

between aerobic capacity, mitochondrial function, and the full range of cardiovascular symptoms,” says Jeffrey Flier, an obesity and metabolism expert at Beth Israel Deaconess Medical Center in Boston. “If you happen to have drawn the wrong genes, you may be subject to not only not being a long-distance runner but also to diabetes and cardiovascular disease.”

All the researchers stress that the results should not be cause for despair

among people who suspect that their own aerobic capacity may be on the low side. Wisløff’s team is testing whether regular exercise can reduce the various risk factors in the low-aerobic-capacity rats, and early results look promising, Britton says. So rather than providing an excuse for sticking to the couch, the new data could well be yet another reason to hit the bike trail or aerobic floor.

—JEAN MARX

PALEONTOLOGY

Fossil Count Suggests Biggest Die-Off Wasn’t Due to a Smashup

If an asteroid or comet impact wiped out the dinosaurs 65 million years ago, unleashing mammal evolution, then might a similar impact have triggered the even bigger extinction 251 million years ago that gave the ancestors of the dinosaurs their start? Evidence for an impact at the boundary between the Permian and Triassic periods (P-T) has yet to convince most researchers (*Science*, 14 May 2004, p. 941). Now, the latest fossil evidence argues that the die-off resulted from a protracted crisis, one that built over tens of thousands or hundreds of thousands of years before pushing Earth over an ecological precipice. The fossil record of large animals in South Africa looks more consistent with extinction by, say, a millennia-long volcanic eruption than by impact.

In a paper published online this week by *Science* (www.sciencemag.org/cgi/content/abstract/1107068), paleontologist Peter Ward of the University of Washington, Seattle, and colleagues report on 126 fossil reptile and mammal-like reptile skulls they collected during the past 7 years across the P-T boundary in the Karoo Basin of South Africa. There the sand and mud of ancient meandering rivers entombed multitudes of animal skeletons in stone. To pinpoint the relative ages of the fossils from five different collecting sites, the researchers had to find “labels” in the rocks that held them. They used the rocks’ changing carbon isotopic composition and Earth’s flip-flopping magnetic field frozen into the rocks.

Analyzing the newly found and ordered skulls as well as previously reported fossils, Ward and his colleagues found that after

10 million years or more of relative stability, Permian creatures suffered more rapid extinction in the time during which the last 50 meters or so of Permian rock were deposited before Triassic rocks appear. Time is hard to gauge in the Karoo sediments, but Ward guesses that the extinction-driven decline of Permian taxa might have gone on for as long as 1 million years or as little as 10,000 years. Then a burst of extinctions occurred at the P-T boundary, lasting perhaps 10,000 years, says Ward.

The pattern on land of accelerating decline punctuated by a P-T pulse of extinction “is staggeringly similar” to the P-T pattern in the sea recorded at Meishan, China, says Ward. “Things [in the environment] were bad, and then they were really bad,” he says. “We can definitely see it’s different from the [dinosaur extinction]. I think there was no impact at all” at the P-T.

Paleontologist Desmond Maxwell of the University of the Pacific in Stockton, California, agrees that the previously proposed foreshadowing of the mass extinction on land—which the new Karoo data strongly support—points to a noncatastrophic cause. Not that life would have been comfortable late in the Permian. In one scenario, eruption of the lavas of the great Siberian Traps at the time of the P-T boundary (*Science*, 21 November 2003, p. 1315) would have poisoned the air and water with acid and alternately chilled the world with a sun-screening haze and baked it with the greenhouse gas carbon dioxide. Hard times indeed.

—RICHARD A. KERR



A goner. This gorgonopsian carnivore disappeared as extinction accelerated in the late Permian, well before the main extinction event.

EPA Asks for Advice on PFOA

The Environmental Protection Agency (EPA) has asked experts to help it assess the health dangers of a common chemical called perfluorooctanoic acid (PFOA).

PFOA and related chemicals are used to make nonstick and stain-resistant coatings, including Teflon. The chemicals apparently do not break down in the environment and have been widely found in people and wildlife (*Science*, 10 December 2004, p. 1887). Little is known, however, about how people are exposed. EPA officials trying to assess PFOA’s risks also face a host of technical issues, says Charles Auer, director of EPA’s Office of Pollution Prevention and Toxics, including how to compare blood levels in humans and animals.

So last week, the agency turned to its Science Advisory Board for guidance on how to address these problems. “We’re trying to assess the science issues,” Auer says. “We’re not attempting to make a critical judgment of the risks.” But toxicologist Timothy Kropp of the Environmental Working Group, an advocacy organization in Washington, D.C., says that EPA has left important issues off the table, such as the potential for breast and testicular cancers. “This is one of the largest reviews that EPA has embarked on in a long time,” he says. “They need to give it a really thorough and fair review.”

The advisory board will meet next month in Washington, D.C., to begin a review of EPA’s proposed approaches that is expected to take several months.

—ERIK STOKSTAD

NASA’s \$800 Million Gamble

NASA is keeping mum on how it plans to finance \$800 million in projects approved last month by Congress.

The agency’s plan for spending what appears to be a robust \$16.24 billion budget this year does not include some \$300 million needed to get the space shuttle flying again this summer, more than \$100 million to repair the Hubble Space Telescope, or \$400 million—plus in legislative earmarks. Any realistic spending plan will have to include most, if not all, of that money, which means agency managers must eventually make huge cuts.

Congressional sources worry that much of the squeeze ultimately will defer or even cancel a host of science projects. NASA officials say the agency will reveal the details when the 2006 budget request comes out on 7 February.

—ANDREW LAWLER