Siberian Site Cedes Stone-Age Surprise

On a windblown terrace above Siberia's Lena River, Russian scientists have unearthed evidence that humanity's evolutionary ancestors inhabited parts of northeastern Asia and could have made initial forays into North America much earlier than previously thought.

Preliminary soil analysis by two U.S. geologists indicates that stone tools found at the Siberian location, known as Diring, date to around 500,000 years ago. However, Russian investigators date the artifacts to at least 2 million years ago, argued excavation director Yuri A. Mochanov last week in a talk at the Smithsonian Institution in Washington, D.C.

"I suspect the artifacts are younger than Mochanov's estimates," says Richard B. Potts, a Smithsonian archaeologist who examined a dozen stone flakes and blades brought from the site by Mochanov. "But even if Diring is only 50,000 years old, it's significantly older than any other human site in Siberia."

No other human sites in Siberia date to more than 35,000 years ago. This fuels the view that North America's initial settlers arrived no earlier than 20,000 years ago (SN: 6/9/90, p.360).

Mochanov, an archaeologist at the Russian Academy of Sciences in Yakutsk, accepted this theory until shortly after he started working at Diring in 1982. Geologists digging up soil samples along the Lena River found some human bones and alerted Mochanov. He and his coworkers then excavated several human burials dating to 10,000 years ago and the 35,000-year-old remains of mammoth hunters.

The investigators also found sharp-edged stones that looked like human tools. These flakes, choppers, and other implements had been sandblasted by Siberian winds. Only East African stone tools that date to between 1.8 million and 2.5 million years old resemble the Diring artifacts, Mochanov contends. The tool-bearing soil has yielded no bones, probably because they were destroyed by windblown sand, Potts says.

A larger scientific team returned to Diring in 1983. Annual fieldwork since then has yielded more than 4,000 stone tools over an area the size of four football fields, making Diring the largest Stone-Age dig in the world, according to Robson Bonnichsen, an archaeologist at Oregon State University in Corvallis, who visited the site in 1992.

Measurements of magnetic reversals and radioactivity in Diring soil — the latter relying on a technique unknown to Western scientists — place the finds at 2 million to 3 million years old, Mochanov maintains.

He offers the radical proposal that direct human ancestors evolved not in Africa, but in the northernmost reaches of Siberia, where severe cold forced innovations in thought and behavior that fostered human evolution.

Archaeologists who have seen the Diring artifacts generally agree that someone intentionally made them, but they express skepticism about Mochanov's age estimates. In fact, thermoluminescence dates for two soil samples collected at Diring last summer by Michael Waters, a geologist at Texas A&M University in College Station, place the stone tools at about 500,000 years old.

Thermoluminescence dating of eight additional soil samples gathered by Waters will continue. Steven Forman of Ohio State University in Columbus directs the analysis, which estimates age from measures of the radioactive signal in sand grains and the dose of radioactivity in surrounding soil.

Ongoing soil and pollen analysis at Diring will help to establish whether its inhabitants endured bitter cold or lived during a relatively warm spell, Oregon State's Bonnichsen notes.

If cold weather prevailed, the Siberian findings will put a chill on the widespread opinion that only Neandertals adapted successfully to frozen climates, Potts asserts. Still, the species identity of Diring's inhabitants remains unknown.

Diring's estimated age of 500,000 years also supports theories that people could have migrated to North America more than 30,000 years ago, adds Smithsonian archaeologist Dennis Stanford.

Investigators should expand their Siberian search by launching excavations at 15 recently discovered sites located near Diring, Potts remarks. — *B. Bower*

Biodiversity helps keep ecosystems healthy

For years, prominent biologists and conservationists have campaigned for the preservation of biological diversity, despite little proof of their assertion that reducing the number of plant and animal species upsets nature's balance. Now, two experimental studies illustrate the detrimental effects of species loss.

More than 10 years ago, ecologist David Tilman of the University of Minnesota in St. Paul and his colleagues began investigating how as many as 250 kinds of plants could thrive in midwestern grasslands, even though the flora competed for limited resources. They did not expect to address the question of the value of biodiversity, Tilman says.

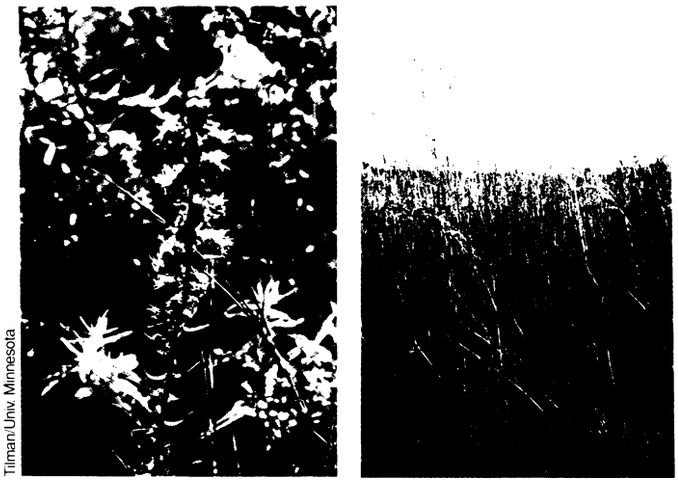
For this experiment, the researchers created 207 4-meter-square plots distributed among one native prairie and three abandoned fields of different ages.

Each season, they clipped a different 0.33-square-meter section in each plot and analyzed its species composition and biomass — the weight of leaves, stems, and flowers combined. They left some plots alone and added specific amounts of nitrogen fertilizer or other nutrients to others.

In 1987, less than 300 millimeters of rain fell, down from an average of 450 mm. The next growing season brought just 200 mm. The more diverse the plant community, the less its productivity declined during these dry years and the faster it rebounded. These changes "provided data that have not been available before," Tilman says.

During the dry spell, plots with nine to 23 species in the clipped sections produced half as much as normal. With fewer than nine species, the plot's productivity declined precipitously. Those with just one or two types of plants dropped to one-eighth normal, note Tilman and John A.

Species-rich fields (left) weather drought better than species-poor ones (right).



Tilman/Univ. Minnesota