

The Rise of the Mind

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Ochre found in this cave at the tip of Pinnacle Point in South Africa has offered up key evidence that early humans were engaging in symbolic behavior long before anthropologists previously surmised. (Photo courtesy of Logan Bartram)

When and where did the cognitive abilities of modern humans arise? It's a big question -- one debated by anthropologists for decades. It's an even bigger question for an undergraduate thesis, but senior Logan Bartram has a leg up on this ambitious project: he helped unearth artifacts that are playing a critical role in shaping our knowledge about human origins.

In the summer of 2009, Bartram and fellow UVM student Kristina Bauman were accepted to join a team of archaeologists at a pivotal dig site on the coast of South Africa. It's the shells, ochre and tools at this site -- and not the paintings in the caves of Europe -- that many anthropologists today cite as the first signs of higher human cognitive power.

Signs of (intelligent) life

One such scientist -- and principal investigator for this National Science Foundation-funded excavation -- is paleoanthropologist Curtis Marean, a professor at Arizona State University's Institute of [Human Origins](#).

Marean's research, which is highly transdisciplinary in nature, drawing on expertise from geologists, plant biologists, geneticists, nutritionists, and others, pinpoints caves along the coast of South Africa as a likely habitat of the small population of *Homo sapiens* we're directly descended from today.

Marean's work shows that the migration of [hominids](#) to the coast of Africa may have helped develop -- or at least coincided with -- a boost in [brain function](#). The ochre at the cave sites along the Indian Ocean is a sign of symbolic behavior, whether it was used for self adornment or markings on stone. Small blades that would have been affixed to stone or wood, instead of just held in hand, are evidence of complex tools. And an appetite for seafood, as evidenced by burned shells in ash pits, means that these early humans were able to use tides and lunar schedules to successfully harvest shellfish as a dietary staple.

The work at these sites, which was recently featured in the three-part Nova special "Becoming Human" (in which Bartram and Bauman have cameo appearances), has extended the origin of modern [cognitive abilities](#) further back in time, to roughly 170,000 years ago.

Since this was not a field school designed to teach archaeological skills to newcomers, Bartram -- a novice -- had to learn the techniques on the job. His training ground was an embankment in a rock shelter, where he cleared away sand deposits in search of the landscape surface inhabited by [early humans](#).

The digging was slow and methodical. Electronic distance measurement

tools collected data to document the precise location in space for each artifact, which allows researchers back in the lab to reconstruct three-dimensional maps of the site.

"You're digging down, and you can see right in the strata what's going on," Bartram says while pointing to an image he took of a cross-section view of the ledge. A black line bisecting the beige sand is the remains of a hearth -- concreted ash and burned shells are what's left behind from an ancient seafood dinner.

Brain food

Why did our ancestors move to the coasts? Climate change and drought throughout Africa meant fewer resources on land just shy of 200,000 years ago. The nutrition offered up by the sea was life sustaining -- a point driven home for Bartram when the site director foraged for mussels at lunchtime on a rock formation just below the caves.

For a pre-med student like Bartram, the idea that higher cognitive function may have been aided by the brain-building omega-3 fatty acids that seafood provides is an intriguing one. The southern coast of Africa is also known for amazing biodiversity and an abundance of tuberous plants, which are high in carbohydrates. "You couple that with shellfish, and you've got a really nice nutritional package going on," Bartram says. "Is it the reason we evolved, just because we had access to this nutrient? Probably not. But the ability to have that available to you and raise kids who are getting complete brain food -- there's no way that could have hurt."

Back at UVM, Bartram's wrapping up his thesis: "Evidence for Modern Human Behavioral Origins on the Southern African Coast." While based on his time in Africa, where he unearthed his own share of stone tools and looked out at the sea from the same cave shelters our ancestors once

shared, he says that his thesis work is really about reviewing the published research. "It's certainly a library project...There's been so much literature published on these issues, and from this site," Bartram says. "If nothing else, my thesis is helping me reaffirm the experience I had, not just for others, but for myself."

Provided by University of Vermont

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