Habitat for Humanity

Past and present. *Ardipithecus*'s woodland was more like Kenya's Kibwezi Forest (*left*) than Aramis today.

ARAMIS, ETHIOPIA—A long cairn of black stones marks the spot where a skeleton of *Ardipithecus ramidus* was found, its bones broken and scattered on a barren hillside. Erected as a monument to an ancient ancestor in the style of an Afar tribesman's grave, the cairn is a solitary marker in an almost sterile zone, devoid of life except for a few spindly acacia trees and piles of sifted sediment.

That's because the Middle Awash research team sucked up everything in sight at this spot, hunting for every bit of fossil bone as well as clues to the landscape 4.4 million years ago, when *Ardipithecus* died here. "Literally, we crawled every square inch of this locality," recalls team co-leader Tim White of the University of California, Berkeley. "You crawl on your hands and knees, collecting every piece of bone, every piece of wood, every seed, every snail, every scrap. It was 100% collection." The heaps of sediment are all that's left behind from that fossil-mining operation, which yielded one of the most important fossils in human evolution (see main text, p. 36), as well as thousands of clues to its ecology and environment.

The team collected more than 150,000 specimens of fossilized plants and animals from nearby localities of the same age, from elephants to songbirds to millipedes, including fossilized wood, pollen, snails, and larvae. "We have crates of bone splinters," says White.

A team of interdisciplinary researchers then used these fossils and thousands of geological and isotopic samples to reconstruct *Ar. ramidus*'s Pliocene world, as described in companion papers in this issue (see p. 66 and 87). From these specimens, they conclude that Ardi lived in a woodland, climbing among hackberry, fig, and palm trees and coexisting with monkeys, kudu antelopes, and peafowl. Doves and parrots flew overhead. All these creatures prefer woodlands, not the open, grassy terrain often conjured for our ancestors.

The team suggests that *Ar. ramidus* was "more omnivorous" than chimpanzees, based on the size, shape, and enamel distribution of its teeth. It probably supplemented woodland plants such as fruits, nuts, and tubers with the occasional insects, small mammals, or bird eggs. Carbon-isotope studies of teeth from five individuals show that *Ar. ramidus* ate mostly woodland, rather than grassland, plants. Although *Ar. ramidus* probably ate figs and other fruit when ripe, it didn't consume as much fruit as chimpanzees do today.

This new evidence overwhelmingly refutes the once-favored but now moribund hypothesis that upright-walking hominins arose in open grasslands. "There's so much good data here that people aren't going to be able to question whether early hominins were living in woodlands," says paleoanthropologist Andrew Hill of Yale University. "Savannas had nothing to do with upright walking."

Geological studies indicate that most of the fossils were buried within a relatively short window of time, a few thousand to, at most, 100,000 years ago, says geologist and team co-leader Giday WoldeGabriel of the Los Alamos National Laboratory in New Mexico. During that sliver of time, Aramis was not a dense tropical rainforest with a thick canopy but a humid, cooler woodland. The best modern analog is the Kibwezi Forest in Kenya, kept wet by groundwater, according to isotope expert Stanley Ambrose of the University of Illinois, Urbana-Champaign. These woods have open stands of trees, some 20 meters high, that let the sun reach shrubs and grasses on the ground.

Judging from the remains of at least 36 *Ardipithecus* individuals found so far at Aramis, this was prime feeding ground for a generalized early biped. "It was the habitat they preferred," says White. **–A.G.**

suggested in 1871 that our ancestors arose in Africa, researchers have debated whether our forebears passed through a great-ape stage in which they looked like proto-chimpanzees (*Science*, 21 November 1969, p. 953). This "troglodytian" model for early human behavior (named for the common chimpanzee, *Pan troglodytes*) suggests that the last common ancestor of the African apes and humans once had short backs, arms adapted for swinging, and a pelvis and limbs adapted for knuckle walking. Then our ancestors lost these traits, while chimpanzees and gorillas kept them. But this view has been uninformed by fossil evidence because there are almost no fossils of early chimpanzees and gorillas.

Some researchers have thought that the ancient African ape bauplan was more primitive, lately citing clues from fragmentary fossils of apes that lived from 8 million to 18 million years ago. "There's been growing evidence from the Miocene apes that the common ancestor may have been more primitive," says Ward. Now *Ar. ramidus* strongly supports that notion. The authors repeatedly note the many ways that *Ar. ramidus* differs from chimpanzees and gorillas, bolstering the argument that it was those apes that changed the most from the primitive form.

But the problem with a more "generalized model" of an arboreal ape is that "it is easier to say what it wasn't than what it was," says Ward. And if the last common ancestor, which according to genetic studies lived 5 million to 7 million years ago, didn't look like a chimp, then chimpanzees and gorillas evolved their numerous similarities independently, after gorillas diverged from the chimp/human line. "I find [that] hard to believe," says Pilbeam.

As debate over the implications of *Ar. ramidus* begins, the one thing that all can agree on is that the new papers provide a wealth of data to frame the issues for years. "No matter what side of the arguments you come down on, it's going to be food for thought for generations of graduate students," says Jungers. Or, as Walker says: "It would have been very boring if it had looked half-chimp."

–ANN GIBBONS

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