PAGE 626
Vanishing pools, vanishing species

627
Hot start for life's chemistry?

PRIMATE EVOLUTION

New Study Points to Eurasian Ape as Great Ape Ancestor

Scientists trying to trace the origins of the great apes—including humans—have come up with several candidates for the honor of being the last common ancestor to the living great apes. The most widely accepted nominees, such as *Kenyapithecus*, *Proconsul*, and *Morotopithecus*, have been extinct African apes (*Science*, 18 April 1997, p. 355). But new results reported in the 30 July/15 August issue of *Current Biology* point to a different—and highly controversial—conclusion.

Based on a synthesis of data from both fossil analyses and comparisons of DNAs obtained from living apes and monkeys, molecular evolutionist Caro-Beth Stewart of the State University of New York, Albany, and molecular anthropologist Todd Disotell of New York University propose that the ancestor was an unknown ape from Europe or Asia that dispersed into Africa 10 million years ago. To a small group of paleontologists who had already been advocating a link between fossil apes from Europe and modern apes, the findings are welcome news, especially because DNA and fossil data have not always been in such good agreement. "It is gratifying that independent lines of evidence suggest a similar interpretation," says one such paleoanthropologist, David Begun of the University of Toronto.

But the agreement between molecules and fossils is winning few new converts. "I don't think we have enough evidence to settle the issue," says Harvard University paleoanthropologist David Pilbeam, who thinks the weak link is the fossil data. Not only is there a gaping hole in the fossil record in Africa during the time when the living African apes evolved, but Pilbeam also doubts whether the fossilized bones of extinct apes will ever offer enough clues to fill in the branches of the ape family tree reliably.

In coming to their conclusion, Stewart and Disotell constructed a phylogenetic tree showing the evolutionary relationships of extinct and living apes and Old World monkeys. First, they placed living apes and monkeys on branches of the tree, based on data from dozens of different studies, by their group and others, comparing the DNA sequences of the primates. Differences in the sequences indicated how close or far apart the primates' perches should be. To determine when the branches split apart, the researchers applied dates from a molecular clock used by molecular phylogeneticist Morris Goodman of Wayne State University in Detroit and colleagues, which converts DNA differences into a time since two lineages split apart.

To see where extinct primates fit in this molecular tree, Stewart and Disotell consulted several new computational syntheses of data from the fossil record, by Begun's group and others. They put these fossils on the molecular tree and found that the dates when extinct species diverged from each other were remarkably similar to those predicted by the molecular studies. "It all fell together so perfectly that I felt like I was cheating," says Stewart.

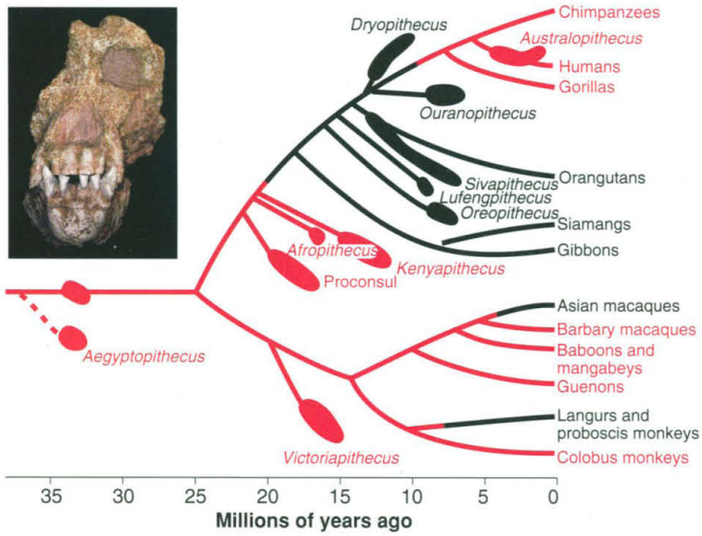
She and Disotell then labeled their tree of monkeys and apes to show the geographical homes of both living and extinct species. Finally, with the help of a computer, they set about testing migration scenarios that could produce such a family tree. The scenario that worked best shows that at least one African ape left the continent about 18 million to 20 million years ago, "when Africa was chockful of apes," says Disotell. Its descendants eventually gave rise to an array of early apes in Asia and Europe, including the ancestors of gibbons and orangutans in Asia. By about 10 million years ago, one of those Eurasian apes moved back to Africa, where it became ancestor to the living African apes and humans.

The authors favored this scenario, because it requires only two migrations—one out of and one back into Africa. In contrast, say Disotell and Stewart, if an extinct ape in Africa gave rise to all the great apes, at least six of its descendants would have had to have migrated out of Africa to produce gibbons, orangutans, and at least four lineages of fossil apes in Eurasia. That seems unlikely, says Stewart, as the continents probably were not continuously connected by the forest habitat critical for most primates.

Begun notes that the migration of a Eurasian ape back to Africa in the past 10 million years fits with his finding that two fossil apes from Europe—the 9-million-year-old *Ouranopithecus* and the slightly older *Dryopithecus*—share more traits with the modern African great apes than do extinct African apes. In his view, the modern apes must be close relatives of the Eurasian ancestor.

But other paleoanthropologists, such as Monte McCrossin and Brenda Benefit of Southern Illinois University in Carbondale, sharply contest Begun's interpretation of the fossil record, which they think included incorrect identifications of the anatomy of fossil apes. In particular, they contend that *Kenyapithecus*, a 14-million-year-old ape from Kenya, resembles living African apes more closely than do *Ouranopithecus* or *Dryopithecus*.

The fossil record is simply too fragmentary to settle this question, says Pilbeam: "The fact you could end up with people say-



Into Africa? The new tree indicates that Eurasian apes (black), perhaps related to *Ouranopithecus* (inset), that migrated back into Africa were the evolutionary ancestors of the great apes (red, top of upper branch).

PHOTO: ERIC DELSON

GRAPH: C. STEWART AND T. DISOTELL, *CURRENT BIOLOGY* 8 (1998)

Hepatitis B vaccine under fire

Turning a sphere inside out

Rep. Ehlers speaks out on science

ing it's Africa, Asia, and Turkey—these are basically trial balloons being floated." The tracks of the great ape ancestry are still faint.

–ANN GIBBONS

NOMINATIONS

Clinton's R&D Chiefs Waiting on Sidelines

With the November congressional elections approaching, Senate Republicans are in no mood to rubber-stamp President Bill Clinton's choices for senior Administration posts. That was clear last week at a hearing on the nomination of U.N. envoy Bill Richardson to head the Department of Energy (DOE), as Republican senators blasted Clinton's handling of nuclear waste, the nuclear stockpile, and global climate change issues.

Richardson is the latest high-level Administration R&D nominee being held hostage to partisan wrangling between Congress and the White House over issues not related to their qualifications for the job. Science advocates worry that the delays could jeopardize R&D programs as the Administration begins work on the 2000 budget.

Perhaps the most frustrated of the science officials–in-waiting is one who has already been confirmed: microbiologist Rita Colwell, who was approved on 22 May as director of the National Science Foundation (NSF). The problem is that her predecessor, Neal Lane, is still awaiting confirmation as director of the White House Office of Science and Technology Policy and, thus, has not officially vacated his NSF post. Neither appointment is controversial; Lane won plaudits from Republican and Democratic senators at his confirmation hearing, and lawmakers dispensed with a hearing for Colwell altogether. Rather, the delays are due both to White House tardiness in completing paperwork and to an election-year reluctance by Republicans to help Clinton rebuild his team.

DOUG MILLS/AP

Holdup? The U.S. Senate may delay its approval of Bill Richardson as secretary of energy.

The partisanship was on display last week during a 4-hour grilling of Richardson, a former Democratic member of Congress from New Mexico, by the Senate Energy and Natural Resources Committee. The sternest words came from Senator Larry Craig (R–ID), who warned that he is prepared to oppose Richardson's confirmation until the White House lays out a clear plan to store spent nuclear fuel from commercial reactors. Under Senate rules, the objections of a single senator can delay a floor vote once the committee acts.

DOE is legally bound to store the waste, but the long-term storage facility at Yucca Mountain in Nevada will not be ready until well into the next century. Some lawmakers want an interim facility, but the White House opposes this option because it could divert money and attention from the long-term solution. Craig complained that the White House has not allowed previous energy secretaries to negotiate an interim plan with Congress. But Richardson, who insisted that decisions about nuclear waste disposal "will be based on science and not politics," reminded legislators that "I can't deal with these issues until you confirm me."

Republican lawmakers also questioned the Administration's efforts aimed at ameliorating global climate change despite stiff congressional opposition to the Kyoto treaty negotiated last December and blasted its oil and gas policies, which they maintain are hurting domestic producers. And some, such as Senator Jesse Helms (R–NC), argued that the department should be abolished, although the idea has garnered little real political support in either the House or Senate.

At the same time, many senators said that holding up the confirmation would be counterproductive. "DOE needs a leader, a Cabinet officer, as quickly as possible," said Senator Pete Domenici (R–NM), who chairs the panel that appropriates DOE funding. Former DOE secretary Federico Peña left last month to join Vestar Capital Partners, a New York investment firm, leaving Deputy Secretary Betsy Moler as acting chief. Moler is expected to resign once a new secretary is confirmed; Administration officials say a leading candidate to succeed her is T. J. Glauthier, who now oversees energy, space, and science issues at the Office of Management and Budget.

Administration officials hope all of the R&D nominees will be confirmed before Congress leaves in early August for a month-long recess. That would let them play a role in developing agency requests for the 2000 budget, which are submitted in the fall. Science advocates fear that the absence of senior officials like Richardson and Lane could hurt R&D programs. But given the Senate's backlog of some 140 nominees, a stack of other pressing business, and continuing partisan tensions, the would-be R&D chiefs may be forced to cool their heels for a while longer.

–ANDREW LAWLER

ECOLOGY

U.S., Ukraine Launch New Chernobyl Lab

Every summer for the past 6 years, U.S. ecologist Ron Chesser dons his moonsuit and respirator and prowls the marshes near the Chernobyl nuclear power plant. The site is not on any travel agent's list of popular destinations, but it does offer Chesser exactly what he wants—a supply of voles, striped field mice, and other small mammals that are markers for the ecological health of a region 12 years after the world's worst nuclear accident. At the end of every field season, however, Chesser must leave behind certain samples, such as highly radioactive biological tissue or soil, that cannot be taken out of the country and transported to his lab at the Savannah River Ecology Laboratory in Aiken, South Carolina. "It's been pretty limiting," he admits.

But things are about to get a bit easier for Chesser and other researchers who venture into Chernobyl's forbidden zone. Last week, Vice President Al Gore and Ukraine President Leonid Kuchma unveiled plans for an International Radioecology Laboratory at Chernobyl, funded jointly by the U.S. and Ukrainian governments. The lab, which will study everything from genetic mutations in local wildlife to radionuclide movement and cleanup technologies, should be up and running by next summer. "We place great hopes in this new facility," says Anatoly Nosovsky, director of the Slavutych Laboratory of International Research and Technology, a nearby research center devoted to nuclear safety and cleanup technologies.

When the Chernobyl power plant's reactor number 4 exploded on 26 April 1986, it