half-centimeter-thick, wormlike animals. "If it's true, it's staggering," says paleontologist Charles Marshall of the University of California, Los Angeles (UCLA). "It would be the first evidence of macroscopic animals."

For now, experts in such trace fossils—most of whom haven't yet seen these specimens—are divided on the claim, torn between the convincing appearance of the tracks and their appearance in rock radiometrically dated to hundreds of millions of years before any other animal traces. "I'm a believer," says Tony Ekdale of the University of Utah, Salt Lake City, who has seen one specimen. "I find them convincing." Others are not so sure that these squiggles are traces of life. "I wouldn't be surprised if they turn out to be inorganic," says Sören Jensen of Cambridge University.

To the authors of the study—paleontologist Adolf Seilacher of Yale University and the University of Tübingen in Germany, and sedimentologists Pradip Bose of Jadavpur University in Calcutta and Friedrich Pflüger of Yale—the ancient tracings paint a detailed picture of one creature's life 1.1 billion years ago. The wormlike animal, about the thickness of a drinking straw, plowed through the sediment a few millimeters below the floor of a shallow sea, the group suggests. They argue that the creature propelled itself with rhythmic muscle contractions, or peristalsis, leaving open burrows with raised edges like those of modern worms that move by peristalsis. The animal was probably grazing on the decaying base of a thin mat of microbial life on the sea floor, says Pflüger, because the burrows follow the base of a thin veneer of darker sandstone that may be the remains of the mat. (At press time, Seilacher was in the field in Libya.)

Burrowing by peristalsis suggests to Seilacher and his colleagues that the animal was rather complex. Peristalsis implies a fluid-filled cavity that can be contracted by muscles, and they argue that it also implies the existence of a coelom, a lined cavity between the gut and body wall. Coeloms are common to mollusks, annelid worms, and arthropods but are absent in the simpler flatworms and roundworms. If so, the fossil evidence would support one date offered by some molecular biologists: a 1.2-billion-year age for a major evolutionary split among the coelomate animals, between a group including the annelids and one including the echinoderms.

Pflüger admits that distinguishing true trace fossils from all manner of sedimentary cracks, wrinkles, and ripples is a tricky business, but says that he is "85% confident" that the features were left by an animal. He points out that the burrows are too irregular to be the type of cracks commonly found in such sediments and too sharply delineated to be wrinkles in the sediment surface. The grooves vary in width, but each has a constant width throughout its length, unlike a crack. "If they were 700 million years old," says Pflüger, "there would be no reaction [challenging] the paper." But given the antiquity of the finding, "there will be people contesting it."

Indeed there are. "This is not the smoking gun," says paleontologist and early life expert Bruce Runnegar of UCLA. "It is almost impossible to tell trace fossils from tubular body fossils [of large algae] when they are poorly preserved, as these are. I'd say the jury is out."

Paleontologist Mary Droser of UC Riverside is more persuaded, agreeing with Pflüger that "if we found this in the Paleozoic [younger than 544 million years], we would say it is a trace fossil." But she notes that "there have been a lot of examples [of sedimentary features] that people thought were trace fossils and they were not." And because no large worm burrowings turn up again in the rock record until about 600 million years ago, "I wonder why we go 400 million years without another one," she says. Paleontologist Andrew Knoll of Harvard University agrees that "if you see centimeter-scale, coelomate organisms and then don't see them for 400 million years, you have a lot to explain."

It's possible that relatively complex animals did appear very early but died out, says Marshall, only to evolve again later. Or perhaps there are older animal fossils that haven't been found yet, and the gap is only apparent. "I'm not sure enough people have looked at the right rocks for the right thing," he says. "Five or 10 years from now, are the gaps in the record going to be filled in? That will be the proof of the pudding."

—RICHARD A. KERR

CREDIT: JIM PICKERELL/STOCK CONNECTION/PNI

Mexican Fires Charge Up U.S. Clouds

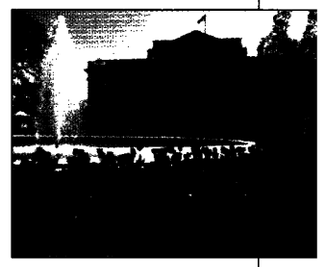
The ancient Greeks believed that lightning bolts sprang from the rage of Zeus in his home on Olympus. Now an odd new discovery suggests that Zeus' moods have a long reach indeed: Last spring, smoke from massive fires in Mexico spawned stronger, more sustained lightning than normal over the Great Plains, thousands of kilometers away. According to lightning records, storms that had absorbed the smoke zapped the ground with three times the usual number of positively charged lightning strokes, which typically last longer than negatively charged ones and can inflict worse damage. Moreover, these positive bolts carried twice as much current as similar flashes produced by smoke-free storms.

ScienceScope

PROJECT RECRUITS WOMEN TO RUN FOR PRESIDENT

Could the first female U.S. president be a scientist? The White House Project believes it's a possibility.

To encourage more women to consider a run at the Oval Office, the nonpartisan, nonprofit group last week released a list of 20 prominent women it thinks might make good candidates. Three women with scientific credentials made the list: psychologist Judith Rodin, president of the University of Pennsylvania; cardiologist Bernadine Healy, a dean at Ohio State University and former National Institutes of Health director; and chemical engineer Mae Jemison, NASA's first female African-American astronaut.



The group is now asking people to vote for the five women they would like to see run for office. It has mailed ballots to more than a million people and will also be inserting them into popular magazines such as *People*. But it's not clear that the winners will respond to a groundswell of support. Healy, for one, says she won't "deal with a theoretical."

MALAYSIAN MIT STILL A DREAM

Political turmoil has delayed for a year Malaysia's plans to open a graduate research university run by the Massachusetts Institute of Technology (MIT). But neither side is abandoning the project, which was supposed to enroll its first students this month.

"We're on hold, waiting for the government to act," says MIT's Fred Moavenzadeh, co-director of the project to create the Malaysia University of Science and Technology outside the capital, Kuala Lumpur (*Science*, 6 March, p. 1474). A private foundation is paying MIT $25 million over 5 years to instill its research-based curriculum into an elite group of scientist-entrepreneurs. But a similar contribution from the Malaysian government has been blocked by political upheavals precipitated by the country's yearlong economic crisis. In particular, last month's firing and arrest of Finance Minister Anwar Ibrahim has disrupted activity at the ministry, which must approve the spending.

emphasis on environmental research, Kiper adds that "we reject the idea of a political steering of science." And he says that, although the Greens "are critical of genetic engineering, we do accept the necessity of certain gene-technology methods, especially in basic medical research." –ROBERT KOENIG

Robert Koenig is a writer in Bern, Switzerland.

House Report Takes Middle Ground

The United States must commit to "stable and substantial" funding for basic research if the country is to prosper in a post–Cold War world. That's the main conclusion of a much-anticipated congressional report* released last week by Speaker Newt Gingrich (R–GA) and members of the House Science Committee. Although some observers predict the report will help politicians to focus on the problems facing the scientific community, critics say its three dozen recommendations offer few fresh insights into such thorny issues as guidelines for participating in international projects and improving science education.

Key report. Local students "unlock" the new report by Rep. Ehlers, left, while Speaker Gingrich and George Brown look on.

CREDIT: RICK KOZAK

In June 1997, Gingrich asked committee member Representative Vern Ehlers (R–MI), the first research physicist elected to Congress, to take a fresh look at U.S. science policy (*Science*, 4 July 1997, p. 28). Ehlers's charge was to write a sequel to "Science: The Endless Frontier," the 1945 report by engineer Vannevar Bush that has guided U.S. science policy for decades. Ehlers pledged to "keep it simple" and to avoid the mistakes of an earlier panel that labored in the mid-1980s on a massive report that was never completed. And he kept his word: "Unlocking Our Future" was delivered on time and at a relatively concise 70 pages.

However, the tepid reaction of many veteran policy watchers suggests that the report may still have fallen well short of its mark. "It's an excellent and welcome statement on behalf of basic science, but it falls short of breaking new ground," says Lewis Branscomb, a science policy analyst at Harvard University Kennedy School of Government in Cambridge, Massachusetts.

To be sure, the report does not call for a radical overhaul of the country's approach to supporting science. "The message of this report is that, while not exactly broke, America's science policy is nonetheless in need of some important maintenance," says Representative James Sensenbrenner (R–WI), chair of the House Science Committee. In fact, the panel's ranking Democrat, Representative George Brown (CA), complains that the report's biggest flaw is that "it fails to take on some of the issues I think are most important to the future health of the scientific enterprise," including the need to support engineering and the social sciences and to ensure that all Americans benefit from research advances.

One of the report's more novel suggestions is a proposal to revamp the peer-review system to encourage "creative ... speculative" studies. "There are no rewards for risky science: It is too important to publish," the report quotes one postdoc as saying. But its solution—a new granting process that "depends on peer-review but takes into account the speculative nature of the proposed research"—is seen as lacking sufficient detail to be useful. The report "tries to have it both ways," says one analyst.

Although many recommendations echo a variety of past reports—expanding public-private research partnerships, improving the use of science in the courts and regulatory agencies, and strengthening science and math education at all levels—others tackle issues fresh on the minds of the science committee. For instance, a call for "a clear set of criteria for U.S. entry into, participation in, and exit from an international scientific project" appears to be rooted in the debate over three recent projects: the Large Hadron Collider now being built at Europe's high-energy physics laboratory in Geneva, the moribund International Thermonuclear Experimental Reactor, and the international space station. The focus on developing such "clear, predictable ground rules" for international projects is welcome as scientists grapple to un-

* "Unlocking Our Future: Toward a New National Science Policy," interim report, House Science Committee (www.house.gov/science/science_policy_report.htm)

ScienceScope

SPACE SCIENCE ISN'T FUN ANYMORE, GINGRICH SAYS

Most Americans may be fascinated by space exploration, but U.S. House Speaker Newt Gingrich (R–GA) says America's space bureaucrats have made it dull. "One of NASA's major achievements" has been "making space as boring as possible," the pugnacious politician charged last week at a Capitol press conference unveiling a new science policy report (see story on left). Reeling off a litany of complaints, Gingrich said the agency had become "cumbersome" and sponsors projects that are "the opposite of what you want good science to be." He also took some sharp jabs at the international space station, calling the oft-delayed project "an absolute disaster."

NASA officials declined an opportunity to respond to the attack. But House legislative staff said Gingrich's remarks could foreshadow more trouble from House Republicans for NASA officials, who have watched their budget shrink in recent years and are currently trying to talk Congress into paying for a $660 million space station bailout. Gingrich's rhetoric, one aide says, "sent a pretty unsubtle message."

BIOLOGIST NAMED RUSSIA'S SCIENCE MINISTER

The appointment of a physicist-turned–molecular biologist as Russia's new science minister could help the nation's natural scientists gain a bigger slice of the funding pie. Last week, Prime Minister Evgeny Primakov tapped Mikhail Kirpichnikov, 53, a veteran science administrator, for the top policy post despite opposition from some physicists and chemists, who currently garner the lion's share of Russia's science spending.

Kirpichnikov earned his doctorate at the Moscow Physical and Technological Institute before taking up a career in molecular biology at several prestigious institutes. Despite working for years as a wonk, Kirpichnikov has kept one foot in the research world, heading a lab in the Russian Academy of Sciences' Bioengineering Center. His background, says Mark van Montagu of the University of Gent in Belgium, could signal rising fortunes for Russia's struggling young biotech industry.

Contributors: David Malakoff, Jeffrey Mervis, and Andrey Allakhverdov