



The Great Library on the main floor of The Stone Age Institute.

The Stone Age Institute

Hidden away in the woods on the outskirts of Bloomington, this famed institute, the brainchild of husband-and-wife scientists, is a focal point for archaeological research on human origins.

At a noisy reception in the cavernous library of the Stone Age Institute, Nicholas Toth, co-founder of the institute, is explaining to a guest the tortuous logistics of extracting core samples from 250 meters below the surface of an ancient lake bed in Tanzania. A week later, scientists from 10 universities will gather in this same library for a conference on the findings from the unprecedented drilling project.

Tonight's reception, however, isn't for the scientists. The guest of honor is Kenny Aronoff, one of rock music's most successful drummers, an old friend and adviser to the Stone Age Institute. Toth hands his wine glass to Kathy Schick, his wife and partner in research and life, and straps on a Fender Telecaster guitar. Then the institute's house band, with Aronoff sitting in, launches into a 1960's rock standard.

Jam sessions are regular occurrences at the Stone Age Institute. Schick is recording the event on video, and the guest is left to wonder: Can these people really be doing serious science when they're obviously having so much fun? →

By Peter Dorfman • Photography by Tyagan Miller



The answer is yes. Toth and Schick are tenured Indiana University professors. Their brainchild, the Stone Age Institute, located on 30 rural acres on the outskirts of Bloomington, is an internationally renowned focal point for archaeological research on human origins. More specifically, the institute studies the origins of technology, beginning with the development of stone tools.

Scientists study human evolution from physical evidence—fossil remnants of early hominids (human-like, upright-walking



changes in Earth's climate during man's early prehistory. That core sampling from the East African lake bed will give archaeologists the first continuous record of climate changes over the last 2.5 million years in the region where human beings first emerged. The core sample will fuel geochemical analysis and yield data for scientists in multiple disciplines for years to come.

The Stone Age Institute is allied with IU, where Toth and Schick maintain faculty positions. But it is an autonomous, nonprofit

universities," Schick explains. She and Toth had experienced those vagaries firsthand.

After grad school, they were postdocs from 1982 until 1986 at the Institute of Human Origins, also in Berkeley. They worked with its founder, Donald Johanson, whose team had discovered the famous early hominid fossil nicknamed "Lucy" in Ethiopia. Johanson had established a private nonprofit institution—an early model for Toth and Schick.

"UC Berkeley was an intellectual playground," Schick recalls. "You could study



"Everything you see here is paid for," Toth says. "We've never had to take a loan for anything, never incurred any debt."

Where the money comes from

Along with the science, the Stone Age Institute is a case study in successful fundraising. In late 2015, the institute landed its largest funding to date—a \$3.2 million research grant from the John Templeton Foundation in Philadelphia. The three-year grant funds research into the evolution of human cognition in four countries. But what sustains the institute is continuing donor funding, mostly through the patient cultivation of philanthropic contacts.

"Virtually all of our donors are people we've known between 10 and 30 years," Toth says. "We rarely raise money cold. It's really based on long-term relationships and trust. People see over the years what you're trying to do. And every donor is a different story."

Gordon Getty, son of oil magnate J. Paul Getty, is a key donor. "Gordon's two major interests in life are human evolution and opera," Toth explains. "We've had his music performed at the music school, as well as at the institute. Gordon was the honorary chairman of the Leakey Foundation in San Francisco, which supports human evolutionary studies, so that was a natural connection. He first visited us when we were digging in Spain with our professor, back in the 80s."

Who are Kathy and Nick?

Toth and Schick make friends easily, and they move comfortably in elite donor circles. A tour of the institute and its accoutrements could convince a visitor that its founders came from money themselves. But they didn't. Both Schick and Toth are from middle-class Ohio families.

"When I was 6 years old, my father died," Toth recalls. "As my mother was sorting out her business, we stayed with various uncles and aunts, and one of my uncles worked on the railroad. He was the family naturalist. He had hiked a lot in Texas and he had a collection of projectile points [such as a spear, dart, or arrow], which I thought were the coolest things I'd ever seen. He subscribed to *National Geographic*, and I read an article on the Leakeys at Olduvai Gorge. I decided, at 6 years old, that I was going to become an archaeologist. I guess I never grew up."

First in his family to go to college, Toth did his early graduate work at Oxford University in England. "My tutor there in archaeology, Derek Roe, was working with Mary Leakey at Olduvai Gorge, analyzing stone tools," Toth says. "So I had connections with East Africa."

He met Schick in 1976 when he returned from Oxford, on an archaeological dig in Ohio.

Schick also had a middle-class upbringing. "My father was an engraver," she says. "I was fascinated with the craft aspect of what he was doing, but he died when I was



(beginning opposite page, l-r) Founders, co-directors, and spouses Nicholas Toth and Kathy Schick; exterior of the Stone Age Institute, featuring the stone tower; interior hallway leading to the library; ancient stone tools.

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creatures, only some of which are direct ancestors of *Homo sapiens*) and the animals they hunted, as well as artifacts like stone and bone tools. But anthropology also is concerned with the evolution of intellect and behavior. The institute's scientists work closely with anthropologists and cognitive psychologists who study modern cultures and the behavior of modern humans and primates, from which the behaviors of our ancient ancestors can be inferred.

Climate over 2.5 million years

Some of the institute's most far-reaching contributions to archaeology may come from its recent investigations into the

501(c)(3) entity, built entirely with donor funding. It's the ultimate realization of its founders' vision—to establish "one of the major places in the world to do Stone Age archaeology," Toth says.

A stable base for research

But it also reflects an insight Toth and Schick came to in the 1980s as graduate students at the University of California at Berkeley: While university research teams come and go, knowledge lasts.

"We wanted a fertile, stable base for research in this field that wouldn't be subject to the whims and vagaries of different administrations, different departments, different

with some of the biggest names in the field. But toward the end of our time there, a lot of them were retiring or moving to other fields of science. That really led us to ask ourselves whether we could build a more stable platform."

That platform resides in a museum-like edifice at the end of a winding, gated driveway. Visitors enter through an imposing stone turret. Embedded in the entryway floor is an exhibit showing what an early hominid camp might look like when unearthed in the field. The award-winning building, designed by Mary Krupinski and Dawn Gray of Kirkwood Design Studio in Bloomington, was completed in 2003.



(top) Schick and Toth at Yosemite National Park in 1977, shortly after they wed. *Courtesy photo* (above) With drummer Kenny Aronoff. *Courtesy photo* (top, right) Schick, walking by the cast of a skeleton donning a hat from Ethiopia. (opposite page) Casts of skulls.

10.” In college she studied paleoanthropology—looking at the evolution of the brain and culture. Through a master’s program at Kent State University, she became a supervisor on the Ohio dig.

“Nick was passing through on his way to Berkeley, but we found we had common interests,” she remembers. “So I applied and also got accepted to Berkeley, and we launched our joint careers.” They married a year later.

They spent much of their honeymoon on a dig in East Africa. “For the first couple of years, about half was spent in a tent,” Toth says. “We’ve done almost all of our field work together.”

The Stone Age Institute starts at IU

At the time, Berkeley was the premier place in the United States to study paleoanthropology

focused on Africa. But in 1986, when the time came to look for tenure-track faculty positions, it was IU that came through for both of them.

By 1988, Toth and Schick had established their focus on the evolutionary significance of technology. They secured funding for the Center for Research into the Anthropological Foundations of Technology (CRAFT), where some of the elements that formed the Stone Age Institute’s mission jelled. CRAFT originally was located in a small house just off the IU campus, but is now incorporated within the institute.

The Stone Age Institute opened its doors in 2003. Schick and Toth have built it by instinct, and they credit good advice from their advisers, especially Henry Corning, scion of the family who built the town of Corning, New York. The Cornings provided early funding for John D. Rockefeller’s oil exploration in Texas. Henry Corning, a Harvard-trained sculptor and venture capitalist, joined Toth and Schick on the institute’s governing board. “Henry was an important visionary,” Toth says. “We would not have this place without him.”

The institute also has a larger and more casual advisory board made up of colleagues, mentors, and friends, some of whom have no obvious connection with the research but inspire the founders in other ways. Kenny Aronoff is a member. “I



don’t ever remember giving Nick and Kathy advice,” the drummer says, “but I’m ready, bags packed, and I’ll be there like a Navy SEAL, if they ever need any.”

Other advisers include Fritz Maytag, of the washing machine family; Jean Auel, author of the popular Clan of the Cave Bear series of novels; and Seymour Duncan, inventor and manufacturer of one of the most widely used electric guitar pickups. The late *CBS Evening News* anchor, Walter Cronkite, was also an advisory board member.

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The tool-diet-brain connection

“Our core thesis is that tools have played a crucial role in the evolution of human cognition,” Toth says. “That’s why we focus primarily on the stone technologies. Stone tools are relatively indestructible, unlike bones and other materials. So they give us the most complete story that we’re ever going to have about our ancestral past. Tools make us human in a lot of ways.”

There’s a counterintuitive notion in what Toth is suggesting: Stone tools didn’t result from human brain evolution. They enabled it.

“Tools allow you to increase diet breadth, exploiting new types of foods,



moving to new areas—that enabled brain evolution,” he explains. “Every species has as large a brain as it can afford, based on its diet and metabolic system. If humans could reduce their gut size by having a higher-quality diet, rich in protein from meats, we could devote more energy toward the brain. The brain represents 2 percent of your body weight but about 20 percent of your caloric expenditure. It’s a very expensive organ, so we needed a good reason to evolve it.”

That larger, more sophisticated brain enabled language and social cooperation, and a greater capacity to adapt to new circumstances. “What evolution really selects for are the benefits of having this enriched diet, but tools are the means to the end,” Toth adds.

Because the early hominids left no record of how they made tools, anthropologists rely on so-called “actualistic studies,” using modern circumstances to infer things about the past. In other words, scientists develop theories about how early man made stone tools by experimentally making stone tools.

The popular image of a laboriously sharpened stone axe is only partly accurate. Early hominids typically started with a large stone core, breaking off smaller, sharp flakes. The tool—what was used to dismember a scavenged or killed animal, for example—was the flake, not the core.

An important lesson from actualistic studies is that you can get hurt making stone tools.

“By about 1.5 million years ago, hominids are knocking off big flakes from boulders, and that’s really quite dangerous,” Toth says. “Sometimes they’re even doing this with obsidian—volcanic glass—and that’s about

the sharpest material in the world. Of course, they weren’t wearing a lot of clothing. They clearly were very good at this. We don’t know how many bled to death in the process.”

It has long been known that other species—crows, parrots, and various primates—use found objects in simple ways to obtain food. But it’s a more recent discovery that primates like chimpanzees can learn to make tools. In an attempt to posit how early hominids could have acquired the capability, Toth and Schick have taught apes to make stone tools.

About five years ago, having built a substantial body of knowledge about human evolution and stone technologies, Toth and Schick gathered their colleagues and asked them what the institute could do for an encore—what contribution would yield the greatest volume of data for the greatest number of researchers. “That’s how we wound up doing the coring project at Olduvai,” Schick says.

The importance of Olduvai Gorge

Olduvai Gorge, near the Ngorongoro Crater in Tanzania, is one of the most famous paleoanthropological sites in the world. Many of the most important hominid fossils and artifacts were discovered there. What has been lacking, however, is a clear understanding of the climate in which the early hominids lived.

“We know some of the environmental history from analyzing the exposed outcrops in the Gorge area where it’s eroded and you can see sedimentary sequences,” Toth says. “But drilling for core samples can give you a detailed, continuous climate history from



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(top) Schick and Dr. Jackson Njau of Indiana University Geological Sciences examine a split core showing layered, pristine lake sediments interrupted by a major eruption of volcanic ash (brown bands), dating to 1.8 million years ago. (top right) Toth and Schick in front of the Olduvai drilling project field tent, with the very last core sample from the last borehole, representing a lava flow that occurred 2 million years ago. (above) Core samples of the ancient Olduvai lake sediments, in clear plastic tubes, ready to be shipped by air freight to a state-of-the-art analytical laboratory at the University of Minnesota. *Courtesy photos*

the sediments. You can do dozens of analyses to figure out climatic and paleoenvironmental change.”

Using oil industry technology, the institute’s scientists drilled for core samples in three different locations in the ancient lake bed at Olduvai. From these cores, from as deep as 250 meters, they obtained continuous, finely resolved paleoenvironmental information going back 2.5 million years, filling in large gaps in the existing record.

Schick and Toth had to contract with five separate companies and raise over \$500,000 for the project. “We had a steep learning curve—we had never done drilling before,” Schick recalls. “We started drilling in August 2014, on the day we projected we would start. Later, we were told that one of these projects typically requires six to eight years of planning. We did it in a year.”

The cylindrical corings—7,500 pounds of material in all—had to be air-freighted to the University of Minnesota in Minneapolis for a wide range of analyses. In late November 2016, the institute held a conference to discuss its findings and the scientific papers that would arise from them.

“We already knew about large-scale climatic shifts,” Toth says. “But we now have much more detailed climatic information. We can see changes in vegetation going from

grassland to woodland and back over time, and we can see whether they are affecting the evolution of animals and humans, or changes in technology.”

One paper is in preparation for submission to the journal *Science*, and several follow-up papers are anticipated. In all, Toth and Schick anticipate dozens of professional papers will result from this work in the next several years.

Basic science is fundamental to the Stone Age Institute, but equally critical is its role in science education. Toth and Schick, through IU via CRAFT and through the institute, have held numerous conferences and educational events for the Bloomington community. They sponsor two lecture series every year, one on human evolution, and one on craftsmanship.

That, in fact, is how Toth and Schick met donor Fritz Maytag. Among Maytag’s many interests is beer; he’s the former owner of San Francisco’s Anchor Steam brewery. “We read that Fritz had brewed Sumerian beer from 3,000 BC,” Toth says, “so we contacted him and asked if he would come out for a lecture. He stayed with us at our house. He’s been an adviser for about 20 years.”

Toth and Schick also write a lot for lay audiences. Their book, *Making Silent Stones Speak*, (Simon & Schuster, 1993) was a Book-of-the-Month Club and History



(top) The band, jamming, (l-r) Rami Halperin, guitar; Tom Schoenemann, drums; Toth, guitar; Schick, congas; Yasmine Ariel, vocals; Reina Wong, guitar. The band is “fluid,” says Toth. (right) Toth with his prized 1930’s “frying pan”—the first commercial electric guitar ever made. He has about 50 guitars in his collection. *Courtesy photos*



Book Club selection; it offered non-scientists a plain-English overview of mankind’s prehistory. While newer discoveries have pushed back the earliest dates of that history, and newer tools such as DNA analysis have been added to the archaeologist’s arsenal, the book remains a relevant record of what stone tools reveal about the dawn of technology.

In 2010, the institute’s broader educational mission led to the creation of a vast timeline that placed 100 key evolutionary and technological advances in the context of the history of the universe. The project, “From the Big Bang to the World Wide Web,” resulted in an exhibition at IU’s Mathers Museum of World Cultures and remains available online at bigbangtowww.org.

The Templeton grant funds archaeological fieldwork and educational outreach in China, Tanzania, and the Republic of Georgia. In addition to the work of senior

scientists, the grant backs three graduate fellowships at IU. And it funds community outreach—workshops, exhibits, teacher training, and student field trips.

And then there’s the music

Search YouTube for “Zinjanthropus Blues” to get a sense of the way archaeologists amuse themselves while working in the field. Toth wrote the song decades ago on the way to a dig, camping with Schick in Kenya’s Rift Valley. (Zinjanthropus was a “robust australopithecine,” an early hominid discovered at Olduvai.)

During development of the Big Bang project, Tim Londergan, an IU physicist, showed Schick and Toth a video of a rap song about particle physics by science communicator Katherine McAlpine. “That was one of our major inspirations,” Toth says. “Songs for science education really began for us with the Big Bang project.”

The institute’s website now features about a dozen songs—most intended to be educational. The vocalist on most of them is Grammy-winning Bloomington singer-songwriter Carrie Newcomer, a longtime friend and advisory board member.

“Adviser is a bit of an honorary title,” Newcomer says. “I’ve been very supportive of Nick and Kathy’s educational outreach, and I’ve attended their conferences and traveled with them. They’ve created a wonderful entwining of art and science.”

“Poor Carrie,” Schick says. “She’s so wonderful. She always throws herself into the song. But we have her singing these tongue-twister words—like cyanobacteria, stromatolite, Ngorongoro.”

The science education efforts are light-hearted, but behind them is a serious purpose. “Go in to a bookstore now, and the New Age section is twice the size of the science section,” Toth observes. “What does that say about us as a society, that so many people are turning their backs on the idea of making judgments based on hard evidence? Evolution is the basic principle of life. But half of America still has doubts about it.”

The future of the Stone Age Institute

Not having children, Toth and Schick have willed their entire estate to the Stone Age Institute. “We’re trying to build something that has longevity, that will be here 200 years from now, still doing what we’re doing now,” Toth asserts. “Our big goal is a substantial endowment, \$20–\$30 million, so we can invest the money. The typical model assumes 4.5 percent or 5 percent a year goes for operational costs.”

Schick adds, “We want this research to continue, not just because it’s our passion, but because it’s important for human society to realize that we’re very new at our role in the world, and we are at a pivotal point of evolution. It’s very important for us to realize our place in this evolutionary succession. It’s vital for our survival.” ✖