While the issues of space will always feature in the daily life of any collections manager, we need to look beyond this difficulty in order to usher in a new era in the management of archaeological collections.

Proper standards

Besides focusing our energies on debates about the need to continue the vast number of excavations, whether there is adequate space and the many other challenges we face, it is equally important for collection managers to establish adequate general operating standards. Proper standards will ensure that rather than having 'dead storerooms', we have lively research areas with material that is extensively used for research and teaching purposes. I am of the opinion that this is one of the strong points from which to argue for an increase in storage space. I see no point in pushing for extra space when we cannot illustrate the usefulness of the materials being stored.

Collections managers must resist the temptation to become 'door keepers' of archaeological material 'thrown' in whatever condition into their storerooms. Amongst other things, instituting clearly defined policies means that we can begin to account for the significance of each and every box, find any part of the

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collection 'at the drop of the pen', and create reasonably clean environments that are welcoming to potential researchers and students. I am of the view that once we have clear operating standards, our material will become easily accessible, which currently is not always the case.

As a direct benefit, we could begin to see an increased interest in the study of collections, bringing life to 'dead storerooms'. Once research activity increases we will have a stronger argument for increased storage space. Some may argue they are already practicing this, but have they seen a substantial increase in the requests for access to archaeological material from either researchers or students? If not, where are we failing them? And how do we provide valid statements for the significance of our presence? It is on this basis that I have taken over the enormous task of turning things round at Wits.

Responsibility for collections

The Bernard Price Institute for Palaeontological Research curates hominid and other fossils, which are currently kept at the School of Anatomical Sciences under the curatorship of Dr Bernard Zipfel. However, in cases where a single site produces fossils as well as archaeological artefacts, such as at Sterkfontein, they are curated in the GAES collection. The archaeological collection I am responsible for does not include modern human remains. These are kept at the School of Anatomical Sciences under the curatorship of Brendon Billings.

My main strategic objective is to ensure that we have well-managed archaeological collections that are easily accessible for study. To attain this objective, I will be guided by the following vision and mission statements:

Vision: 'To be amongst the leading departments in the management of archaeological collections to ensure optimum utilisation as "windows" into our rich past.'

Mission: 'To apply highest possible standards in managing the archaeological collection, while also ensuring its effective utilisation by creating an enabling environment where researchers and students are able to work with relative ease.'

Over a period of three years I wish to achieve four aims that are central to creating an environment in which the vision and the mission can be attained. These are addressed below.

Properly archived archaeological material and the relevant documentation

Because Wits Archaeology previously did not have a fulltime collections manager, its efforts to look after the full archaeological collection properly were not well coordinated. In addition, the department moved from the Van Riet Lowe Building, where it had been based since 1990, to the Origins Centre. Both these factors resulted in the management of Wits' archaeological collection lagging behind the minimum standards required for dealing with a rich southern African cultural heritage.

With the valuable support of student assistants I am engaged in turnaround strategies. The first phase involves the process of removing from the shelves over 5 000 archaeological collection boxes and reshelving them appropriately. Attention is being paid to ensuring that every box is shelved where it should be, namely with material from the same site. When this process has been finalised, archaeological collections will be easily found when needed.

Above: Work in progress – sorting the archival collection in the Map Room

Left: Reorganising the archival collection

Ensure that all our archaeological material is properly labelled

This is a significant element for any archaeological collections manager. When dealing with over 10 000 archaeological boxes, as in our case, memory is not amongst the best things to rely on. It is thus not only necessary for each and every archaeological box to be appropriately shelved, but it has to have a label that is legible and will survive for an extended period. The labelling of all boxes will form a second phase of my work.

Create policies under which archaeological collections are managed

All organisations operate under guiding policies and an operating framework. Collections management at Wits is no different. I am in the process of developing a number of policies to ensure that every student or researcher dealing with the collection does so within the framework of approved policies. These policies will cover the procedures to be followed when taking

in new archaeological collections, ensure that we have a secure and safe environment for the archaeological collection, and regulate the process to be followed when loans of archaeological collections are approved. The policies are crucial to ensure that all parties concerned have a fully beneficial relationship.

Create an interest in collections management
It is my goal to ensure that the teaching of collections management is adequately incorporated in Wits' curricula. I strongly believe that this will create an interest among some students to follow a career in the management of archaeological collections. We cannot expect collections managers to mushroom from somewhere when we have not put in the necessary effort to ensure that we have individuals capable of taking on this role. Currently the general perception of a collections manager is someone stuck in a dusty corner looking after hundreds of boxes, with little interest beyond that. We need to change this unfortunate perception that has its roots in the unintended positioning of a career in academia as the only important contribution an archaeologist can make. If we successfully create an interest in a career in collections management we would eliminate the current struggle to find interns or appointing well-trained and experienced collections managers.

Achievements to date
Since my appointment, a number of milestones have been achieved, among them the following:

- Material previously housed at the garage in the Palaeosciences Building was moved to a new store-room in the same building by the end of December 2011.
- Good progress has been made with the reorganisation of the archival collection to ensure that we have knowledge of all the documents and publications in our records (see photos on page 11).
- The archaeological collections housed at Origins Centre have been completely reorganised and shelved appropriately.

Conclusion
The tremendous support that I have received thus far from colleagues and student assistants must not go unrecognised. Without this the achievements to date would not have been possible. It seems highly likely that within the next two years collections management at Wits will have taken a significant leap into a new world, a world that will have storerooms that provide optimum care for the archaeological material I have been tasked to manage.

WORLD ARCHAEOLOGY

Denisova cave girl gives up DNA
The DNA of a Denisovan cave girl who lived about 80 000 years ago has been analysed in remarkable detail. The picture of her genome is as accurate as that of modern day human genomes and shows that she had brown eyes, hair and skin. The research in *Science* also sheds new light on the genetic differences between modern humans and their closest extinct relatives. The cave dweller was a cousin of the Neanderthals. Both groups died out about 30 000 years ago, but have left their mark in the gene pool of modern people.

The Denisovans have mysterious origins. They appear to have left little behind for palaeontologists save a tiny finger bone and a wisdom tooth found in Siberia's Denisova cave in 2010, although some researchers have proposed a link with human fossils from China. Svante Paabo of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, believed it might belong to an early modern human, but the results came as a surprise. DNA analysis revealed a human who was the first of a new group of ancient humans. The detailed genetic analysis shows that about three per cent of the genomes of people living today in Papua New Guinea come from Denisovans, with a trace of their DNA lingering in the Han and Dai people from mainland China.

BBC News, 31/8/2012

Discussion

MEGAMIDDENS

Antonieta Jerardino

Megamiddens have featured to a considerable extent in recent issues of *The Digging Stick*. In this discussion I wish to comment on Gareth Angelbeck's (2012) and John Parkington's (2012) contributions. I am not the first one to work on west coast megamiddens (see Buchanan 1988), but I have knowledge of such large sites based on intensive fieldwork and extensive laboratory analyses, and familiarity with relevant literature from South Africa and elsewhere. I will briefly describe the history of research into these sites in response to Angelbeck, before addressing Parkington's comments.

What are megamiddens?

The term megamidden was coined 30 years ago by John Parkington (Parkington 1976). Subsequently, the work of Mike Taylor, Bill Buchanan (1988), Royden Yates with the help of Dave Halkett and Tony Manhire (Yates 1989), myself in collaboration with Yates and students (Jerardino and Yates 1997, Jerardino 2010, 2012), and Jonathan Kaplan (Kaplan 1994) revealed the following:

- All megamiddens in the Elands Bay and Lamberts Bay areas date to 3000-2000 BP, with two in the latter area having lenses aged ~3200 BP.
- The middens are located immediately behind rocky points or platforms.
- Freshwater sources are not far from the middens (Fig. 1).
- Some megamiddens are 1,8 m to 2 m deep, others have material about 1 m thick, and a few have depths of about 0,5 m.

All megamiddens are vegetated to various degrees and their present surfaces are relatively even or undulating. Some have been severely impacted by human activity. Their stratigraphic profiles vary considerably. One comprises nearly solid shell, while most others have shell horizons showing different levels of density and compaction, as well as differences in charcoal and sediment content. Black mussels (*Choromytilus meridionalis*) dominate the mollusc contents of these sites, with limpets and whelks making smaller but important contributions between about 3000 and 2700 BP.

Similar-sized shell middens dating to the same millennium have been reported further south from Elands Bay at Paternoster (Smith, 2006: 56-57; Yates, 2004). Yates in particular reports on the presence of abundant cultural and vertebrate material, a human burial and large quantities of marine shell. Soon after Yates' report, Peter Nilssen undertook months-long contract work at the Paternoster megamidden. In 2006 the Western Cape Provincial Heritage Agency declared part of this megamidden and another one known as Mike Taylor's Midden just south of Elands Bay (Jerardino & Yates 1997) as Provincial Heritage sites.

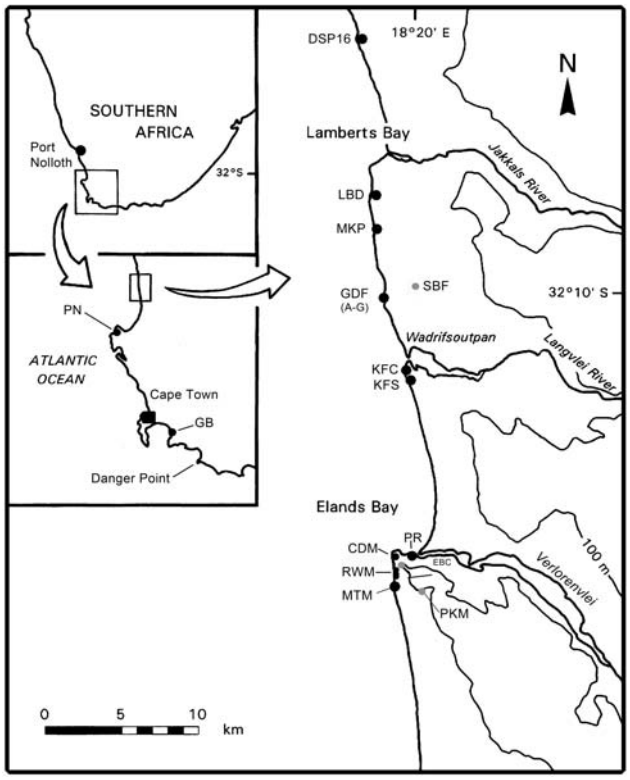

Fig. 1: Map of known megamidden sites (black dots) and other sites (grey dots) along the west coast of South Africa: CDM – Cape Deseada Midden; DSP16 – Deurspring; EBC – Elands Bay Cave; GB – Gordon's Bay; GDF (A–G) – Grootrif sites; KFC – Kreefbaai C; KFS – Kreefbaai South; LBD – Lamberts Bay Dump; PKM – Pancho's Kitchen Midden; PN - Paternoster; PR – Public Resort; RWM – Railway Midden; MKP – Malkoppan; MTM – Mike Taylor's Midden; SBF – Steenbokfontein.

Extensive research by the University of Cape Town's Archaeological Contracts Office (ACO) north of the Olifants River and along the coastal diamond fields has revealed no obvious evidence of megamiddens, but indicated the existence of numerous smaller shell middens. Interestingly, when I visited Port Nolloth with archaeologists Mary Leslie, Sarah Wurz and David

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Morris in March 2006 we came across a ~600 m x 200 m area covered almost completely by relatively shallow, limpet-dominated shell middens (Fig. 2a). These overlapping and semi-continuous middens were situated immediately behind kilometre-long rocky platforms north of a development within the Kaikai Richtersveld Residential Coastal Reserve. Some of the middens at the southern end had been destroyed by the development.

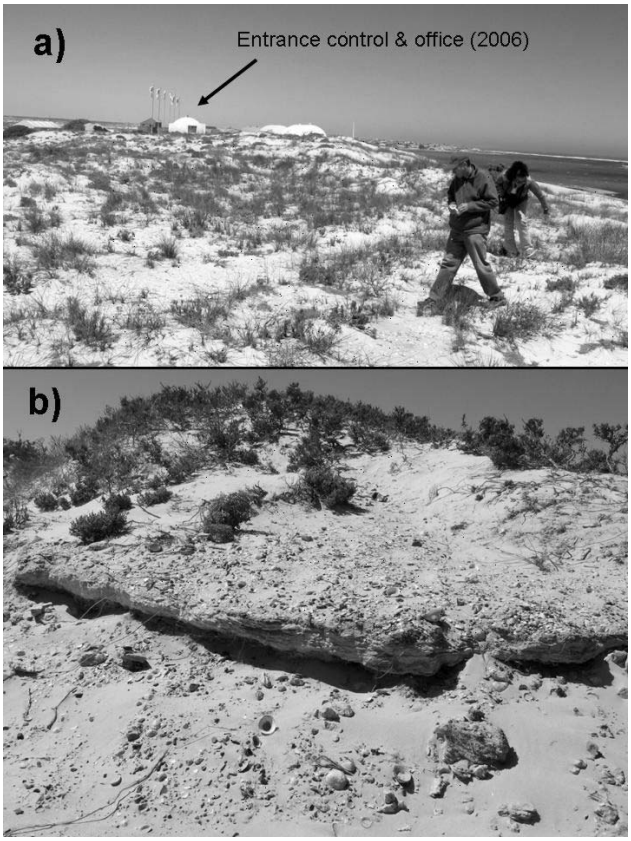

Fig. 2: An extensive shell midden at Port Nolloth: a) view from north during 2006 visit and b) intact stratum of shell on eastern flank of coastal dune; see shells for scale.

Morris called this vast site a megamidden, but I was not sure that this was the case given its relatively shallow depth and the absence of radiocarbon dates (Fig. 2b). To my knowledge, this site has not been sampled despite continuing housing development on the site. Recently, Webley and Orton (2010) excavated a shell midden ~70 m long, 30 m wide and 0,1 to 0,2 m deep next to a large salt pan about 2 km north of the Kaikai development and obtained a megamidden-period date. If systematic excavations were to be done in the Kaikai middens and similar dates were established, the middens could be considered a northerly expression of the more studied large middens to the south.

No megamidden has been observed between Paternoster and Cape Town. Except for a possible one in Gordon's Bay (Van Noten 1974), there is just one very large site to the south-east of the city, apparently of substantial depth and dominated by abalone and limpet shells, in the vicinity of Danger Point near Gansbaai (Fig. 3) (personal observation in the company of Graham Avery, February 2006). A thick kelp forest surrounds this rocky point, which surely helped to sustain a high biomass of molluscs. This massive, largely vegetated site is surrounded by extensive rocky platforms. I have no knowledge of any associated radiocarbon dates, but Jonathan Kaplan did some contract work near the abalone nursery in 2004. Much archaeological work has been done on the south and east coast, but no site with a continuous and vast surface extension and depth of at least 0.5 m has yet been reported east of Danger Point. It appears that megamiddens are essentially a west coast phenomenon.

This makes sense in terms of marine biological studies. The biomass of west coast biological communities is on average significantly greater than that of the south coast and along the Eastern Cape. This is explained directly by the existence of kelp forests (sub-tidal primary producers) that support a high biomass of filter feeders, e.g. mussels, grazers such as limpets, and anything that feeds on and above it (Cape rock lobster, fish, seals and humans) (Bustamante and Branch 1996). Kelp forests are found from just west of Cape Agulhas to northern Namibia.

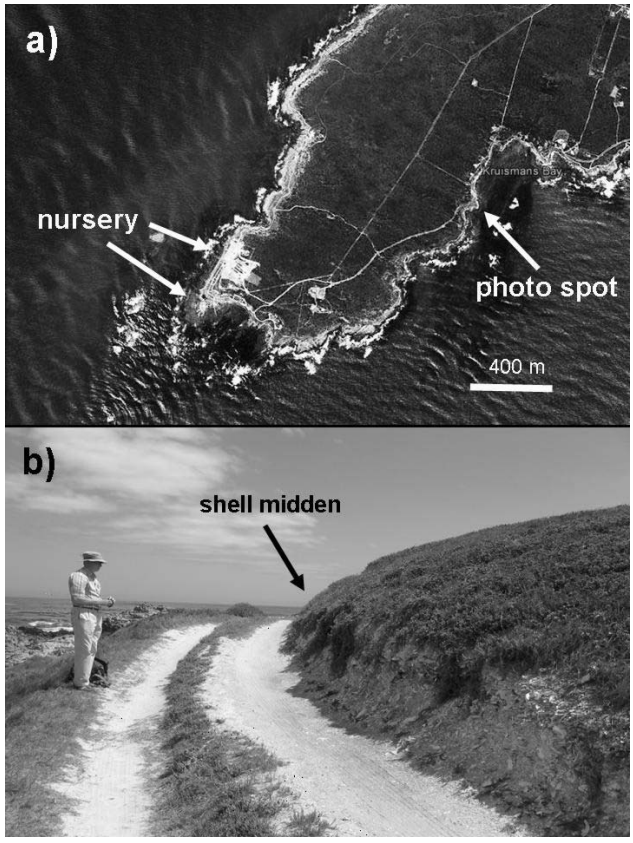

Fig. 3: Large midden at Danger Point: a) Google Earth aerial photograph of 11 November 2006 and b) site section next to dirt road with Graham Avery to the left

Response to Gareth Angelbeck

Megamiddens are generally very large shell middens (12 000 m^2) of varying depth and content with relatively even or somewhat undulating surfaces, which, most importantly, date to between 3000 and 2000 years ago. Angelbeck's photographs of Mouth Point and Mazeppa Bay islet show heaped sites, the sizes of which are difficult to estimate from the pictures. In my opinion, there are alternative explanations for these sites. They could, for example, relate to titanium prospecting at nearby beaches to estimate ore potential (Angelbeck notes that local beach sands are rich in this metal). Prospecting and mining often create large heaps of sediment. When this occurs close to the coast it can remove old fossil-beach material that can be confused with shell-bearing archaeological deposits. As for Black Beach midden, it is a small site and for this reason it is unlikely to be a megamidden. Only systematic surface examination and excavation, if needed, might shed light on its unique location high on a pillar of rock.

Response to John Parkington

The fact that Parkington found little positive to say about my short paper on a little known megamidden called Kreefbaai South (*The Digging Stick* 28(2), August 2011) might stem from our historically different views, but I suspect it has more to do with the fact that I indirectly questioned his interpretations of the megamidden archaeology of the Elands Bay and Lamberts Bay areas. My research is characterised by the use of *various lines of evidence* to explain the appearance of megamiddens. This involves a diverse array of quantified and well-dated material evidence from a range of coastal sites, which not only includes megamiddens.

In contrast, Parkington's attitude misrepresents my work by selective reading of some of my original statements. When contesting them, he sets up a 'straw man' by simplistically focusing solely on megamiddens, using only a particular set of observations from San ethnography and ignoring crucial evidence from Steenbokfontein Cave and Pancho's Kitchen Midden. Incidentally, he mentions Elands Bay Cave as being contemporary with megamiddens in his article, even though only scraps of material dated to about 2900 BP were excavated from this site.

Everything changes in our scientific understanding of the universe, from the expansion of space caused by the Big Bang to the continuous diversification and narrowing of species numbers through geological ages, the rise and fall of civilisations and cultures, and scientific knowledge itself. Why would this universal rule not apply to Parkington's interpretations on megamiddens and transhumancy? This certainly reflects my feeling about the resource intensification model I have proposed for the period between 3500 and 2000 BP, a process that starts before the appearance of megamiddens. If *solid* evidence were to refute or expand the proposed resource intensification model I will gladly accept the new version. Unfortunately, there is nothing either solid or new in Parkington's criticisms appearing in the December 2011 issue of *The Digging Stick*.

Parkington again insists that megamiddens contain almost nothing but marine shell dominated by black mussels despite recent published observations to the contrary (Jerardino 2010, 2012). For example, my analysis stated that if the calculated volume of a megamidden is at least 1 000 m^3, which is very conservative, and the density of discarded bones is 0,5 kg/m^3 while that of lithics is 20 artefacts/m^3, then the total amount of bone weight and the number of lithics in such a site is 500 kg and 20 000 items respectively.

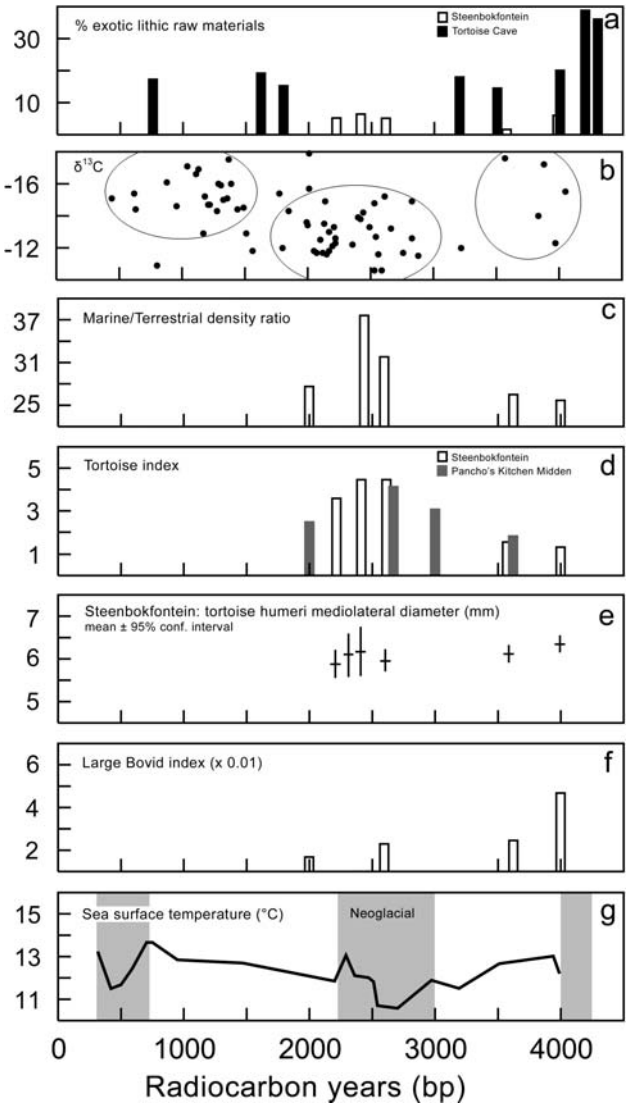

Fig. 4: Summary of trends during the megamidden period

These numbers compare well with those describing the contemporary deposits of Steenbokfontein Cave, the only cave site in Lamberts Bay with substantial volumes of material during the megamidden period. The lithics numbers are certainly larger than that quoted for Dunefield Midden (Parkington 2012: 1527).

The same type of calculation applies to charcoal abundance at megamiddens, on which Parkington places such emphasis because he sees megamiddens only as collection locales where shellfish was dried with the aid of hot coals ('logistical camps' in the archaeological jargon) (Henshilwood et al. 1994). As I have shown (Jerardino 2010, 2012), densities and total quantities of charcoal in megamiddens are one order of magnitude smaller than the corresponding values for Steenbokfontein Cave. Why is this not acknowledged?

The fact that one megamidden contains at least as much bone or lithics as contemporary occupations at a cave site with a clear domestic signature can be interpreted as domestic activities also having taken place at megamiddens. When calculating the total of lithics and bone for all megamiddens, it is clear that domestic activities took place at these large sites (Jerardino 2010, 2012). If a larger volume figure for megamiddens ought to be used in calculations, then the total amount of domestic debris in all megamiddens would be much higher and my case would be even better supported.

Parkington's fixation on a mono-specific composition (black mussels) of megamiddens patently disregards the shellfish data presented by me (Jerardino 2010: Table 3) - mono-specificity is only apparent from 2600 BP until 2200 BP. Before then limpets and whelks were collected persistently in small but significant quantities (~10 per cent) in most megamiddens, although at the Grootrif D site limpet frequencies are as high as 33 per cent and 65 per cent. The change to black mussel dominance in megamiddens corresponds with a reformulation from lower caloric-yielding limpets (3 750 kJ/person/h of collection) and whelks (3 970 to 1 260 kJ/person/h), with a distribution in the mid-intertidal, to a focus almost entirely on the denser and higher-yielding black mussels (6 125 to 4 900 kJ/person/h) found mostly in the low-intertidal and sub-tidal zones (Jerardino 2010, 2012). Because most of the megamiddens in the Elands Bay area date to after 2600 BP, this process of contraction in the diversity of shellfish species through time is not seen in this area.

Interestingly, as the percentages of mollusc species changed from 2600 BP onwards, the mean sizes of gathered molluscs and Cape rock lobsters reduced in size over time. For this to happen, a population settling for long periods is needed. If logistical groups had come to the coast, gathered and processed shellfish at megamiddens and then returned to the interior, shellfish colonies would have had time to recover until the next visit, but this was not the case. The frequencies of lithic raw materials used during the megamidden period (Fig. 4a) are indicative, since exotic raw materials (hornfels and silcrete) were rarely procured for making artefacts during the megamidden period, which indicates that people were not, or only rarely, reaching areas where such raw material are found (the interior mountains for hornfels, and the Olifants River Mouth and Vredenburg Peninsula for silcrete). What is more, no sites at interior locations date to 3000 to 2000 BP. All sites falling within this age range that I know of, even in Namaqualand, are situated at the coast.

The mammal and tortoise record followed a very similar chronological pattern to that of shellfish diversity, but started about 500 years before the appearance of megamiddens, as has been shown by studies at several sites (Jerardino 1998, 2010, 2012). This is ignored by Parkington. The Steenbokfontein Cave and Pancho's Kitchen Midden faunal sequences show that people increasingly relied on small prey such as tortoises, rather then on other vertebrate fauna, and replaced the hunting of large antelopes, such as eland, with snared or otherwise procured small bovids (e.g. steenbok, grysbok and gray duiker) (Fig. 4d, f).

In other words, there was a shift from larger prey to many small food parcels. Furthermore, Steenbokfontein Cave data shows decreasing tortoise sizes, mirroring and slightly foreshadowing the trend in marine molluscs (Fig. 4e). Clearly, we must not only look at megamiddens to reconstruct the diet of people at the time when these large sites accumulated. The mammal and tortoise data on which the above observations are based were provided as tables by Prof. Richard Klein and Dr Peter Nilssen (Jerardino 2010, 2012) both independent and well-known faunal analysts.

Finally, as for stable carbon isotope readings on human skeletal remains found specifically between Elands Bay and Lamberts Bay, Parkington does not consider the relationship between the Paternoster megamidden and skeletons recovered from nearby areas that reflect strong marine protein consumption (see Dewar 2010). It is not clear what bibliographic source he uses when he states that there are '… seven readings between 1800 and 3200 years ago from the coastal stretch where megamiddens occur …', so I cannot comment. However, the increasing preponderance of marine fauna over terrestrial species is markedly clear at Steenbokfontein Cave and Panchos Kitchen Midden (Fig. 4b). The extensive damage by road building and agriculture to areas behind megamiddens would have obliterated many skeletons but some of the several skeletons dating to the megamidden period recovered from underdeveloped areas in Elands Bay in the last five years have provided marine diet readings (Sealy, personal communication 2010).

My work on megamiddens is reflected in leading books on the archaeology of South Africa (Deacon & Deacon 1999: 154; Mitchell 2002: 179–182), and on world marine adaptations (Rick & Erlandson 2008: 279–296).

Acknowledgements

Thanks go to Gareth Angelbeck and John Parkington for giving me an opportunity to clarify some aspects of my research, as well as to Anne Solomon for her expert editorial assistance.

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Book notices

INVENTING AFRICA

Robin Derricourt*, Inventing Africa: history, archaeology and ideas.* 2011. London and New York: Pluto Press. Available from ArchFox Books, fox@boers.org.za, at R270.

Inventing Africa is a critical account of how Western appreciations and conceptualisations of the African continent have changed over time and narratives selectively interpreted and misinterpreted Africa's past. Writers from Basil Davidson and Raymond Dart to Afro-centrists like Cheikh Anta Diop have created alluring images of vast prehistoric migrations, the African origins of humankind and golden ages of past civilisations. Simplifying images of Africa have existed from ancient Mediterranean worlds, slave trading nations and colonial powers to today's political elites, ecotourists and aid-givers, often serving a particular need but rarely that of those to whom they are applied. The narratives have often invented a history that credits outsiders with African cultural developments, denying Africa's deep and complex history.

Author Robin Derricourt, Professor in History at the University of New South Wales with a career covering archaeology and heritage administration, explores the limits and dangers of simplifications. He argues that ambitious ideas can delude or oppress as well as inform. In this lively book he defends Africa against some of the grand narratives that have been imposed upon its peoples. In an articulate and intelligent analysis, but unfortunately with an occasional factual mistake, Derricourt places generations of research and thinking in a broader context.

uKHAHLAMBA

John Wright and Aron Mazel*, uKhahlamba: exploring the history of the uKhahlamba Mountains.* 2012. Johannesburg: Wits University Press. Available from ArchFox Books, fox@boers.org.za, at R135.

The uKhahlamba (Drakensberg) Mountains have been home to different groups of people for a long time. Small groups of hunter-gatherers began living there at least 25 000 years ago, followed in about 1400 AD by African farmers who moved to the foothills and grazed their cattle in the mountains. They interacted with the hunter-gatherers through trade, marriage and rituals like rain-making. From the 1840s European settlers in the Natal colony began laying out sheep and cattle farms in the foothills, driving out the San and bringing the African farmers under their domination. Later the settlers and their descendants also began using the land for tourism and leisure activities, and as a water source for industry.

This 86-page book in English and Zulu (translator Sylvia Zulu) tells about the coming of these different peoples to the mountains and describes the ways of life they established. Written in a simple style, the book is a good introduction to the history and archaeology of the region. It is well illustrated, but one misses the inclusion of a map, as well as an index.

Reinoud Boers

A SOUTH AFRICAN PLEISTOCENE AVIAN AND MAMMAL TRACK SITE WITH PURPORTED PRINTS OF A SHOD HOMINID

Charles Helm, Richard McCrea and Daniel Helm

The past decade has yielded a succession of discoveries from the southern Cape coast, spanning a time from 164 000 to 70 000 years ago. They have added to the understanding of early human origins, pushing back the known dates that our species, already modern in an anatomic sense, began cognitively and behaviourally to act like modern humans. These discoveries have come from two major excavation areas, 80 km apart, namely –

1. Pinnacle Point (the Mossel Bay Archaeological Project, led by Curtis Marean of Arizona State University), and
2. Blombos Cave (the Blombos Cave Project, led by Chris Henshilwood of the University of the Witwatersrand).

The discoveries relate to art, jewellery, complex tools, microliths, the use of fire as a technological tool and the use of seafood. A genetic bottleneck has also been identified, probably caused by climate change during the long, cold glacial period that stretched from 195 000 to 123 000 years ago. One estimate is that this happened 141 000 years ago and involved just 600 breeding individuals (Fagundes et al. 2007). It appears that all modern humans may have descended from a small number of people from one location. There is reason to believe that this progenitor group survived along this same southern Cape coastline (Marean 2010).

The question arises whether there may be other evidence of this pioneering human presence. Specifacaule, can Hominid ichnology (sensu Lockley 1998), the study of hominid traces, contribute?

Vertebrate ichnofossils

In the same area as these archaeologically significant sites the coastline is rich in vertebrate ichnofossils from about the same period. Here aeolian deposits, the remains of ancient sand dunes, stretch over a distance of 6 km in the form of impressive cliffs up to 50 m in height. These have been dated between 60 000 and 90 000 years old (late Pleistocene) through optically stimulated luminescence (OSL) and amino acid racemisation (AAR) chronology (Roberts et al. 2008). Assessment of these ichnofossils was pioneered by Dave Roberts of the Council for Geoscience.

Fig. 1: Fossilised elephant footprint in profile

The cliffs are eroded during storms and spring tides, and areas frequently collapse and slide down into the ocean. Well-preserved trackways representing both mammals and birds are present, and are best viewed on the more recently exposed surfaces. The largest of the Pleistocene trackways were made by African elephants (*Loxodonta africana*). Roberts et al. (2008) have described these tracks, which include natural moulds, prints in profile (Fig. 1), natural casts and what can be termed 'loxodonturbation' (similar to the 'dinoturbation' that occurs at dinosaur sites with extensive trampling).

Other mammal evidence includes small, medium and large ungulate trackways. One resembles that of a modern-day jackal; another may have been made by

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the extinct giant Cape horse (*Equus capensis*). Unfortunately these tracks were lost due to cliff collapse before they could be well documented. Fossilised mole burrows are present. A single example of fossil bone has been found. The main elephant track site is on a large block that broke off and slid down the cliff. In 2008 this block split in two, exposing a new bedding plane rich in ungulate tracks.

Fig. 2: Rock overhang featuring a guineafowl-like trackway of 24 prints

Avian trackways

Prior to the exploration of this area, there was only one known avian trackway from South Africa, from Nahoon, 600 km to the east. This was discovered in 1964 and is housed in the East London Museum. Subsequently much more recent bird tracks, between 500 and 1 500 years old, have been described from the Kuiseb Delta in Namibia (Bennett et al. 2010), and Paul Ellenberger (1974) described a late Triassic site at Mokanametsong in the Quthing District of Lesotho with several trackways of bird-like animals, which have received little attention (Lockley et al. 1992).

To date, four new bird trackways and two single tracks have been found along the Cape south coast. These resemble tracks of modern-day heron, guineafowl, gull and a shorebird (wader) species. The gull and shorebird tracks were on a rock that has disappeared into the ocean. The guineafowl-like trackway is particularly impressive, being a sinuous series of 24 prints on the underside of an overhang (Fig. 2).

A human trackway?

Most intriguing of all is what may be a human trackway within 50 m of the elephant trackway. This series of four prints was discovered in 2009 following a large rockfall (Fig. 3). The counterslab (natural cast surface) lies in the sand just a metre below the trackway-bearing rock slab (Fig. 4).

There are two previously described cases of South African human trackways (Lockley et al. 2007). The first is from Nahoon (right beside the bird trackway described above) and is housed in the East London Museum. The second is from Langebaan, 400 km to the west, discovered by Dave Roberts in 1997. It is deposited in Iziko South Africa Museums. The age of both these trackways is estimated to be in the region of 120 000 years (Jacobs & Roberts 2009; Roberts 2008). Multiple human tracks and trackways of comparatively recent origin have been described from the Kuiseb Delta in Namibia (Bennett et al. 2010).

International interest in research on hominid track sites and hominid ichnotaxonomy is increasing with a recent report putting the number of global hominid track sites at 63 (Kim et al. 2008; Lockley et al. 2007, 2008). These sites range in age from 3,7 million years

Fig. 3: Purported shod hominid trackway

Fig. 4: The counterslab lies in the sand just a metre below the trackway-bearing rock slab

(the famous Laetoli site – Leakey 1979; Leakey and Hay 1979) to less than 500 years (Kim et al. 2008). The majority of the track sites listed by Lockley et al (2007 – Table 1) are younger than 60 000 years and most of these are younger than 10 000 years. Only seven reported hominid sites are older than 60 000 years, making them particularly rare. The potential importance of new track finds would thus be difficult to understate.

The traces in question are different from any of the other prints thus far discovered along this stretch of coastline. Footprint size, pace and stride length are consistent with a juvenile human track-maker. However, it is not possible to conclusively identify the tracks as human, for a number of reasons:

1. Only the second and third prints are distinct, insufficient to meet Sarjeant's (1989) 'ten ichnological commandments'. A longer trackway needs to be found to provide more positive identification and ichnotaxonomic assignment.
2. The exposed layer is of wind-borne infill and the actual impressions made are therefore not identifiable. This is a common phenomenon in other tracks in the area. It appears unlikely that this infill layer can be removed effectively to expose the underlying original layer.
3. There is no evidence of toe impressions, which are traditionally regarded as one of the distinctive features of human prints.

A shod human footprint?

Only a barefoot walker can make toe impressions. As these are missing, could our ancestors 60 000 to 90 000 years ago have crafted and worn footwear? The third print, in particular, resembles a sandal impression.

Care must be taken in this regard as erroneous claims of shod human footprints have previously been made. One instance from Cambrian strata (Stokes 1986) simply represented non-biogenic sedimentary structures, although the footprint locality being reported here does not suffer from such a staggering temporal paradox. Marsh (1883) reported a bipedal trackway of six very large, human-like prints in Nevada associated with the tracks of other mammals. In a controversy that involved Mark Twain, a human wearing sandals was postulated as the track-maker. However, under careful scrutiny the human-like trackway turned out to have very faint forefoot impressions and it was concluded that it was likely to have been produced by a large sloth.

Given the relatively poor preservation of the southern Cape trackway and the short sequence it comprises we cannot be certain that it was produced by a hominid. However, in the light of known hominid track sites from older deposits along the South African coast, a hominid origin is a possibility. At the very least, this find may spur researchers to examine vertebrate traces in the area more carefully. Are there any other plausible explanations for this trackway (other than non-biogenic)? The horse family is one potential candidate. Zebras sometimes register a front track over or just ahead of a hind track. Two such tracks, with loss of detail due to the infill layer, could conceivably create a sandal-like impression.

Given their other documented advancements and skills, the inhabitants of this region at the time these Aeolian deposits were laid down may have had the skills and technology to fashion footwear. It has been postulated that these inhabitants were the first to forage for seafood (Marean 2010). Anyone who has foraged for oysters and mussels on the coast can vouch for how tough the rocks are on bare feet, and the likelihood of developing lacerations unless stout footwear is worn. The preservation of foot integrity would have been a priority for ancient foragers and it is plausible that this new source of protein brought with it the impetus to develop foot protection. An argument for the earlier use of shoes, based on anatomical changes in foot bones, has been made (Trinkaus 2005). The earliest known evidence for such speculative changes is from a cave in China dated to about 40 000 years ago.

Protection and further research

The ichnofossil area described here complements a very impressive South Africa fossil trackway list. There is a reasonable record of awareness of this form of heritage along with efforts at preservation. Protection, documentation, inventory and research, recovery of the more important slabs, CT scanning, the creation of replicas, and museum interpretation are desirable for the trackways described here as their natural fate is to slip into the ocean. The high rate of erosion makes further surface trackway exposures inevitable, justifying long-term studies and regular site visits.

If our speculation on these potentially human tracks and the early use of footwear is substantiated, there will be another archaeological first on the southern Cape's long list.

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Guy Gardner graciously and repeatedly provided access and hospitality. David Roberts generously shared details and locality information on the elephant trackways and the region. Curtis Marean, Kyle Brown and their research team inspired and encouraged our work. We are grateful to Kim Hill and Jan de Vynck for their insights on the importance of foot integrity for hunter-gatherers.

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WORLD ARCHAEOLOGY

Skull resets human migration clock

A partial human skull from Tam Pa Ling, the limestone 'Cave of the Monkeys', in northern Laos suggests that modern humans migrated out of Africa and into south-east Asia at least 60 000 years ago. The find helps fill a mysterious gap in the fossil record. 'Most surprising is the fact that we found anything at all,' said paleo-anthropologist Laura Lynn Shackelford from the University of Illinois. No artefacts were found at the site.

The shape of the bone and teeth is distinctly anatomically modern human, not like those of an extinct lineage such as the Neanderthals. A variety of dating techniques of the sediments surrounding the fossils suggests they are at least 46 000 to 51 000 years old, while direct dating of the bone suggests a maximum age of about 63 000 years. This makes the fossils the earliest skeletal evidence for anatomically modern humans east of the Middle East.

The findings 'change the thinking regarding modern human migration routes into Asia, that there were more routes of dispersal than previously thought,' Shackelford said. 'The typical thinking was that once modern humans hugged the coastline to go from India to Southeast Asia, they went southward into Indonesia and Australasia. We think they absolutely did that, but we are also suggesting other populations probably went north or north-east toward China, and some went through the mountains into mainland Southeast Asia.' *Proceedings of the National Academy of Sciences/LiveScience, 20/08/2012*

Stone Age cave painters were realists

Researchers claims to have found the first evidence that spotted horses, often seen depicted in European cave paintings, actually existed tens of thousands of years ago. That means ancient artists were drawing what they saw around them, rather than abstract or symbolic paintings. By analysing bones and teeth from more than 30 horses in Siberia and Europe dating back as many as 35 000 years, researchers found that six shared a gene associated with a type of leopard spotting seen in modern horses. Until now, scientists only had DNA evidence of monochrome horses. The team was led by Melanie Pruvost of the Leibniz Institute for Zoo and Wildlife Research and the Department of Natural Sciences at the German Archaeological Institute in Berlin.

Proceedings, National Academy of Sciences, & AFP, 08/11/2011

ARCHAEOLOGY AND ROCK ART IN SOUTHERN ETHIOPIA

Reinoud Boers

In October 2011, 27 members of the Archaeological Society toured southern Ethiopia, travelling mainly along the Great Rift Valley. Unlike Ethiopia's northern plateau, which is the country's historic and Christian heartland, the southern part is poorly developed and stands in total contrast to the north.

Southern Ethiopia has exceptional natural beauty and is the home to many ethno-linguistic groups who have to a large extent been untouched by outside influences. The floor of the 20 million-year-old Rift Valley is studded with dormant or extinct volcanoes, a string of lakes, grasslands and, towards Kenya, acacia scrubland. The surrounding cool and fertile highlands feature lush forests (juniper, hagenia and podocarpus), savannah and small, neatly-cultivated farms.

To the east of the Rift Valley lie the green Bale Mountains and the 4 100 m high Sanetti Plateau. This is Africa's largest expanse of Afro-Alpine moorland with clumped grey heather interspersed with lichen-covered rocks and stands of giant lobelia. It protects African juniper and fragrant *Hagenia abyssinica* woodland and is the home of the Simien wolf, which we were fortunate to see near a crystal-clear tarn. Also found in the 2 200 km^2 Bale National Park is the white-flowered Abyssinian rose, the only flowering rose indigenous to Africa.

We travelled mainly in the Southern Nations, Nationalities and People's State that was only incorporated into Ethiopia in the early 20th century by Emperor Haile Selassie. The state incorporates the remote South Omo region tucked against South Sudan and Kenya. As many as two dozen culturally unique tribes occupy this region, some numbering tens of thousands, others no more than 500. Three of Africa's major linguistic groups (Omotic, Cushitic and Nilotic) are represented. It is a region of extraordinary cultural integrity, with tribal uniqueness being expressed by colourful dress and custom.

One of the best known of these groups is the Dorze, renowned cotton weavers who live in their distinctive 6 m tall beehive-shaped dwellings constructed entirely of bamboo, grass and enset (false banana). A small tribe, the Tsemai, is structured around the age set system. Four fixed age sets are recognised and every set graduates in seniority once every 10 years. Men of the handsome Ari tribe often shave their heads from the forehead to the middle of the skull and wear ornate jewellery, while their women are still draped in the traditional *gori*, a dress made of enset and koisha leaves.

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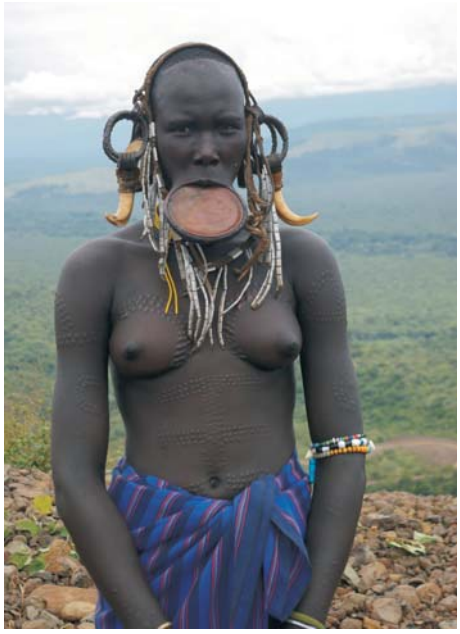


A Mursi woman with lip plate and decoration

The renowned Mursi, humourlessly mercenary, who made a very poor impression on us, require their women to mutilate their lower lips with circular clay lip plates eventually reaching 15 cm in diameter. The larger the plate, the greater a women's value when she is married. In contrast, the women of the elaborately-costumed Hamer tribe are heavily scarified and the tribe's annual three-day initiation ceremony concludes with the amazing bull-jumping ceremony. The Karo sport extensive body painting, while the women of the semi-nomadic hunting and cattle herding Bumi wear a tentacle-like tangle of leather necklaces and side-cropped hairstyles. The mixed-agriculturalist Konso live in walled hilltop villages and are noted for sculpturing eerie wooden *waga* statues as grave markers. The semi-nomadic Borena pastoralists hold strong taboos against raising one's voice in anger and unprovoked violence, while the Gurage consider idleness sin.

We had an excellent introduction to the tribes of South Omo at the ethnographic museum of the South Omo Research Centre at Jinka.

Stelae fields

Southern Ethiopia has relatively few archaeological sites. The Tutu Fala stelae field near Dilla between Yabello and Awassa is a densely clustered field of roughly 300 stelae, none more than 2 m in height. Most are of the anthropomorphic type, but several are phallic in nature. Archaeological excavation has uncovered numerous artefacts, including iron and copper bracelets, beads, chisels and pottery sherds. In the same vicinity lies the Tututi stelae field, where around 1 200, mostly fallen stelae are scattered in and

around a small village. These are almost all of phallic design and one standing 7,55 m high is probably the tallest stela to be erected in southern Ethiopia.

These stelae are part of an estimated 10 000 stelae scattered across the south of the country. Little is known about their origin or the societies that erected them, although archaeological research indicates that they were erected over a 400 to 500-year period from the 9th century onwards. The older stelae are the phallic ones, which are typically cylindrical in shape and rounded at the top, with incisions that leave little room for ambiguity. The later anthropomorphic stelae, thought to date to the 12th century, are attributed to a different society. These stelae are generally flattened and are engraved with symbolic human features and abstract symbols. Both types mark graves, but the burial method was different. Below the older, round stelae bodies were buried in the foetal position, while below the flattened stelae the dead were buried lying flat. The Oromo who spread relatively late into the area from the north might well have displaced the stelae-erecting society.

Stelae at Tutu Fala near Dilla

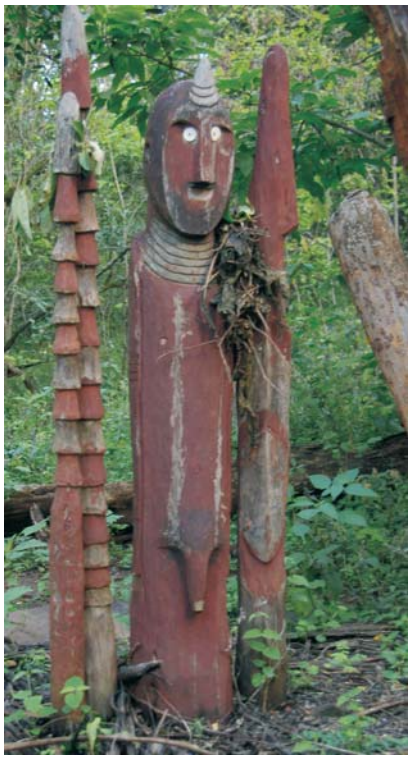
Konso tribal system and *wagas*

Near Mecheke on the way to Yabello we visited the atmospheric compound of paramount chief Ezahengne Kalla, a trained civil engineer who has been recalled to act as the spiritual guru and judicial head of the Konso and as chief of the Kertita clan, an important patrilineal unit of Konso society. He and his immediate family live in isolation on a hilltop to ensure his impartiality when settling disputes. The title is strictly hereditary and chief Ezahengne is the 20th in a line to live in this compound over 500 years, as indicated by the *olahita* poles erected outside the gate. Konso society is structured around the *Kata* generations set, whereby every village will initiate a new generation comprising boys between eight and 25 years old every 18 years. Every initiation is marked by the erection of an *olahita* pole.

Chief Ezahengne gave us an excellent talk on the tribal structure and his role, after which we were allowed to wander through the densely thatch-hutted compound cluttered with artefacts ranging from huge woven baskets brim-full of coffee beans, massive wooden serving platters, huge beer vats and solid furniture. But the highlight was our walk through the surrounding juniper and coffee forest to view one of the four groups of *waga* statues remaining in Mecheke. Here the fascinating UNESCO-protected wooden statues mark the graves of chiefs. Up to 150 cm high and dating to over 150 years ago, the sombre-faced *waga* are carved in the image of the person buried at the site and is accompanied by a smaller *waga* of the deceased's wife. *Waga* have an obvious precursor in the stone stelae.

Cattle rock art at Manchiti

The most spectacular archaeological site we visited was the Manchiti rock engraving site, also near Dille, the finest of four rock engraving sites in the area. It consists of a partially collapsed frieze of around 50 cows that move herd-like along the rock face near the top of a narrow river gully. The bas-reliefs, ranging in length from 40 cm to 70 cm, are nearly identical in their highly stylised form, with small heads and grossly engorged udders. The engravings show affinities with rock art in the mountains of Harar in eastern Ethiopia and in parts of Eritrea. They are thought to be at least 3 000, but possibly 4 000 years old. Considering the likelihood that they were engraved when the depth of the gully was far shallower, their ancient age



Waga statues protecting a deceased Konso chief's grave at Mecheke

Crossing the Omo River by dugout

seems likely. On the opposite side of the gully, along the pathway down, there are engravings of three steers in the same stylised form as the cows but with large decorated horns.

Bandits, floods and mud

Manchiti was indeed a fascinating visit, particularly as we had to do some detective work to find it. We were eventually given a guide by the regional office of the Department of Mines, who also served as our 'permit' to visit the site. It was therefore perturbing when on the way out our convoy was stopped by a smartly-dressed gentleman accompanied by two Kalashnikov-armed accomplices. He maintained that we had entered an enclave of the Omoro federal state for which we did not have permission. He kept us at the 'border' – a length of rope between two poles – for an hour, until the hefty arguments of our drivers and the successful efforts of our guide to reach Ethiopia's director of tourism made an impression. Our bandit did not ask for money, but the intent was clear.

Part of a frieze of 50 cows moving herd-like along the rock face near Dille. Note the enlarged udders.

Travelling in one of Africa's least developed regions can bring with it such unexpected occurrences, although seldom this drastic. On another day, our party, split over two hotels separated by a virtually dry riverbed, found itself sitting on either side of a raging torrent. But two hours later the flash flood had abated sufficiently for our 4x4s to be able to cross. However, the next river was not that kind – it would not fall and we had to retrace our journey.

Travelling up to the Sanetti Plateau on a distinctly cool and rainy day we were suddenly faced by a completely blocked road, which is also the main route to Mogadishu in Somalia. Side-by-side, a bus and two trucks were stuck up to their axles in a mud pool. An hour later, with much shouting, scraping away of mud, stone rolling and pulling, and some judicious advice from our party, one truck was finally set free and we could pass through the narrow gap. On our return, we were faced by the same situation.

This visit to a very special and unspoilt part of Africa was a unique experience. Apart from the unexpected encounters, we had to accept the occasional poorly maintained hotel or room, were shaken up on some rough roads (but there were surfaced roads too), and needed to deal with unseasonal rain and the resulting mudbaths. But the magnificent scenery, the variety of friendly peoples and adventures such as crossing the Omo River by wobbly dugout to visit the only accessible habitation of the Bumi tribe, or hiking down (and back up!) to Lake Chew Bet, a small saline body of water inside a deep volcanic crater, to observe the salt winning activities of the Borena, made this a really special trip.

ARCHSOC NOTICES

Subscription rates for 2013

Membership invoices for 2013 were mailed in early January. Council has applied a very reasonable fee increase for 2013. Subscriptions are due *by end of February*. Prompt payment of your dues would be of great assistance to the Society's assistant secretary and branch membership secretaries.

Membership rates for 2013 are as follows:

Individuals	
Ordinary (single)	R255
Joint	R270
Africa Ordinary	R290
Overseas Ordinary	R500
Juniors	R180
Institutions	
South African and African	R500
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Annual General Meeting

Notice is hereby given in terms of section 8(a)(i) and (ii) of the Constitution that the Annual General Meeting of the South African Archaeological Society will be hosted by the Western Cape Branch on Tuesday 14 May 2013 at 18:00 in the South African Astronomical Observatory (SAAO) Auditorium, Observatory Road, Observatory, Cape Town. The speaker and topic for the lecture that will follow will be announced at a later date.

Members should submit items for the Agenda in writing to the Secretary, PO Box 15700, Vlaeberg, 8018, South Africa, or archsoc@iziko.org.za, before 1 March 2013. Proposals must state in specific terms the resolution to be put to the meeting and the reasons therefor.

Janette Deacon
Honorary Secretary
South African Archaeological Society

ARCHAEOLOGY IN BRIEF

Reindeer engraving among Britain's oldest. A faint engraving of a reindeer in a South Wales cave looks to be among the oldest rock art known in Britain. Researchers from the University of Bristol have dated the image at roughly 12 600 years or older. In 2003 the first British rock art from the Upper Paleolithic, which ended about 12 000 years ago, was discovered in Creswell Crags in England. An excavation at the cave in the late 1950s revealed flint tools that may have been used to make such symbolic art.

LiveScience, 29/07/2011

The South African Archaeological Society

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

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

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The Society produces the following publications:

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

Subscription rates for 2012 are as follows: Individuals: Single – R245; Joint/Family – R255; Junior membership – R190; Africa ordinary – R270; Overseas ordinary – R480*. Institutions: Local and African – R480; Overseas – R950*. [* Plus R100 bank charges]

The Digging Stick

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