narrow and defensible criteria," agrees George Leventhal of the Association of American Universities, a group of 63 major research institutions.

Presidential science adviser John Marburger unveiled the proposed policy last week at briefings for Congress and the higher education community. It flows from a 29 October 2001 presidential directive intended to stop foreign students and scientists from "abusing" the visa process by which they gain entry to U.S. educational institutions. (The U.S. Department of Agriculture has gone much further, declining to sponsor any new visas for foreign scientists to work in its labs. See *Science*, 10 May, p. 996.)

Roughly 175,000 students or scholars enter the country each year to carry out scientific work, says James Griffin, a Department of Education official who is coordinating the effort while on loan to the White House. Of those, he says, perhaps a few thousand will warrant a closer look under the new guidelines. "But that doesn't mean they will be denied entry," Marburger notes. Officials will look at what type of research they plan to pursue, where and with whom they will be working, and whether they will have access to specialized equipment of a sensitive nature.

The screening would be done by a new Interagency Panel on Advanced Science Security (IPASS), created by and composed of representatives from the major U.S. science agencies as well as officials from the State, Justice, and Commerce departments. "Combining science agencies with law enforcement agencies should make for a more rational and systematic review," says Hartl. University officials are also relieved that they will not have to decide which applicants warrant closer scrutiny. That will be the responsibility of either the State Department or the Immigration and Naturalization Service, although schools would be required to pass along information about significant changes in course work or research projects.

The co-chairs of IPASS will be appointed by Secretary of State Colin Powell and Attorney General John Ashcroft. Griffin says that the White House is weighing a suggestion from university officials to set up an expert committee to help IPASS define "uniquely sensitive" courses of study and areas of research.

A presidential directive spelling out how IPASS will operate is probably "a few months away," says Marburger. The announcement was made now, he says, to give the academic community plenty of time to react.

—JEFFREY MERVIS

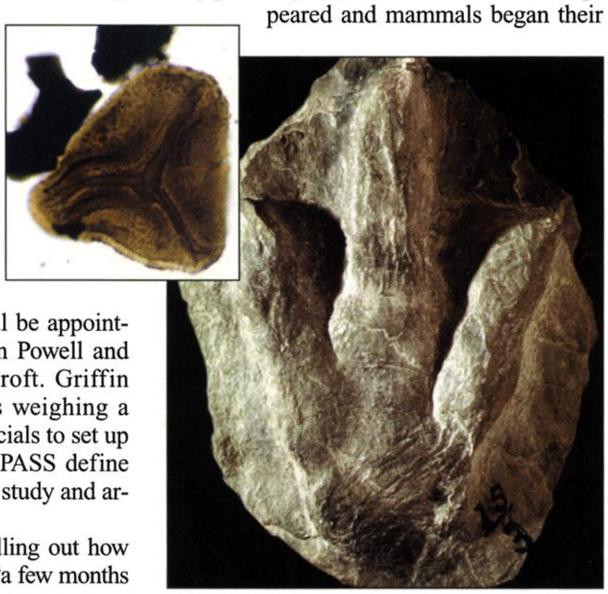
EVOLUTION

Did an Impact Trigger The Dinosaurs' Rise?

Large impacts would seem to be bad for dinosaurs. After all, a huge asteroid or comet ended the 135-million-year reign of the dinosaurs when it hit Earth 65 million years ago. But on page 1305, a group of researchers suggests that an impact also triggered the final rise of dinosaurs to dominance 200 million years ago. Proving that an impact is a two-edged sword will depend on demonstrating that a large body hit Earth at the very geologic instant that the dinosaurs' reptilian competitors abruptly died away and meat-eating dinosaurs came into their own.

By following fossil footprints, geologist Paul Olsen of Lamont-Doherty Earth Observatory in Palisades, New York, and his colleagues show for the first time that the final ascent of the dinosaurs was indeed abrupt, at least in eastern North America. And they now have a geochemical hint—although not yet proof—of an impact at the geologic instant that dinosaurs established their supremacy. "There was something interesting going on" 200 million years ago, says Olsen.

Linking evolution to impacts is a tough job. When researchers made the first impact-extinction connection in the 1980s, most of their colleagues were skeptical. But the case for an impact's wiping out the dinosaurs and numerous other creatures strengthened steadily following the discovery of high levels of iridium—an element rare on Earth but abundant in asteroids—in rock laid down at the boundary between the Cretaceous and Tertiary periods (K-T), when the dinosaurs disappeared and mammals began their



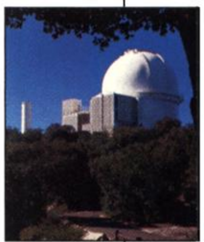
No mere coincidence? Fern spores (*inset*) marking a possible impact disaster immediately precede the first tracks of a new, bigger Jurassic dinosaur.

CREDITS: (TOP TO BOTTOM) NOAO/AURA/NSF; SARAH FOWELL; P. OLSEN

ScienceScope

Dimming Its AURA The National Science Foundation (NSF) has decided to let the Association of Universities for Research in Astronomy Inc. (AURA) run two major observatories for another 5 years despite criticism of AURA's long-term planning.

Last week NSF's governing board gave the green light to a contract with AURA to manage the National Optical Astronomy Observatories (below) and the National Solar Observatory. In the first-ever competition for a prize worth up to $216 million, AURA bested Research Corp., a private foundation in Tucson, Arizona, and the Universities Research Association Inc., which runs Fermilab for the Department of Energy.



Last year a National Research Council report faulted AURA for not preparing the groundwork for two instruments deemed essential for the field's progress: the Giant Segmented Mirror Telescope and the Large-Aperture Synoptic Survey Telescope. NSF has told AURA that it must do better at helping the U.S. community plan the next generation of telescopes.

"We have made it clear to AURA that this is not a carte blanche renewal," says Robert Eisenstein, the outgoing NSF assistant director for mathematics and physical sciences (see p. 1219). An external advisory committee will provide "an added level of scrutiny," he says.

Wait Till Next Month France has a new team of ministers overseeing research and higher education. But their tenure could be short-lived if the Socialists, as some analysts predict, win next month's parliamentary elections and replace them with their own appointees.

Researchers are keeping a close eye on the new health minister, Jean-François Mattei, a geneticist and parliamentary deputy from the Marseilles area. Two years ago Mattei mobilized researchers for a petition campaign against patenting of genes (*Science*, 23 June 2000, p. 2115), but he has also upset scientists by advocating strict limitations on human embryo research. Meanwhile, François Loos, a relatively unknown engineer and industry manager who helped run President Jacques Chirac's campaign, has been given day-to-day responsibility for French science within a new superministry for education and research headed by philosopher Luc Ferry.

"We are just holding our breath," says one Paris-based biologist about the upcoming elections.

rise. The iridium showed up around the globe sandwiched between Cretaceous rock and Tertiary rock, often accompanied by mineral bits bearing scars from the shock of impact. And these traces of impact always fell at the moment of extinction, a time pinned down with increasing precision as paleontologists built more detailed fossil records.

Many paleontologists began to think that before long, every mass extinction would have its impact. No such luck. Not a single other extinction has been firmly linked to an impact, although there have been hints. In the early 1990s, palynologist Sarah Fowell of the University of Alaska, Fairbanks, and Olsen found a rock layer rich in the spores of ferns—plants that rush in when the landscape is devastated—in southeastern Pennsylvania. These fern fossils appear in rocks formed at the Triassic-Jurassic (T-J) boundary 200 million years ago. (A similar fern spike marks the K-T boundary in western North America.) And geologist David Bice of Carleton College in Northfield, Minnesota, found what he suggested were impact-shocked quartz grains near a marine T-J boundary in Italy (*Science*, 11 January 1991, p. 161).

But the Pennsylvania fern spike and the unimpressive Italian shocked quartz never won anyone over, so Olsen and colleagues checked the fern spike for iridium and hit pay dirt. As they report in their paper, three sites in Pennsylvania show elevated iridium across the same 40 centimeters of rock containing the pollen spike. Peak iridium comes at the base of a 5-centimeter coal layer sitting on top of a layer of claystone, much as K-T rock looks in western North America. But at a maximum of 285 parts per trillion, the T-J iridium is not far above a background of 50 parts per trillion and is only one-third the size of the lowest concentrations found at the K-T. That small an amount of iridium might have been concentrated by natural geochemical processes or perhaps even carried in from volcanic eruptions; one of the largest outpourings of lava in Earth's history began nearby no more than 20,000 years after the boundary and has itself been suggested as a trigger for the T-J events (*Science*, 18 August 2000, p. 1130).

What was happening to the dinosaurs during the iridium-dusted fern spike? To find out, Olsen and his colleagues—especially amateur paleontologists Michael Szajna and Brian Hartline of Reading, Pennsylvania—collected footprints left in the mud of the string of lakes that ran through the middle of what was then the supercontinent Pangea. Lumping together more than 10,000 tracks found in former lake basins from Virginia to Nova Scotia, they found that "the nondinosaurs were getting wiped out" across the boundary, says Olsen; dinosaurs jumped from 20% to more than 50% of taxa. At the same time, meat-eating dinosaurs ballooned to twice their previous mass, to judge by the size of their tracks—much as mammals grew larger after the K-T.

In the Newark basin lake sediments in New York and Pennsylvania, the group found that tracks of Triassic reptiles that had been around for 20 million years disappeared within 20,000 years of the spore-iridium event. Then the first distinctive tracks of dinosaurs that would dominate the Jurassic appeared within 10,000 years after the event. Given the high statistical unlikelihood of ever finding the last Triassic track or the first Jurassic track, that places all four events—the disappearance of Triassic reptiles, the ascendancy of the dinosaurs, an apparent disaster among plants, and a hint of an impact—in the same geologic instant.

Paleontologists like what Olsen and his colleagues did with their huge footprint database. "They've definitely pinned [the evolutionary transition] right on the boundary," says paleontologist Michael Benton of the University of Bristol, U.K., thanks to their use of clocklike climate cycles recorded in the lake basins. Impact specialists are less impressed. The iridium by itself is unimposing, says cosmochemist David Kring of the University of Arizona in Tucson. Finding clear-cut shocked quartz would be convincing, he notes, but analyses for other, iridiumlike elements could show that the iridium is truly extraterrestrial. Then the dinosaurs could feel ambivalent about visitors from outer space. **–RICHARD A. KERR**

DRUG RESEARCH

Novartis Sows Its Future in U.S. Soil

CAMBRIDGE, MASSACHUSETTS—It was no mere political braggadocio when U.S. Senator Edward Kennedy (D–MA) last week called Cambridge's Kendall Square the "epicenter of the biotech world." The Swiss drug giant Novartis, based in Basel, intends to set up a $250 million research facility here that will guide its overall R&D efforts—a move that has sent shock waves rippling through the company's home turf.

Novartis's move is the latest blow to homegrown European drug research and reflects the company's efforts to keep U.S. competitors in its sights. "Europe created its own problems by failing to … ensure a dynamic research environment," explains Novartis Chief Executive Officer Daniel Vasella. The new center—the Novartis Institute for Biomedical Research Inc.—will coordinate the company's $2.4-billion-a-year R&D portfolio in the United States, Japan, and Europe.

The lab, slated to open early next year, initially will house 400 scientists—eventually staffing up to 1000—and will specialize in developing drugs against diabetes, cardiovascular ailments, and viral diseases. Its market is increasingly centered on this side of the Atlantic: Less than one-third of Novartis's sales are in Europe, while 43% is in the United States.

However, it was the talent pool as well as drug sales that convinced Novartis to establish its research hub in the United States. After considering both Southern California and the San Francisco Bay area, Vasella chose Cambridge with its winning combination of academic institutions such as the Massachusetts Institute of Technology (MIT) and Harvard University and its boatload of biotech businesses crowding an area once known for candy factories.

Interweaving. Novartis will set up its new center in this MIT-owned building.

Novartis was drawn to Cambridge's "interwoven environment," as Vasella calls it, where the traditional lines between industry and academia are becoming ever more blurred. The company persuaded Mark Fishman to leave academia—Harvard Medical School—to head the new center. The reluctant cardiovascular researcher turned down the job twice before Vasella overcame his skepticism about jumping to industry. "It was a very long and difficult sell," says Vasella. The blurring was also apparent in the setting of Vasella's announcement: the home of MIT president Chuck Vest. MIT will be Novartis's landlord, and talks likely will get under way this summer on a potential collaboration between the two powerhouses, Vest told *Science*. The company already has a decade-long collaboration with Harvard's Dana-Farber Cancer Institute that has been key to the development of the new cancer drug Gleevec.

Novartis hopes to avoid a reprise of the controversy surrounding its $25 million investment in plant research at the University of California, Berkeley, in 1998, which sparked widespread concern among academics about industry influence over the direction of university research. But that conflict pales in comparison with the general resistance in Europe to links between industry and academia. And European governments have failed to match the prodigious investments in biology and biotechnology made by both the U.S. government and venture capitalists, Vasella says: "The U.S. has pursued a much smarter policy."

CREDIT: RUDER FINN PUBLIC RELATIONS/NOVARTIS