docrinology circles to describe the growing population of obese people at risk for diabetes and heart disease.

But O'Rahilly points out that no one can yet pin down 11β HSD-1 as the cause of the millions of cases of diabetes and heart disease. "You have to find out whether the level of metabolic disturbance in people correlates with the activity of this enzyme," O'Rahilly says.

Meanwhile, two recent clinical observations support the team's results: In April, Joel Berger's group at Merck Research Laboratories in Rahway, New Jersey, showed that a class of antidiabetic drugs now on the market suppresses 11β HSD-1 levels in fat cells. And Eva Rask of Umeå University Hospital in Sweden and Brian Walker of the University of Edinburgh, U.K., report that obese men express higher levels of 11β HSD-1 activity in fat tissue than do lean males, which begins to address O'Rahilly's concerns.

Flier and O'Rahilly both say they are aware of drug companies that have in hand, or are scrambling to come up with, potent inhibitors of the enzyme. Such compounds might be used to treat obesity by altering stress hormone levels in belly fat. "We have wanted to know for some time what properties of fat inside the abdomen make it different from fat outside the abdomen," says O'Rahilly. "If this enzyme explains it, that would be interesting indeed." **–TRISHA GURA**

Trisha Gura is a science writer in Cleveland, Ohio.

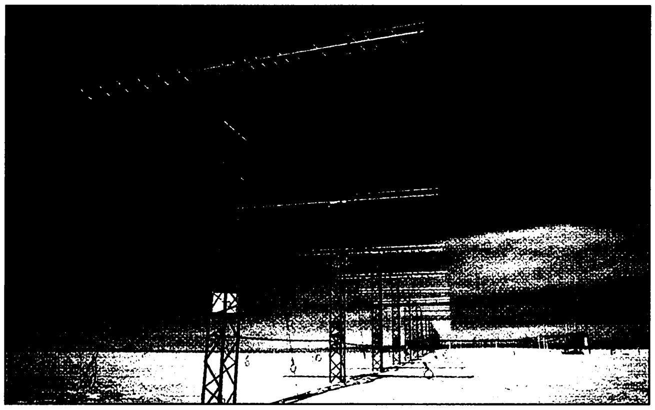
ATMOSPHERIC PHYSICS

Finding the Holes in The Magnetosphere

Just outside the protective cocoon of our atmosphere, a battle rages in space. A gas of electrically charged particles—the solar wind—traveling at hundreds of kilometers per second streams at us from the sun. All we have to guard us is Earth's magnetic field, but this shield is not impregnable. Every so often, particles and energy burst through, by means of a process called magnetic reconnection, causing displays such as the aurora borealis as well as magnetic storms that disrupt satellites, power lines, and communications. Researchers have puzzled for decades over how and where reconnection happens. Now physicists from the British Antarctic Survey (BAS) in Cambridge have developed a way to pick between two competing views of where reconnection occurs.

The work "seems to provide strong evidence for one [model] rather than the other," says space plasma physicist Stan Cowley of the University of Leicester, U.K. Finding a recipe for picking between the two models is an "important step," agrees physicist Ray Greenwald of Johns Hopkins University's Applied Physics Laboratory in Laurel, Maryland.

The solar wind is no steady breeze. Violent events in and around the sun, such as flares and coronal mass ejections, can whip up the wind to gale force. And because it is made up of charged particles, the solar wind carries the sun's magnetic field with it. As it nears Earth, our magnetosphere diverts the solar wind around our planet like river water around a bridge pier. But sometimes the two magnetic fields don't just rub together: They hook up,



Looking up. The British Antarctic Survey's SHARE radar scans the skies over Halley research station in Antarctica.

creating an entry point for the particles and energy to pour into the magnetosphere.

Researchers still don't understand reconnection events well enough to predict when and where they will happen. Theoretical models have divided them into two principal camps. Supporters of the "subsolar" theory hold that the action takes place at the point closest to the sun, the "nose" where the magnetosphere bears the full brunt of the solar wind. The rival "antiparallel" camp, meanwhile, believes that any point where the sun's and Earth's fields are in direct opposition—typically well away from the "nose"—is fair game for reconnection. "It is debated at every meeting," says Greenwald.

A team from BAS decided to settle the matter. A key difference between the two theories is that, under particular seasonal and solar wind conditions, the antiparallel model predicts that two reconnection points will always be created, whereas the subsolar theory produces only one. Finding reconnection events, which may be just a few thousand kilometers wide and last only a few minutes, is hard for the handful of spacecraft currently surveying the vast magnetosphere. But Richard Horne and his BAS team realized they had just the tool for the job: ground-based radar.

Horne and his colleagues have spent years monitoring Earth's ionosphere, the plasma layer that forms the uppermost tier of the atmosphere. Because reconnection events cause disturbances in the ionosphere, the BAS researchers realized that the radar data they had collected might contain "footprints" of past reconnections. The team searched back through years of data from radar stations close to the poles, the best places to monitor the ionosphere. Data collected from Goose Bay in Newfoundland and Stokkseyri in Iceland on a December day in 1997 showed two distinct ionospheric disturbances signaling reconnection events. Neither took place close to the spot nearest the sun favored by the subsolar model. The results, to appear this month in the *Journal of Geophysical Research* (Volume 106, p. 28995), show "clear evidence in favor of the antiparallel theory," Horne says.

Researchers caution that one example doesn't clinch the case. Reconnection events may appear "all over the place," Cowley says, perhaps with one model dominating the other. Greenwald agrees that more observations are needed. The BAS team has since identified three more double events and has submitted a second paper to the *Journal of Geophysical Research*. In time, these results should help solve what Cowley calls "the fiendishly difficult problem" of understanding in full how magnetic reconnection works. **–ANDREW WATSON**

Andrew Watson is a writer in Norwich, U.K.

PALEONTOLOGY

Paring Down the Big Five Mass Extinctions

BOSTON—The five largest extinctions of the past half-billion years seemed immutable milestones on the path to modern life. Ever since researchers fingered a huge impact to explain the most recent of them, the one that ended the age of the dinosaurs 65 million years ago, the rest have also borne the tinge of doom. But now a pair of paleontologists say that two of the Big Five just don't measure up. Instead, Richard Bambach and Andrew Knoll of Harvard University argue, the losers should be demoted to "mass depletions": plunges in diversity caused by still-mysterious failures to produce enough new species.

Doubts about the legitimacy of the Big Five—those that came late in the Ordovician and Devonian periods and at the ends of the Permian, Triassic, and Cretaceous—began with the same sort of data first used to identify them. As they reported last month at the annual meeting of the Geological Society of America (GSA) here, Bambach and Knoll

CREDIT: C. GILBERT/BAS

started their analysis with a listing of fossil marine genera compiled by John Sepkoski, who died in 1999 at age 50. It was Sepkoski and paleontologist David Raup, retired from the University of Chicago, who in the early 1980s drew attention to the Big Five as the largest extinction events since the Cambrian explosion of life 540 million years ago.

Bambach and Knoll used Sepkoski's last compilation—genera of marine fossils arranged by their first and last appearances in the fossil record—and crunched numbers to see whether the extinctions were indeed large, sudden, and unusual enough to qualify as distinctly different from the multitude of lesser extinctions that mark the fossil record. To start, they dropped the entire Cambrian period and the early part of the subsequent Ordovician from their analysis. Extinction rates were high and varied wildly in those early days, prompting exclusion of the whole 60 million years from the analysis as too atypical.

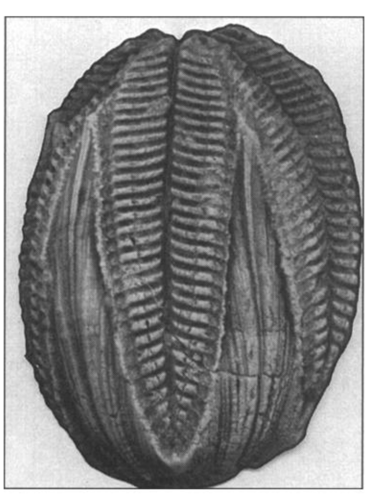
With the early days dropped, four intervals of extinction stood out as exceptionally intense. The extinction in the late Devonian 364 million years ago, however, did not. "It fails the first criterion for a mass extinction interval: It isn't unusual," says Bambach. Several intervals in a row, including the interval in question, have higher-than-normal extinction rates, but none of them is high enough to be called "big."

The next to go was the end Triassic extinction of 200 million years ago. When Bambach and Knoll compared its extinction rate with those of intervals coming before and after, the end Triassic did not stand out as bigger than its neighbors. "It's not an outlier," says Bambach. "All of the Triassic has high extinction rates." What's more, Bambach says, although all five events are marked by large losses in the diversity of genera, the end Triassic and late Devonian intervals lose more of their diversity through a failure to produce new genera than through extinction. "Normal extinction was high," says Bambach, "and there wasn't much origination" of new genera to replace losses due to extinction. He calls these two events "mass depletions" rather than mass extinctions.

Paleontologists who specialize in the demoted intervals are taking the losses well. "I wouldn't argue too strongly" with the end Triassic's being dropped, says Anthony Hallam of the University of Birmingham, U.K. "I've been challenging the idea [that] there was a catastrophic event at the time. It was more gradual. Its magnitude was certainly less than [Bambach's] three big ones."

The late Devonian doesn't have many adamant defenders, either. "We agree with Bambach and Knoll," paleontologist Johnny A. Waters of the State University of West Georgia in Carrollton told the GSA meeting. "We believe the late Devonian 'mass extinction' should go away." Waters and his colleagues argue that the late Devonian has been overblown in much the way the lesser extinction at the Cenomanian-Turonian boundary has been (*Science*, 10 August, p. 1037). In the case of the late Devonian, says Waters, paleontologists have tended to collect fossils close to their labs in Western Europe and North America. But during the late Devonian, sediment-laden waters flushed those areas, altering the local marine ecology and skewing the fossil counts. As paleontologists look farther afield, as Waters and colleagues have done in northwest China, more species turn up, lessening the apparent magnitude of the extinction.

Other paleontologists are taking the demotions in stride because they believe there are better ways to gauge evolutionary events. "We've gone as far as we can playing number games with taxonomic diversity," says paleontologist George McGhee of Rutgers University in New Brunswick, New Jersey. "We need to look now at analyzing the ecological impact of the big events."



Winners. Reports of extinctions of blastoids were greatly exaggerated.

CREDIT: J. A. WATERS/STATE UNIVERSITY OF WEST GEORGIA

By the reckoning of McGhee and his colleagues, the end Permian extinction retains its position as the number one crisis in the history of life, followed by the end Cretaceous extinction that led to the replacement of dinosaur-dominated ecosystems by mammal-dominated ones. But in McGhee's ecological ranking, the late Devonian overtakes the late Ordovician extinction of 450 million years ago—the third of extinction's Big Three. Although plenty of new creatures appeared after the Ordovician extinction, he says, ecosystems worked much the way they had before; in contrast, after the Devonian extinction, reef communities did not fully recover for a couple hundred million years. A mass depletion may never have the cachet of a mass extinction, but perhaps it can trigger crises in the history of life just as well.

–**RICHARD A. KERR**

DEVELOPING NATIONS

Web Site Aims to Bridge North-South Divide

The Internet has been billed as the great democratizer, providing cheap and easy access to information for all. In many developing countries, however, the reality is very different: Computers and decent phone lines are scarce, and subscriber-only Web sites bar people from the best data. Now a new Web site, officially launched in London this week, aims to bridge the gap with scientific news and information relevant to developing nations (see Editorial on p. 2053). The site is also intended to help foster scientific cooperation.

Journalists, scientists, and development agencies conceived the site, known as SciDev.Net (www.scidev.net), 3 years ago and drummed up funding from international bodies. With a budget of $2 million over the first two and a half years, a staff of six journalists and several foreign correspondents will provide daily news, in-depth features by scientists and officials, and a selection of articles from *Science* and *Nature*. The site also features a database of scientific organizations, the first stage of a regional network of scientists designed to promote "North-South and South-South collaboration," says Mohamed Hassan, executive director of the Third World Academy of Sciences (TWAS) in Trieste, Italy, which helped conceptualize SciDev.Net.

Part of SciDev.Net's mission will be to separate the wheat from the chaff: It is often hard to find accurate and useful information on the Web when many appealing sites are promoting questionable assertions, such as the claim that HIV does not cause AIDS. "Some of these sites that are trying to undermine scientific ideas are really very user-friendly," says David Dickson, SciDev.Net's director and *Nature*'s former news editor.

The site's success will depend on access, which is severely lacking in some developing countries. Only the best Indian universities, for example, have reliable access to the Web. "The Internet has the potential to transform research in the developing countries. But the potential will remain just that if we do not take care of several other factors," says Subbiah Arunachalam, an information consultant in Chennai, India, and a former officer of the Indian Academy of Sciences.

Several agencies are already hard at work providing access, some sponsoring telecenters in poorer countries, and some, such as TWAS, developing networks of research academies and science ministries across the North-South divide. SciDev.Net complements these efforts, Hassan says: "This is really confidence building for scientists in the developing countries."

–**BEN SHOUSE**