

Lucy: The trouble with dating an older woman

A geologist and an anthropologist, working independently, have recently challenged the age of the Hadar fossil site in Ethiopia, raising questions about the age and significance of the Hadar's most famous hominid, Lucy. Lucy's American proprietors, while welcoming the geological clarification of the shaky Hadar dates, have rejected the anthropological work wholesale, charging their critic with methodological clumsiness and intellectual dishonesty.

Using an innovative dating technique, University of Utah geologist Francis H. Brown has matched the chemical "fingerprints" of a particular tuff (volcanic rock) at Hadar with those of three tuffs at Lake Turkana nearly 500 kilometers away. What this match means, according to Brown, is that the tuffs in both sites may have resulted from the airfall of a single volcanic explosion; and because the Lake Turkana tuffs (near the Kenya-Ethiopia border) are fairly reliably dated at just over 3 million years old, the fingerprinting evidence challenges the oldest date of 3.6 million years previously proposed for Hadar — and (implicitly) for Lucy.

Brown reports his analysis in the Dec. 16 NATURE. Writing in the same issue of NATURE, New York University anthropologist Noel T. Boaz argues that the variety of animal fossils at Hadar also indicates a younger date for the site. Based on a statistical analysis of fauna that do and do not exist at Hadar and other sites, Boaz argues that the Hadar sediment probably accumulated between 2.9 and 3.2 million years ago. Because the redating makes Hadar approximately the same age as the Makapansgat site in South Africa, Boaz told SCIENCE NEWS, the fossil hominids from the two sites must represent the same species; Lucy, in other words, is not a distinct and older species as claimed, he says, but merely an Eastern representative of the South African race of ape-men.

Lucy was discovered in 1974 by Donald C. Johanson (now at the Institute of Human Origins in Berkeley). And in 1978 Johanson and Tim D. White (of the University of California at Berkeley) named a new species of hominid, *Australopithecus afarensis* (SN: 1/20/79, p. 36); this small-brained, bipedal species, they said, must have evolved into both the well known *A. africanus* from South Africa and into *Homo*. Reacting to the Boaz argument, both Johanson and White told SCIENCE NEWS that the precise age of Lucy (and the other *A. afarensis* fossils) means nothing in terms of a theory of human origins. *A. afarensis*, they say, was distinguished from *A. africanus* on the basis of anatomy (primarily the facial features and dentition) and remains phylogenetically distinct regardless of when she existed in time. Indeed, Johanson says, he originally constructed his theory of human evolu-

tion believing the fossils were about 3 million years old. Evidence of *A. afarensis* has also been discovered by Mary Leakey at the 3.7-million-year-old Laetoli site in Tanzania, Johanson says, suggesting that *A. afarensis* existed as a stable species over a long period of time; there is no reason that *A. afarensis* could not have given rise to *A. africanus* and then coexisted with its daughter species, he says.

More to the point, White and Johanson say, is the fact that Boaz's faunal analysis is misleading. The Hadar is 200 meters deep and therefore represents a considerable amount of evolutionary time, they say, yet Boaz has lumped all of the fossils together for a statistical analysis. The effect, White says, is to obscure glaring evidence that parts of Hadar may be older, not younger, than previously considered. Certain very primitive pig fossils, he points out for example, have been found both in Hadar and in Laetoli. Boaz includes this evidence in his NATURE article, Johanson and White say, but he then ignores it when drawing his conclusions about the age of Hadar and its hominid fossils. Boaz's analysis is co-signed by F. Clark Howell of U.C. Berkeley, an expert on animal fossils who, in

1970, introduced Johanson to paleontological field work in Africa.

While Johanson and White reject the work of Boaz and Howell, they do not reject the possibility that the Hadar site might require redating. James Aronson, the geologist from Case Western Reserve University who assigned the 3.6-million-year-old date to Hadar, says that he finds Brown's evidence and his conclusions "very convincing." Hadar is a very difficult site to date accurately, he explains; although a shallow (and thus younger) tuff is well dated at 2.9 million years, he says, the older date was taken from a lava flow that had clearly been altered over centuries. The 3.6-million-year date was interpreted from conflicting results, he says, and it is not a date he is willing to argue for without better samples.

Johanson and White agree in principle, although they point out some potential problems with the fingerprinting method. The Hadar tuff analyzed by Brown is very thick, Johanson says, so it would have required an enormous volcanic explosion to create an airfall that wide and deep. It is also possible, White says, that the volcano exploded twice, throwing chemically identical magma into the sky on two distinct occasions, possibly quite distant in time. —W. Herbert

Anti-nausea drug linked to stomach birth defect

Use of Bendectin, the government-approved drug for combatting nausea in pregnant women, has been linked to a specific stomach malformation in offspring. Yale University researchers report. The stomach defect, called pyloric stenosis, can cause severe dehydration and malnutrition if not surgically corrected. Whether the association between the anti-nausea drug and this birth defect is a "direct causal" one is unclear, the researchers report in the Dec. 15 AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY. Nonetheless, they urge physicians to "carefully weigh the hazards of maternal nausea and vomiting during pregnancy against the risk of a malformation. . . ."

Yale University School of Medicine epidemiologists Brenda Eskenazi and Michael B. Bracken drew these conclusions from data gathered during interviews of 1,427 mothers of newborns and stillborns with congenital malformations — most of whom were delivered in central Connecticut hospitals between Nov. 18, 1974, and Nov. 17, 1976. The researchers also interviewed 3,001 "controls": mothers of healthy newborns.

Data from those interviews indicate that offspring with pyloric stenosis were more than four times as likely to have mothers who used Bendectin — which, during the 2-year study period, contained a vitamin, an anti-spasm compound and an antihistamine. (In an action unrelated to the Yale study, Bendectin manufacturer Merrell

Dow Pharmaceuticals Inc. in 1976 decided to eliminate the anti-spasm ingredient for its U.S. market because a National Academy of Sciences panel had found no evidence that that component contributed to the efficacy of the drug; however, the company continues to sell the three-ingredient product abroad.)

Exposure to Bendectin's active ingredient, the antihistamine doxylamine succinate, previously was linked in animal studies to the occurrence of diaphragm and heart defects in offspring (SN: 7/3/82, p. 7). This finding resulted in a recently updated Bendectin product label that mentions those animal studies.

But the new label also states that "a review of the results of [human studies] leads to the conclusion that the existing data do not demonstrate an association between Bendectin use and birth defects." Such a statement is "misleading," says Rep. Doug Walgren (D-Pa.), who is chairman of the House Science Research and Technology subcommittee. In a Dec. 1 letter to Food and Drug Administration Commissioner Arthur H. Hayes, Jr., Walgren wrote that the label information contradicts the findings of the recent Yale study.

William Grigg of FDA says that the agency still is reviewing the Yale study, but it already regards it as being limited. Moreover, data from previous larger studies, Grigg says, do not support the Yale group's finding. —L. Garmon