Dogs today carry on a 9000-year tradition in Siberia.

PHOTO: DMITRY FEOKTISTOV/CONTRIBUTOR/GETTY IMAGES

ARCHAEOLOGY

Siberia yields earliest evidence for dog breeding

Bones suggest that dogs pulled sleds 9000 years ago–implying humans domesticated dogs to put them to work

By **David Grimm**

The hunter-gatherers of Zhokhov Island were a hardy folk. Nine thousand years ago, they survived frigid year-round temperatures in animal-skin tents some 500 kilometers north of what is now the Russian mainland, and they were the only people ever known to hunt large numbers of polar bears without firearms. Now, it appears these ancient Arctic dwellers did something even more remarkable. An analysis of canine bones from Zhokhov suggests they bred dogs to pull sleds, making this the first evidence—by thousands of years—for dog breeding in the archaeological record.

"It's pretty convincing and very exciting," says Melinda Zeder, an archaeozoologist at the Smithsonian Institution's National Museum of Natural History in Washington, D.C. The finding may help explain why people domesticated dogs in the first place: to put them to work. "It fills in a missing piece of the puzzle of early human-dog relationships, and even domestication itself," adds Angela Perri, a zooarchaeologist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

Zhokhov wasn't an island at the time. Before seas rose as ice age glaciers melted, it was connected to the Russian mainland. In addition to polar bears, mostly hunted in winter, the Zhokhovians pursued reindeer hundreds of kilometers across vast plains. "They needed a means of transportation," says Vladimir Pitulko, an archaeologist at the Russian Academy of Sciences in St. Petersburg who has been excavating Zhokhov since 1989. He previously found dog bones and the remains of wooden sleds on the island, but it was never clear whether the animals were actually bred for sledding.

Now, Pitulko has evidence that they were. To confirm that the canines were dogs, he and Aleksey Kasparov, an archaeozoologist at the same academy, compared the two most complete skulls to those of wolves and Siberian Huskies. They found that two key ratios—snout height to skull length and cranium height to skull length—could reliably distinguish the two. By those measures, their samples were truly dogs—though one appeared to be a wolf-dog hybrid.

To figure out what the Zhokhov dogs looked like, the team extrapolated their sizes from the fossil bones of 11 individuals. Ten of the dogs weighed between 16 and 25 kilograms and may have resembled Siberian Huskies, the team will reveal next month in the *Journal of Archaeological Science: Reports*. The remaining dog—the putative wolf-dog hybrid—weighed about 29 kilograms and may have been similar to an Alaskan Malamute. Good sled dogs typically weigh between 20 and 25 kilograms, Pitulko says, as dogs of this size are big enough to pull sleds yet don't overheat like larger dogs. He concludes that the Zhokhovians probably bred the smaller dogs for sledding, and may have bred the larger one to hunt polar bears. "They were clearly shaping these animals to do something special."

"If this is indeed a breeding program, it would be the earliest evidence of dog breeding for any purpose," Perri says. The next closest example, she says, would probably be herding dogs in the Near East, which were bred about 7000 years ago. But she thinks the wide range of weights of the ancient dogs argues against strictly controlled breeding. "I think there were a lot of different kinds of dogs—and maybe even some wolves—mating with each other, producing random litters." From those litters, humans may have selected the best sled dogs, which would still indicate some sort of focus on breed. "It's as convincing as you're going to get with the material they have," Zeder says.

The find may shed light on why dogs were domesticated in the first place, at least 15,000 years ago. Significantly, this was around the time when Earth was beginning to warm after the ice age, with large species like mammoths disappearing and smaller migrating game like reindeer starting to dominate the landscape. Dogs could help hunt down this smaller prey and even provide a means for people to follow them. "Before then, there was no real reason to have a dog," says Pitulko, who dedicates his paper to Liverpool, a 15-year-old dachshund he calls a "true friend." "We turned to them when we really needed them."

Zeder agrees. Her own work has shown that animals from foxes to badgers were hanging around early human campsites, and that some may even have become tame. The reason we don't have pet foxes today, she speculates, is that we never found a use for them. "Starting a two-way street with dogs and shaping them into the animals we needed—that was the real domestication."

Another study published last year concluded that dogs may have been domesticated in both Europe and East Asia. The new work doesn't necessarily challenge that idea, although it suggests that early dogs may have played an important role in the Arctic as well. And Pitulko thinks dogs could have been domesticated independently in this region.

"The Arctic should be a bigger part of the domestication equation," Perri agrees. "It's holding some secrets. Something interesting is going on there." ■

Siberia yields earliest evidence for dog breeding

David Grimm

Science **356** (6341), 896.
DOI: 10.1126/science.356.6341.896