



PROFILE: ALBERT AMMERMAN

Exploring the Prehistory of Europe, in a Few Bold Leaps

Archaeology's Renaissance man takes a new plunge—into the topic that made him leave a life of literature for a "\$10-a-day" life

NISSI BAY, CYPRUS—For the operator of the bungee jump here at the Olympic Lagoon Resort, it is a strange request. The Cypriot Department of Antiquities wants him to give a ride to a visiting American academic. A tall man in khaki trousers, Albert Ammerman steps over the coiled bungee cord and joins the operator in the metal cage. The crane hoists them 60 meters over the bay—the point at which most passengers are bound at the ankles and dive screaming into the air—and then Ammerman has the crane pivot farther, dangling the cage above the bone-white escarpment flanking the resort. Here Ammerman pulls out a camera and snaps shots of the land below.

"People came here on boats 12,000 years ago. It's one of the most important archaeological sites on Cyprus," Ammerman says, surprising the tattooed bungee operator. Most people consider it a waste area, full of jagged rocks that hurt the feet—there have been plans to bulldoze it for a hotel. As the bungee operator swings the cage back over the water, he asks, "Are you sure you wouldn't like to have a go?" Ammerman chuckles, and cocks his head to consider the plunge.

Ammerman, 64, is no stranger to wild leaps into the unknown. Indeed, they have defined his career. But in spite of changing research areas—and even fields—about once a decade, Ammerman has made impor-

tant advances again and again. "He is truly a Renaissance man of archaeology," says Nicola Terrenato, an archaeologist at the University of North Carolina at Chapel Hill. A decade ago, Ammerman all but abandoned the topic that launched his career, the origins of agriculture. But after a chance discovery on Cyprus's shore a few years ago, he has come back with a radical hypothesis—that sea-going people dominated the coasts and islands of the Mediterranean for millennia before farming was established.

Piccolo è bello

The first time Ammerman took a leap into the unknown was as an undergraduate at the University of Michigan, Ann Arbor, in 1964, when he turned away from math and physics to literature. As the Vietnam War reached its apex, he put aside dreams of becoming a "rocket scientist" because, he says, he felt it would mean making weapons "in one way or another." A newly declared English major, he scooped up the university's top prizes for essay writing and for original poetry. By 1966, he was an editor at a New York literary company,

producing recordings of readings by famous actors and actresses.

But in 1967, says Ammerman, "curiosity" drove him to jump again. He moved to England and enrolled in a Ph.D. program at the Institute of Archaeology, now part of University College London. "My friends told me I was crazy to consider being a student," Ammerman recalls. His employer had just agreed to make him the new editor in chief of their European operation, with "my own London office and two secretaries." Instead, Ammerman ended up "in Italy, searching for the origins of agriculture, living on \$10 a day," he says. "Those were the great years."

In the late 1960s, Ammerman says he and a like-minded group of "young turks" believed in a theory called "indigenism," which held that crops were domesticated all over Europe by the people living there. The theory was wrong, Ammerman soon realized. But in searching for evidence to support it, he acquired a deep understanding of the continent's prehistoric landscape. According to Andrew Moore, an archaeologist at the Rochester Institute of Technology in New York state, Ammerman had "a knack for finding sites in areas that others had not thought worthy of exploration."

Ammerman demonstrated that the earliest signs of agriculture didn't overlap with late hunter-gatherer sites, and this was key evidence for a theory contrary to indigenism—the view that agriculture swept across Europe in a rapid revolution, imported by newcomers. But it would be nearly 2 decades before Moore and others proved definitively that Europe's crop plants were domesticated in the Near East.

To find evidence of a farmer mass-migration, Ammerman crossed disciplines again. While he was in Italy in the late 1960s,

he teamed up with Luca Cavalli-Sforza, a geneticist now at Stanford University in Palo Alto, California, who was studying human migrations. "Theirs was the first collaboration between an archaeologist and a geneticist to put together two

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—Albert Ammerman,
Colgate University

totally distinct forms of scientific knowledge," says Moore. Ammerman mapped out the location of the earliest known appearances of agriculture across Europe, while Cavalli-Sforza analyzed samples of blood from people living in Europe today, gauging genetic differences by comparing mutations in the genes for blood proteins.

When they compared notes, a striking pattern emerged. Agriculture appeared steadily later the farther west they looked, and the degree of genetic difference between populations also grew steadily greater. “The best explanation for those patterns is that agricultural people moved into Europe from the east, displacing and mixing with hunter-gatherers as they went,” says Ammerman. By correlating geographic and genetic distance, the duo calculated the rate of the spread of agriculture across Europe at roughly 1 kilometer per year. “It created an entirely new field of archaeology,” says Curtis Runnels, an archaeologist at Boston University in Massachusetts.

The next leap came in 1985 while Ammerman was holding a temporary position at the University of Parma in Italy. While working on a dig in Rome, Ammerman teamed up with geophysicists to use techniques then foreign to archaeology, such as radar imaging and computer modeling of landscape evolution. In retrospect, says Terrenato, “establishing the solid contours and the geology of a site as it was when human occupation started” is an “obvious first step.” But archaeologists had rarely done so, “in part because of the difficulty of acquiring the necessary data,” he says.

Ammerman wasn’t the only archaeologist exploring these new methods, says John Cherry, an archaeologist at Brown University, “but he was one of the first, and his approach was very creative.”

The geo-archaeological methods paid off well. From Rome, Ammerman went to ancient Athens and other cities, plying his quantitative methods. In Venice, says Moore, Ammerman produced “spectacular results, pushing back the date of the inception of the city and giving it a new founding history.” This work has also embroiled him in debates over the future of coastal cities in the face of climate change (*Science*, 25 August 2000, p. 1301).

But staying out of the mainstream has often required Ammerman to work “as the proverbial army of one,” says Terrenato, stringing together small grants to do field work either alone or in small collaborations. Unlike colleagues at big research universities with troops of graduate students, Ammerman drifted between universities in Italy and settled at a small liberal arts college, Colgate University in Hamilton, New

York. But if he has an underdog reputation, Ammerman is sanguine about it. “Piccolo è bello,” he says—small is beautiful.

Neolithic redux

In 2004, Ammerman spent a year as a Fulbright senior scholar in Cyprus. He was attracted to an archaeological mystery on the island.

Ammerman and Cavalli-Sforza’s rate of 1 kilometer per year for the spread of agriculture works well on the European mainland, but the picture is confusing along the Mediterranean coast. Cyprus, as the first big island off the Near Eastern coast, partly visible from mountains in Turkey, should have been colonized by farmers relatively early. To get there, however, they would have needed boats to traverse 60 kilometers of open water, and evidence for ancient seafar-



Striking similarity. Ammerman found stone tools near a rocky outcrop on Cyprus that he says resemble Neolithic tools from the mainland.

ing in the Mediterranean is scant.

Within the past decade, Edgar Peltenburg, an archaeologist at the University of Edinburgh, U.K., has pushed the date of Cypriot occupation back to 8200 B.C.E., making it one of the earliest arrivals of agriculture from the Near East. The discovery implies that seafaring technology must have been available by then, says Ammerman, and it also creates a paradox. “In a world of boats, agriculture should have spread far more quickly around the Mediterranean than on the mainland.” But the opposite is true. Traveling west, the next big island, Crete, is only days away by boat, but farmers do not seem to have left their mark there until 7000 B.C.E. The toe of Italy seems to have been foreign to farming until 1000 years after that. “What took them so long?” Ammerman wonders.

A few months after arriving at Cyprus, Ammerman was strolling along the Aeolianite bluff at Nissi Bay when he saw something that stopped him in his tracks. He picked up a small, chipped stone and turned

it over in his hand. It was a tool from before the Neolithic Period. “Then I started seeing them all over the place,” he says. He teamed up with a fellow Fulbright senior scholar on Cyprus, Jay Noller, a geologist at Oregon State University in Corvallis, to map out other Aeolianite outcrops on the island. Sure enough, a similar part of the coast to the west is peppered with stone blades and scrapers typical of the mainland about 12,000 years ago.

Archaeologists have never noticed these sites, says Ammerman, “because no one would ever think of looking in such a place.” The Aeolianite seems like an unpleasant place to make a living, he says. But after several summers of fieldwork, “I now appreciate that it’s awful for agriculturalists but wonderful for hunter-gatherers.” The Aeolianite’s natural pits and shelves “are like Paleolithic furniture, perfect if you’ve got seafood you’ve captured down at the coast and need a sheltered place to process and cook it.”

Ammerman believes he’s found by far the oldest evidence of seafaring in the Mediterranean, and he thinks it could shed light on the agricultural transition itself. “The mistake that I think we have always made about the Neolithic is to assume that agriculture must have been perceived as a far superior lifestyle and was immediately embraced,” he says. “Agriculture can support far higher population densities,” and that is why the agriculturalists inevitably took over. But the coastal environment is not ideal for agriculture, says Ammerman, adding “I think agriculture didn’t spread along the coasts because they were already frequented by a stable culture of voyaging foragers.”

But Ammerman “desperately needs independent evidence to sustain the early dating of his sites,” says Peltenburg. Ammerman’s first shot at that—getting a carbon date on a sample of charcoal from the surface—was disappointing. The sample turned out to be no older than the days of Napoleon. Now he plans to get carbon dates from samples of shells at lower levels.

Back in the bungee cage, Ammerman decides to skip this plunge. But about his new research direction, he has no hesitation. “Sure, I could be wrong,” he says. “But this sure is fun.” That seems to be the motto of a scientist who has followed the beat of his own drum.

—JOHN BOHANNON