ARCHAEOLOGY

Siberia: Surprising Home for Early Modern Humans

For most Europeans and Americans, the name Siberia conjures up prison camps, inhospitable landscapes, and unspeakable cold. Certainly archaeologists have considered Siberia to be one of the last places on Earth that modern humans elected to settle. But, ironically, it may have been one of the first. In the June issue of *Antiquity*, American and Russian archaeologists report that two key Siberian sites date to at least 40,000 years ago—nearly 10,000 years earlier than previously thought and just about the time modern human beings first showed up in Europe.

"This shows that Siberia was not a gulag back then," says Ted Goebel, an archaeologist at Southern Oregon State College and an author of the paper. Scientists have been debating whether ancient Siberia's climate could support a human population. But the work indicates some modern humans indeed hoofed it out of Africa, bypassed Europe completely, and headed straight for the Siberian frontier. "The dates look extremely good," says James Bischoff, a geochronologist with the U.S. Geological Survey in Menlo Park, California.

The dates look particularly good to those prehistorians who favor an early arrival for people in the Americas. Until now, the consensus view has been that the Americas were first peopled about 12,000 years ago, and some of the arguments for that point of view came from Siberia: Some researchers argued there wasn't enough time for migrants to make the arduous journey from Siberia and arrive much before then. But the extra time implied by Goebel's work makes an earlier American landing more plausible. "The 40,000-year date gives a little more breathing room," says David Meltzer, an archaeologist at Texas's Southern Methodist University—although it hardly clinches the case for earlier Americans.

Goebel began to find this breathing room in 1990, when he dated bone and charcoal samples from several Siberian sites excavated by Mikhail Aksenov, an archaeologist at Russia's Irkutsk State University, and his colleagues from the Institute of Archaeology at Novosibirsk. At one site, Makarovo-4, which lies on a high bluff overlooking the Lena River, Aksenov uncovered thousands of artifacts, two possible hearths, and a dense accumulation of bones from woolly rhinoceroses, red deer, and roe deer. Based on the geologic context and the implements—many reworked stone blades, knives, and scrapers similar to those found in the Middle East about 45,000 years ago—Aksenov had suggested a similar date for the site. Another site, Varvarina Gora, had similar materials, as well as bone and ivory tools and a flat, disk-shaped stone that might have formed a pendant, and was roughly dated to about 34,000 years ago. But those dates were always disputed by other archaeologists.

Thinking that a more sophisticated dating technique might resolve the dispute, Goebel sent bone samples from the sites to Douglas Donahue and Austin Long at the University of Arizona, Tucson, for accelerator radiocarbon dating. Carbon isotopes such as ^{14}C decay at a steady rate, and so the number of ^{14}C atoms remaining in a sample provides the basis for a clock. Accelerator dating uses a tandem accelerator as a mass spectrometer to count these atoms directly; in this case, the scientists measured the number of ^{14}C atoms left in the bone's protein.

TED GOEBEL

Siberian survival kit. Artifacts from a site that is at least 35,000 years old include scrapers, blades, and a flat stone that might have been a pendant *(bottom row, center)*.

The bones from the Siberian sites had been buried in permafrost conditions, so they were "exceedingly well preserved," says Long, reducing the risk of contamination with modern organic material that can produce misleading recent dates. "It was like working with bone that had just been pulled out of a freezer after 40,000 years." Another advantage of accelerator dating is that it allows scientists to use samples as small as a milligram, making it much easier to purify the sample and further reducing the risk of dating a contaminant. Still, says Long, that risk is never zero, and therefore "we're conservative in our interpretation." Because of the chance of contamination—and thus of an artificially young date—the geochronologists did not put an upper limit on the age of the sites, calculating that Makarovo-4 must be at least 39,000 years old, if not older. In the same way, the date for Varvarina Gora is given at more than 35,000 years. The researchers intend to back up these dates with another technique, thermoluminescence dating, which may yield a more definite answer.

Even before that answer is available, Goebel is confident modern humans ventured into southern Siberia at least 42,000 years ago, noting that similar dates were obtained from charcoal samples at another site in southwest Siberia. And, if the dates are correct, those earliest Siberians had a culture that was a few thousand years ahead of their European counterparts. The Siberians had a diverse tool kit, with stone blades for working bone, ivory, and antlers into hunting weapons, as well as ornaments like pendants; such sophistication doesn't show up in the European record until after 40,000 years ago. That comes as no surprise to Goebel, who notes that other archaeologists have suggested that western Asia "may have been the heartland of early human activity," while western Europe was "the outpost, where things happened later."

The Siberian artifacts, particularly the blades, are also reminiscent of 11,000-year-old Paleoindian implements from the western United States, part of the so-called Clovis industry, says Dennis Stanford, a curator of North American archaeology at the Smithsonian Institution. This suggests a connection, albeit a tentative one, between these earliest Siberians and the first Americans, he adds: "I think there may be a link—but that part of Siberia is still a long, long, long ways away." Southern Siberia is about 4000 kilometers away from the Bering Strait.

Nor would the trek from Siberia to the Americas have been easy. "All these early sites in Siberia that Goebel and the Russians are investigating are in a band stretching along the southern Siberian border," notes Roger Powers, an archaeologist at the University of Alaska, Fairbanks. People probably did not venture much farther north, where they would have faced subarctic conditions. And while that subarctic landscape lies only 6 degrees north of Makarovo-4, the difference in the land, temperature, and animals is huge. "There were many factors they'd have to overcome to move into that region, and to learn the skills they'd need to cross to Beringia," admits Goebel. But in the extra 10,000 years that has been provided by the new dates, he adds, human beings could have learned a lot about coping with the climate of their new home.

–Virginia Morell