

Was Lucy a Climber? Dissenting Views of Ancient Bones

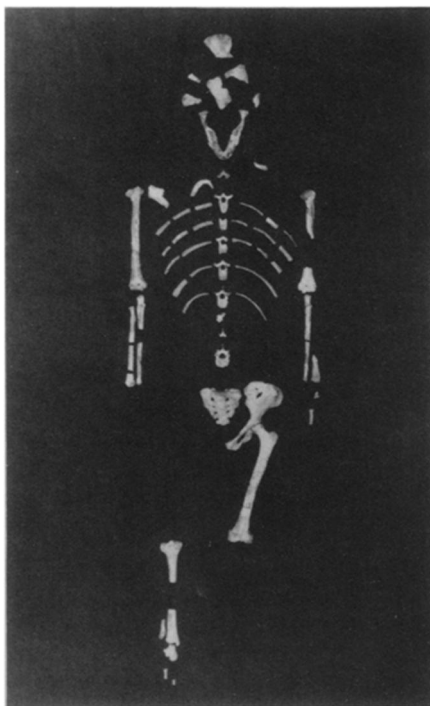
Two groups of scientists, working independently, have recently challenged the claim that "Lucy"—believed to be the earliest known human ancestor (SN: 1/20/79, p. 36)—had completely abandoned the trees and had fully adapted to upright walking on the ground. The alternative views, based on anatomical studies of fossil remains from Ethiopia and Tanzania, raise questions about how early hominids foraged for food, nested, socialized and—ultimately—evolved into humans.

Anthropologist Randall L. Susman and anatomist Jack Stern of the State University of New York at Stony Brook say that Lucy's bones and other fossils from the Hadar region of Ethiopia indicate that the earliest known species of hominid (called *Australopithecus afarensis*), while adapted to walking, was still spending considerable time in the trees. University of Chicago anthropologist Russell Tuttle has independently come to the same conclusion, although he argues that bipedality actually developed in tree-dwelling apes—perhaps millions of years before the existence of hominids. Tuttle also argues, based on an analysis of the Laetoli footprints in Tanzania (SN: 3/31/79, p. 196), that another more human species of ape-man co-existed with *A. afarensis* about 3.7 million years ago; this unnamed species, rather than *A. afarensis*, was probably the direct ancestor to *Homo sapiens*, Tuttle says.

Tuttle examined the footprints at the invitation of Mary Leakey, who discovered the trail and interpreted it as evidence of a species—distinct from *A. afarensis*—directly related to the human line. Tuttle's argument challenges the position of Lucy's discoverer, anthropologist Donald C. Johanson of the Institute of Human Origins in Berkeley, Calif., who has argued that the Laetoli footprints were also made by a member of the species *A. afarensis*, which he considers the sole evolutionary link between apes and man.

Johanson has also maintained, based on the work of Kent State University anatomist C. Owen Lovejoy, that Lucy was fully bipedal and adapted to life on the forest floor. The opposing case for Lucy's arboreal habits, based on interpretations of technical anatomical evidence, calls into question Lovejoy's theory that upright walking evolved along with monogamous mating and the nuclear family.

Susman and Stern base their conclusions on an examination of Lucy's scapula and the feet and hand bones from the Hadar, all of which show "unmistakable hallmarks of climbing," according to Susman. Although they agree with Lovejoy that Lucy's knee, leg and hip show bipedality, they say that the *A. afarensis* toes,



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"Lucy": Did she frequent the trees? Fossil remains have been interpreted as evidence that early hominids were fully adapted to terrestrial life 3.7 million years ago.

which they describe as "long and curved," were still used in climbing, as was the mobile but still undeveloped thumb. In addition, Susman says, Lucy's limb proportions indicate that she had not yet developed an efficient upright gait. Susman also says that evidence of a well-developed "peroneal" muscle in Lucy's lower leg indicates adaptation for climbing; he bases his conclusion on electromyographic studies of living chimps and gibbons, which show that the peroneus is active in climbing.

Tuttle agrees that, based on anatomical data, *A. afarensis* must have been arboreal, but he goes even farther, arguing that Lucy's pelvis shows a flare that is better suited for climbing than for walking. More importantly, he says, the Laetoli footprints do not match the foot bones found in Hadar; where the Hadar foot is ape-like, with curved toes, the footprints left in Laetoli are "virtually human." Tuttle concludes that the bipedal species which lived in Tanzania is a different species from *A. afarensis*—and one more closely related to humans.

Both Susman and Lovejoy dismiss Tuttle's theory about two separate lineages; modern chimpanzees (and presumably ape-like hominids) walk in such a way as to make very human looking prints, Susman claims. Tuttle, in reply, says that the others have misinterpreted the data be-

cause they have examined only casts and not the actual prints.

Lovejoy argues that Lucy's hip is "beautifully adapted for bipedality and poorly adapted for arboreal climbing"; Susman agrees. But Lovejoy dismisses any evidence that *A. afarensis* inhabited the trees. The digits, he insists, are short—not long, as Susman and Tuttle have described them—and are very limited in their ability to flex, indicating poor suitability for climbing. In addition, Lovejoy says, an X-ray of a partial femur discovered recently in Ethiopia reveals an internal structure designed to accept stress only in an upright position. Finally, Lovejoy dismisses Susman's claim about the peroneal muscle, arguing that the muscular function in living apes is not relevant; in modern humans (and presumably in early hominids) the peroneus functions to support the arch when standing upright, he insists.

Morphological data are important, because it is with such data that any speculation about behavior and evolution must begin. Lovejoy has argued that bipedality was a social adaptation—that upright walking was necessary for the evolution of the nuclear family, in which the male foraged and carried food home to provision the female and children. Tuttle suggests, in contrast, that bipedalism probably evolved millions of years earlier; apes, he says, developed bipedalism to climb vertically through the trees and to pursue prey along branches. He dismisses Lovejoy's theory as speculation without evidence.

Susman offers something of a middle position. He agrees with Lovejoy that the species was sexually "dimorphic," and he suggests that as males became larger and less adept at moving through the forest compound, they spent more time foraging on the ground. Bipedal features are pronounced in the larger forms, he says. But both males and females certainly nested in the trees at night, he says; an animal Lucy's size could not have survived on the ground. He says that climbing ability actually fits the view of Johanson and Berkeley anthropologist Timothy D. White that Lucy's skull and teeth were chimpanzee-like. A fruit-eater would have to have access to trees, he says.

Lovejoy and Johanson disagree. While they concede that Lucy may have nested in the trees at night, they say it is unlikely; living in groups, they could have survived on the ground. But foraging in trees would have been impossible for an animal so adapted to terrestrial life, Lovejoy insists. With the descent from the trees, he says, ape-men began the kind of ground foraging which anticipated early man's migration from the forest to the savanna.

—W. Herbert