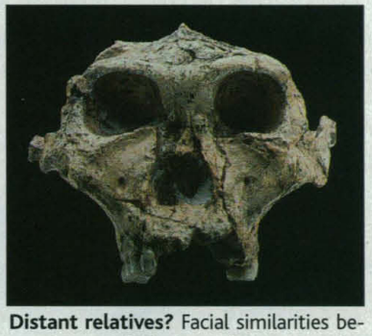
versity in Cleveland, Ohio, says that the facial traits are the developmental consequences of a single character—a unique combination of cow-sized molars and small front teeth. "There are not 50 or 70 traits in the [hominid] skull that evolve independently," and studies that assume so are deeply flawed, says McCollum. Instead, she argues that the robust australopithecines look alike because their unusual teeth force the hominid face to take on its distinctive robust shape. Even if the robust australopithecine species evolved separately on opposite sides of Africa, "as long as they have big molars and small front teeth, their faces will look alike," she says.

Although some researchers note that previous analyses have raised similar cautions, many say that the paper is a needed tonic for the field. "It's high time this kind of thing was said," says Tim White, a paleoanthropologist at the University of California, Berkeley. The anatomical features used for phylogenetic analysis "have become too atomized," he says. Adds Daniel Lieberman, a paleoanthropologist at George Washington University in Washington, D.C., "She's created a challenge for us to better define what a good trait is biologically."



Distant relatives? Facial similarities between two different robust australopithecines—*A. boisei* (*top*) and *A. robustus* (*above*)—may have evolved independently.

To analyze the way australopithecine faces grew, McCollum studied how the differently shaped skulls and faces of living hominoids—humans, chimpanzees, gorillas, and orangutans—grow during postnatal development. The comparison showed that teeth drive the shape of much of the rest of the face. For example, the australopithecines' massive molars require a tall back jaw, along with big jaw muscles and the skull-crowning crests that serve to anchor them. And their small front teeth change the configuration of the floor of the nose. In order to balance the competing demands of the growing mouth and nose, including the tall back jaw, the palate, the boundary between all these areas, thickens, forming a massive bone in the center of the face. The rest of the face then has to adjust to this bone, with the net result being a face so tall that it almost rises above the brain.

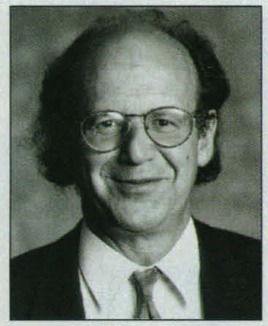
The analysis "shows that if you have similarities in dental pattern, then you're going to get similarities in facial features," says McCollum. Selection—perhaps for crunching tough nuts and tubers—shaped the teeth, and the striking facial shape just came along for the ride. Thus it doesn't make sense to count up facial changes when deciding who's most closely related to whom, says McCollum. "We've been chasing a red herring." To sort out the robust lineage, researchers should instead "look for traits in the shape of [australopithecine] teeth," she says. And although she doesn't do the analysis, she points out that variations in tooth shape suggest the robust australopithecines may not be closely related. If she's right, then paleoanthropologists will be heading back to the bench with only their dental calipers in hand.

Bernard Wood, a paleoanthropologist at George Washington University, notes that others have argued before that teeth are the best features to use in phylogenetic analyses of human ancestors. But others welcome the work's larger implication: that any traits used in phylogenetic studies should be scrutinized from a developmental perspective. "I'm thrilled," says developmental biologist Rudy Raff of Indiana University, Bloomington, who has long argued for explicit consideration of development in evolutionary studies. "She's looked at the growth consequences—what big teeth do to the shape of the skull during development. That adds a dimension that's not usually thought about." –VIRGINIA MORELL

CREDITS: (TOP TO BOTTOM) JEAN MIELE/LDEO PHOTO FILE; NATIONAL MUSEUM OF TANZANIA, DAR ES SALAAM/DAVID L. BRILL; TRANSVAAL MUSEUM, PRETORIA/DAVID L. BRILL

COLUMBIA UNIVERSITY

Earth Institute Director Bows Out



Stepping down. Eisenberger.

An ambitious attempt to bring scientists from diverse disciplines together to study global problems is about to get fresh leadership. Peter Eisenberger, the controversial director of Columbia University's Earth Institute, resigned on 24 March, citing differences over the institute's direction as well as his health. Columbia has named executive provost Michael Crow, a key force behind the creation of the Earth Institute, as its interim leader until a replacement is found.

Columbia lured Eisenberger from Princeton University, where he had founded the Materials Institute, to head the new Earth Institute in 1995. Eisenberger's mandate was to bring members of a vaunted physical sciences team at Columbia's 50-year-old Lamont-Doherty Earth Observatory (LDEO)—renowned for their research on topics like plate tectonics—together with experts on the main campus, in research cultures ranging from biology to social science, to work on climate change and other pressing societal issues. Not surprisingly, the wrenching changes drew resistance, with many scientists complaining that Eisenberger was slighting traditional areas like petrology and rushing headlong into squishy realms such as the economics of global climate change (*Science*, 22 May 1998, p. 1182).

The culture clash and Eisenberger's management style may have precipitated his resignation, observers say. LDEO geochemist Wallace Broecker, who doesn't hide his distaste for Eisenberger's leadership, says he's "not a good manager," and he "does not know that much about the Earth." Broecker says he's "delighted" he'll be getting a new boss. He's not the only Columbia scientist who Eisenberger rubbed the wrong way. Oceanographer Taro Takahashi, associate director of LDEO, says the hard-driving Eisenberger "didn't listen to people very well," al-

though he says, "I thought he was getting better." In Takahashi's view, Eisenberger "likes to handle [global] problems ... not as a scientist but as a politician."

Ironically, Columbia provost Jonathan Cole expressed confidence in Eisenberger's leadership in a letter to staff last December, saying that despite "bumps ... in the road," the institute was "making excellent progress." Some colleagues agree. Eisenberger "did an excellent, courageous job under difficult circumstances," says Columbia mathematician and economist Graciela Chichilnisky.

Eisenberger did not return repeated calls from *Science*. But in his resignation statement last month, he cited "differences on matters of principle and how best to proceed with the growth of the Institute, and more recently my personal health."

Crow's most pressing task will be to bring some equanimity to the institute. Crow could not be reached for comment, but Takahashi says one big issue is whether the Earth Institute and LDEO directorships, both of which were held by Eisenberger, should be offered to two people instead.

"The Earth Institute is a great idea," says Broecker. "It's just got to be done in the right way." Few would disagree—especially if somebody can figure out just what the right way is. **–CONSTANCE HOLDEN**

JAPAN

New Career Path Seen For Young Scientists

Four years ago, Japan set out a 5-year plan to create 10,000 postdoctorate positions to provide more opportunities for younger researchers. The government will meet its goal this year, ahead of schedule. That success, however, leads to the next challenge: how to find jobs for these scientists at a time when public payrolls are being reduced. The answer, according to a government advisory committee, is to loosen up the research tenure system, which traditionally bestows lifetime appointments, by offering fixed-term positions to both "superpostdocs" and more established researchers. In exchange for giving up job security, the researchers would receive greater freedom to explore their ideas. "It would be a new career path for researchers in Japan," says Ken-ichi Arai, director of the University of Tokyo's Institute of Medical Science and a member of the committee, which last week submitted its report to the Science and Technology Agency.

Young scientists typically begin their careers as lecturers or researchers, advance to associate professors or group leaders, and eventually become professors or heads of research departments. Although they have a job for life, they achieve full independence only after reaching the top of the administrative ladder. The committee's recommendations envision an alternative starting point with much more autonomy: superpostdocs for younger researchers who have finished one postdoctorate position and are ready to work on their own.

The committee—which was asked to reconcile the need for more research positions with growing political pressure to help close a budget deficit by reducing the number of public employees—says such flexibility also should extend up the career ladder. It is recommending that fixed-term independent researcher positions be created for senior people capable of directing a team. The committee hopes that these positions, filled through an open competition, will appeal to scientists who want to switch from a traditional career track. The trade-off for this impermanence, says Yuji Kamiya, a plant scientist at the Institute of Physical and Chemical Research (RIKEN) and a member of the committee, would be "more money and more freedom." Those who have completed a superpostdoc or a term as an independent researcher would be free to seek tenured positions at national universities or laboratories.

One model for such an arrangement exists at RIKEN, whose status as an independent research entity gives it greater flexibility than national institutes in personnel matters. Hitoshi Okamoto, a developmental biologist working with zebrafish, gave up a tenured position at the private Keio University for a position at RIKEN's Brain Science Institute. Okamoto says the level of financial support made it "a great chance." And he is confident that his productivity will win him a renewal of his current 5-year term. "I think a lot of Japanese young people would be willing to apply for those positions," he says.

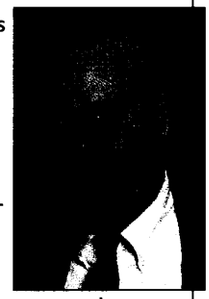
Miho Ohsugi, a postdoc in

CREDITS: (TOP TO BOTTOM) SAM KITTNER; D. NORMILE

Super idea? Miho Ohsugi says she likes the flexibility of a "superpostdoc" slot with a fixed term.

ScienceScope

Neutron Bomb The $1.3 billion Spallation Neutron Source (SNS) is facing fresh troubles in Congress. Last week, Representative James Sensenbrenner (R–WI) (below), chair of the House Science Committee, recommended wiping out next year's $214 million allotment for the high-profile Department of Energy (DOE) project, which aims to create powerful neutron pulses for studying atomic structure and the physics of materials. The recommendation follows several critical reviews of SNS management, including Sensenbrenner's own fact-finding mission last month to the Oak Ridge National Laboratory in Tennessee, where DOE hopes to build the project by 2005.



Sensenbrenner had a few kind words, giving Energy officials high marks for hiring physicist David Moncton last month to oversee the project (*Science*, 5 March, p. 1425). And if Congress were to hold up next year's funding, the legislator says, money could be restored after DOE produces a solid cost estimate and revised timetable. It could be months, however, before Congress decides whether SNS's ailments deserve Sensenbrenner's harsh prescription.

Fruit Fly Nanny Got some extra lab space and the desire to coddle a few thousand jars' worth of flies? Consider becoming the next curator of the *Drosophila* Species Center, a collection of 265 species of fruit flies. We aren't talking about your average *Drosophila melanogaster*, the workhorse of molecular genetics. Rather, the 1400 strains range from Mexican cactus-eaters to flies with a taste for only select Hawaiian fruits. No comparable collection exists for studying how species arise, says evolutionary biologist Jerry Coyne of the University of Chicago: "It would be a terrible loss to evolutionary biology if that collection were shut down."

Heeding such warnings, the National Science Foundation (NSF) is soliciting proposals for a new manager to take the reins in 2001 from Bowling Green State University's biology department, which no longer does much fruit fly work. Disabuse yourself of the idea that curating means laying out fly chow and cleaning jars now and then. The job requires "somebody really punctilious" to maintain stocks at proper temperatures and humidities and with special diets, Coyne says. Still interested? Send an application to NSF by 6 July.