

Ripple Marks

The Story Behind the Story BY CHERYL LYN DYBAS

Ancient Eye on Humanity

South Africa's Blombos Cave Is a Window to Our Past—and Perhaps Our Future

*It didn't happen quite like this, but this
Will do for now: imagine how a clan
Of folks—let's say the first on earth—began
One day to dream themselves beyond this place.
And some walked off and some did not, some came
To coasts where some built boats and some did not
And some went pretty far away, to hot
Or cold or different weathers. Some were changed.*

*And some made bread and some made war, and all
Forgot the place they had wandered from,
And made up names for what they had become
And named their patch of earth and built their wall.*

*Now stand with me, just here. Let's say we've come
To know ourselves, and know ourselves at home.*

—“Just Here, Blombos Cave,” Antony Dunn

(below) Blombos Cave entrance.
Photo credit: Magnus Haaland

“At home” is a perch high above the sea on a rocky ledge along the South African coast east of Cape Town. “Just here” is an indentation on that cliff, a cave some 35 meters above sea level and 100 meters from the coast.

Called Blombos Cave, it's a time capsule sealed tens of thousands of years ago. The cave lies near Cape Agulhas, where the Atlantic and the Indian Oceans flow into one another. The past and present—and perhaps the future—merge here as well.

The cave's opening, an almond-shaped eye, faces the sea. Once, it was shuttered by windblown sand from nearby dunes. But 20 years ago, archaeologist Christopher Henshilwood of the University of Witwatersrand, South Africa, and the University of Bergen in Norway removed Blombos' eye-patch.

What Henshilwood found would change our understanding of human history—and the likely date when our species began to use symbols to communicate information.

ROOM WITH A VIEW—OF THE DISTANT PAST

Henshilwood first became interested in the cave in 1991. The archaeologist had long searched the South African coastline for ancient artifacts. He hit pay dirt at Blombos, which, fittingly, lies on ground he owns. Empty shells of abalones, periwinkles, mussels, and limpets were in the cave, the remains of edible shellfish.

Humans had been there...long, long ago.



Henshilwood's grandfather bought the oceanfront property in 1961 as a fishing retreat. He was among the most recent in a long line of owners. The cave's history goes back at least 140,000 years, when ancient humans fished and foraged for shellfish in the local waters, retreating within to fashion bead necklaces, mix bright red paint in shells, make elaborate stone points used to spear animals for food, and engrave reddish-brown stones known as ochre.

When excavations at Blombos Cave began in 1992, the entrance was obscured by dune sand. Some 20 centimeters of undisturbed windblown sediments were draped across Later Stone Age deposits. The Later Stone Age extends from about 50,000 years ago to historical times. "When we entered the cave for the first time, there had been no disturbance of its contents after its last occupation by humans," says Henshilwood.

Named for the white, bristly blombos bush that covers clifftops along this stretch of coast, Blombos Cave has an interior area of about 55 square meters. Its long, low entrance is 10 meters across, seven meters deep and little more than a meter high. The hollow gaps open in the shape of a cat's eye.

"If we use our imaginations, we can almost see the cave's former inhabitants—our ancestors—at work," muses Henshilwood, who first crawled into Blombos' dark interior on hands and knees. "They would be our envy, cooled by ocean breezes and with a beautiful view of the sea. Blombos Cave was 'prime real estate' in the Middle and Later Stone Ages."

(below) Blombos Cave excavations in progress.
Photo credit: Magnus Haaland



DAWN OF THE MODERN MIND

Homo sapiens was anatomically modern at least 200,000 years ago. But when did we begin to think as we do today? When did humans open the earliest equivalent of a Twitter account?

The cave may hold the answers. "The most impressive single site for early evidence of symbolism is Blombos Cave, with a record stretching well beyond 70,000 years ago," writes anthropologist Chris Stringer of the Natural History Museum in London in his 2012 book *Lone Survivors: How We Came to Be the Only Humans on Earth*.

The Middle Stone Age began around 280,000 years ago and ended about 50,000 years ago. No one believed that the humans of that long-ago time had the ability to think in abstract patterns or to translate that into symbols.

It's long been thought that symbolic behavior originated in Europe. Scientists based that view on the culture of the cave-painting Ice Age Europeans during the Upper Paleolithic, which started some 40,000 years ago. Sites such as Chauvet Cave in the Ardeche region of France, for example, showcase Ice Age animals painted 35,000 years ago.

"When people are surprised at the stunning paintings of Chauvet," says Jean Clottes, emeritus archaeologist at the French Ministry of Culture, "I tell them about Blombos Cave. Modern humans—whether in Europe or in Africa—had the same abilities tens and tens of thousands of years ago, and Blombos offers proof."

Indeed it does, believe Henshilwood and colleagues. Their first inkling came from

two- and three-inch-long engraved pieces of rock, known as ochre, uncovered in the cave. The ochre was scraped and ground to create flat surfaces, then marked with cross-hatches and lines to create complex geometric patterns. The pieces were found in deposits of ash and sand near hearths. "They were likely fashioned with symbolic intent, the meaning of which is now unknown," says Henshilwood.

The next clue was in shells with holes in them, openings made, it would turn out, by human hands.

Diamonds are a girl's best friend, or so the saying goes. The number of carats a diamond or other precious gem contains is a status symbol in today's world. Our jewelry, our clothes, our cars. All advertise our resources, and, perhaps, our social allegiances.

When did this human desire for adornment begin? Was there a long-ago ancestor who found something shiny on the ground, and started a fashion landslide?

Findings in Blombos Cave show that personal ornamentation started more than 70,000 years ago. Researchers discovered beads made of shells in sediment deposited during the Middle Stone Age. The shells are among the earliest appearances of symbolic objects in the archaeological record, and mark an important step in the emergence of modern social behavior in early humans.

Henshilwood and others discovered hundreds of *Nassarius kraussianus*—"sea snail" or tick shell—beads in Blombos Cave sediments dated to about 75,000 years ago. "The shells had been transported a good distance from the environment in which they lived and had clear evidence of human alteration," he says. *Nassarius kraussianus* dwells in estuaries, so the mollusks must have been carried to the cave from the nearest watercourses 20 kilometers down the coast.



(left) Map showing location of Blombos Cave at the tip of South Africa. Credit: Magnus Haaland

The shells were strung together as necklaces or bracelets, had holes made by tools, and marks around the openings like those in items threaded on a string. “Wear patterns on the shells imply that they were suspended,” says Henshilwood. “Some were covered in red ochre.” Ochre is a form of iron ore. Its red pigment was likely used as a decorative paint.

Sand grains surrounding the artifacts were dated using a technique known as optically stimulated luminescence. The results show that the sediments were buried some 75,000 years ago. Thousands of individual grains of sand were dated to look for mixing between Middle and Later Stone Age layers. No blending was detected.

The finding indicates that shell beads in Africa became hot items at least 40 millennia before the appearance of similar jewelry in Europe. The shells infer that people alive 75,000 years ago acted much like modern humans. “There have been questions about the links between anatomically modern humans and behaviorally modern humans,” says Henshilwood. “The people of Blombos Cave may have looked like us, but did they behave that way?”

The engraved ochres and shell beads suggest they did. Use of items like beads to signal information about the wearer requires skills unique to modern humans, including well-developed language and an ability to understand abstract concepts. Ornaments made of modified natural objects, scientists say, are the quintessential such items.

“Once symbols were adopted by our ancestors,” says Henshilwood, “communication could rapidly develop. We were able to ‘transmit’ individual and group cultural values.”

What the shell beads signified remains unknown. The beads may have been a means of conveying shared access to resources,

or of identifying oneself to members of another group.

Not so different from another modified natural object whose origins are in Africa: the diamond.

SHELL GAME: ONE SHELL LEADS TO ANOTHER

Blombos Cave’s tick shells, Henshilwood would later discover, lay a few sediment layers above other empty shells: those of abalones. These remnants of the marine world mark what may be the most important Blombos Cave discovery to date: the abalones stored an ochre-rich paint mixture, possibly used for decoration or skin protection. The date? One hundred thousand years ago.

“Ochre may have been applied with symbolic intent as a decoration on bodies and clothing during the Middle Stone Age,” says Henshilwood. He and an international team of scientists discovered an ochre-processing workshop in Blombos Cave. Its toolkits included ochre, bone, charcoal, grindstones and hammerstones. “The discovery is an important benchmark in the evolution of complex mental processes,” says Henshilwood. “It shows that humans had the conceptual ability to find, combine and store substances that may have been used to enhance social practices.”

The scientists, including Francesco d’Errico of the University of Bordeaux in France and Karen van Niekerk of the University of Bergen, believe that the manufacturing process involved rubbing pieces of ochre on slabs to produce a fine red powder. Ochre chips were crushed with hammerstones/grinders made of silcrete (quartz grains cemented by silica), then combined with heated crushed mammal-bone, charcoal, stone chips and a liquid. The slurry was

transferred to the abalone shells and gently stirred. A bone was likely used to turn the mixture and to transfer it out of the shell.

The recovery of the 100,000-year-old toolkits adds evidence for humans’ early technological and behavioral developments: deliberate planning, production of pigmented compounds, and use of containers. It also demonstrates, says Henshilwood, that the people of the time had an elementary knowledge of something we would later call chemistry.

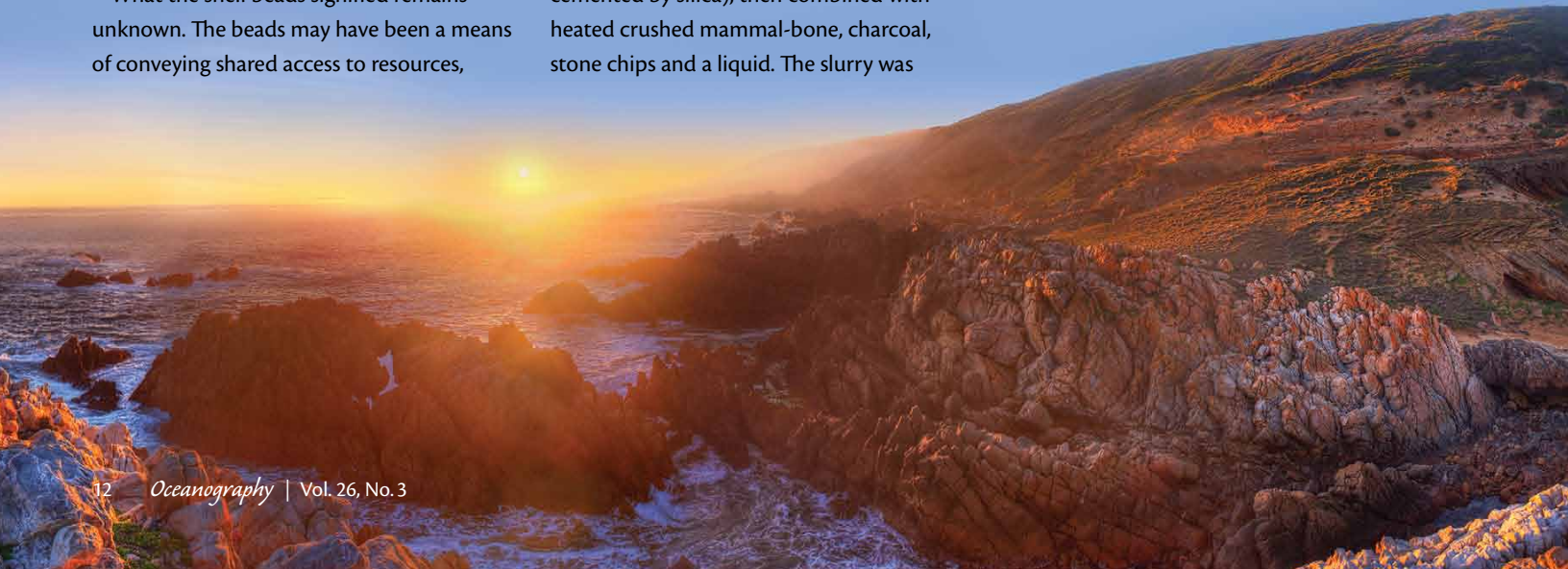
OCHRE PAINT FACTORIES... AND STONE TOOL SHARPENING WORKSHOPS

Shells, whether tick shells or abalones, and engraved ochres aren’t Blombos Cave’s only claims to fame.

A highly skilled way of sharpening and retouching stone artifacts was developed there at least 75,000 years ago. Blombos Cave inhabitants used a technique known as pressure flaking. It involves taking implements shaped by hard stone hammers, striking them with wood or bone hammers, and finally shaping the edges with a bone flaker.

The method is an accurate means of controlling the sharpness, thickness, and overall shape of bifacial—two-sided—tools like spearheads and stone knives. Before the Blombos Cave discovery, the earliest evidence of pressure flaking was from Upper Paleolithic cultures in France and Spain some 20,000 years ago.

Scientists—including Henshilwood, Paola Villa of the University of Colorado Museum of Natural History, and Vincent Mourre of L’Institut national de recherches



archéologiques preventives in France—speculate that pressure flaking may have been invented in Africa and used sporadically there before its widespread adoption in Europe, Australia, and North America.

The researchers analyzed 159 silcrete points and fragments, 179 other pieces, and more than 700 flakes from a layer in Blombos Cave linked to the Still Bay industry, a Middle Stone Age tool manufacturing style that started roughly 76,000 years ago and may have lasted until 72,000 years ago.

Blombos' pressure flaking is important, the archaeologists believe, as it shows that modern humans in South Africa had a sophisticated repertoire of tool-making techniques at a very early time. It is a clear example, they say, of an ability to develop new ideas and techniques widely viewed as advanced, or modern, behavior.

What would be next for the long-ago residents of Blombos Cave, with their sophisticated spear points, containers, and ornaments?

WHERE HAVE ALL THE CAVE-DWELLERS GONE, LONG TIME PASSING?

After about 70,000 years ago, the Still Bay culture, to which Blombos Cave's inhabitants belonged, abruptly vanished. Where did these technologically advanced early people go?

From conditions that were relatively benign—warm and intermittently rainy—at about 76,000 years ago, say Henshilwood and Jessica Thompson of the University of Queensland in Australia, colder, perhaps drier conditions and falling sea levels would have affected the hunter-gatherer-fishers of Blombos Cave.

Did climate change force our *Homo sapiens* ancestors to look for better hunting and fishing grounds?

Was the sophistication of these Middle Stone Age people the spark for a great migration out of Africa, one in which *Homo sapiens* acquired a position of world dominance among the competitors of the time—Neanderthals in Europe and Asia, scattered populations of *Homo erectus* in the Far East, and tiny people, *Homo floresiensis*, on the Indonesian island of Flores?

"It seems likely that the advanced technologies and social structures of *Homo sapiens* that evolved in Africa," says Henshilwood, "played a key part in the success of our

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expansion into Europe."

To find out, Henshilwood, d'Errico, and other scientists are midway into a project called TRACSYMBOLS, slated to run from 2010 to 2015. Its aim is to test the hypothesis that many of the cultural developments of early *Homo sapiens* are related to climate variability. The scientists are reconstructing climate, vegetation, and natural fire-related changes in Europe and in southern Africa, and comparing the ecological niches exploited by human populations during the relevant climate phases.

"Discovering the role of climate in shaping the cognitive evolution of *Homo sapiens* is a priority," says Henshilwood.

PAST IS PROLOGUE?

If climate turns out to be a major factor, state Henshilwood and d'Errico in their 2012 book *Homo Symbolicus: The dawn of language, imagination and spirituality*, it "will serve to remind us that cultural innovations are not inscribed in our genes—climate change does not only affect what we can or cannot do, but it also specifically defines who we were and what we have become."

On a planet that is growing hotter and hotter, *Homo sapiens* is again at a crossroads. Will we continue to adapt and flourish as our ancestors ultimately did...or, like the Still Bay society, disappear into the sands of time?



(above) Abalone after removal of cobbles with ochre. Photo credit: Grethe Moell Pedersen

(right) Christopher Henshilwood excavating in Blombos Cave. Photo credit: Magnus Haaland



(background photo) Blombos Cave. Photo credit: Magnus Haaland