

EVOLUTION'S HOT POTATO

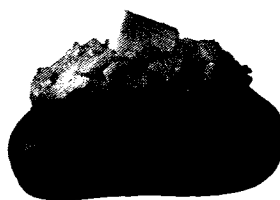
CONSIDER THE LOWLY TUBER: not much to look at, tough to clean, a pain to peel. It does make some nice comfort food and goes well with steak. But could this unassuming vegetable—or whatever it is—actu-

ally be a linchpin of human evolution? Could the spud have spurred the development of big brains and small teeth in early hominids, not to mention the first human “marriages”?

Five anthropologists laid all this and more at the door of the tuber in the December issue of *Current Anthropology*. Richard Wrangham, a professor at Harvard who specializes in chimpanzee behavior, David Pilbeam, a Harvard colleague who studies human evolution, and three junior scholars claim that when protohumans hit their evolutionary growth spurt 1.9 million years ago, it was because they had learned how to cook “underground storage organs” found in the savanna—basically, African potatoes.

Current Anthropology published the paper alongside responses that ranged from the

Could the lowly spud have spurred the development of big brains, smaller teeth, and human marriage? Two leading evolutionists think so.



provisionally intrigued to the derisive. But perhaps Henry Bunn, an anthropologist at the University of Wisconsin, best summed up the worries of biological anthropologists when he asked: "Is the cooked-tuber story science, or is it half-baked wishful thinking?"

Scholars have long wondered how the big-toothed, medium-brained early *Homo* metamorphosed into *Homo erectus*, the first recognizable human. Charles Darwin thought hunting was the answer. In the 1960s, paleoanthropologists such as Sherwood Washburn and C.S. Lancaster built on that thesis, developing a scenario known as "Man the Hunter." The need to track herds and cooperate with other hunters, the theory went, would have encouraged selection for intelligence.

Almost as soon as the Man the Hunter idea was unveiled, however, there was a backlash. In the subsequent "Woman the Gatherer" counter-thesis, feminist researchers argued that big-game hunting was a high-risk, low-reward activity. Women, they contended, were more likely to have supplied early humans with most of their protein through such unheralded activities as killing lizards and digging up roots. Today, the most widely accepted explanation for the jump from early *Homo* to *Homo erectus* sidesteps gender altogether, holding simply that the consumption of meat, which carries concentrated amounts of energy, was the key.

Wrangham, the co-author of *Demonic Males* (Houghton Mifflin, 1997), and his colleagues argue that the meat thesis is a tad underdone. For one thing, tools and evidence of cut animal bones enter the fossil record 2.5 to 2.3 million years ago, but *Homo erectus* didn't stand up until 1.9 million years ago. Cross-species comparisons also cast doubt on the importance of meat: Carnivorous breeds of chimpanzees aren't much different from their vegetarian cousins.

If the missing link isn't meat, though, why presume it's potatoes? Here the paper gets more speculative. Tubers are widespread in the African savanna; hunter-gatherers in Africa today rely on them. Since these roots require fairly arduous digging, the anthropologists surmise, other mammals would not have offered much competition to early humans. Certain tools preserved in the fossil record, moreover, could well have served as tuber-scoopers.

In the article's key maneuver, the authors argue that the onset of cooking—specifically, cooking tubers—would have provided the boost in nutrients that scholars have long chalked up to meat eating. Potato starch goes down hard when it's raw, but when cooked it's easily digested. You would expect cooking, Wrangham and friends say, to enlarge and improve the diet—finally resulting in bigger brains, smaller teeth, and a slimmer gut. Voilà: precisely the changes that occurred 1.9 million years ago.

But wait. The authors add still more evolutionary conjecture to the pot: Tasty and ready to go, cooked food would have been vulnerable to theft. Women would face particular risk that their prepared food would be stolen, since men were, on average, stronger. Given their strength advantage, game theory suggests males would quickly give up cooking in favor of pilfering. Females would therefore form alliances with men, who would guard their hearths. Sex would be the bodyguard's payment. This chain of events would have led to the first

pair-bonds. Long-term pair-bonding would in turn reduce male-male competition, leading the size gap between males and females to shrink—another change seen in the record at the right time.

To some scholars, all of this sounds reasonable. Kristen Hawkes, chair of the anthropology department at the University of Utah, calls the paper "exciting." The traditional arguments stressing the importance of meat, she says, "are due for a serious revision." Ralph Rowlett of the University of Missouri, who has been studying an early *Homo* campsite in Kenya, wrote in *Current Anthropology* that his dates for the control of fire jibe with the Wrangham thesis. He plans to expand his research project to include a search for cooked biomaterial.

Other anthropologists, however, almost fell off their chairs when they read the article. "I don't understand why scholars who are so talented went to the trouble to write this paper," says Katharine Milton of the department of environmental science, policy, and management at Berkeley. "It's so implausible." Just for starters, she asks why cooked tubers would be any more attractive to thieves than raw ones. What's more, mashing raw tubers makes them almost as digestible as cooking does.

Craig Stanford, an anthropologist at the University of Southern California, says the paper's logic is strikingly circumstantial. "Whereas we have literally a ton of evidence of meat eating—the cut marks on fossilized bones make it very clear that early hominids were scavenging or hunting

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meat—there is no evidence that early hominids ate tubers, ever," he says. Finally, other theories of the advent of cooking abound: One pegs it at 200,000 or 300,000 years ago, when humankind spread into the colder parts of Europe. In a region where meat quickly froze, humans would have needed to control fire in order to defrost their dinners.

The University of Michigan's C. Loring Brace, the author of the latter theory, was especially withering in his assessment of the article. In the first draft of his response, he included a parodic summary of the new theory, in the voice of Rudyard Kipling: "In the

earliest times of our world, O Best Beloved, our primitive progenitors did not know the art of making their food either tasty or digestible...." The editors snipped that bit out.

"We don't have a fossil of an *Australopithecine* with a root in its mouth," Wrangham concedes. But he insists that the *Current Anthropology* thesis fits the environmental and fossil record better than the meat-eating alternative and that its evolutionary logic is more rigorous. "There is no equivalent paper to this one, for meat eating, that lays out a series of arguments for why meat should have been important and what kind of

impact it can have been expected to have."

Wrangham's paper may spark more research, but it has already inspired endless wordplay. Milton wrote in her commentary: "*Demonic Males* seems to have spawned demonic meals, leading to a good case of indigestion!" Bunn called the theory a "warmed over" version of 1970s thinking, "served up" as a new dish. He also foisted this monstrosity onto the journal's unsuspecting subscribers: "With due apologies to the Beatles, 'Lucy at the Campfire with Tubers' is not going to sell."

Stanford and Wrangham, who are friends, already have an idea of what a synthesis of the conventional wisdom and the new notion might be called: the meat and potatoes of evolution.

Somebody, make them stop.

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