

PAUL DAVIES SPEAKS TO ALIENS • BATTLEGROUNDS PAST, PRESENT, AND FUTURE

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## For the Birds

**b**ombay's Towers of Silence are the focal point of a longstanding religious tradition that may soon become ancient history. For centuries, India's Parsis have disposed of their dead by offering the bodies to scavenging vultures, but recently the birds haven't been keeping up their end of the work. In the last decade, the country's vulture population has declined nearly to the point of disappearance.

The vultures, ravaged by the lethal effects of feeding on cattle treated with the anti-inflammatory drug diclofenac, aren't alone. According to a recent paper in the *Proceedings of the National Academy of Sciences*, ten percent of all bird species may become extinct by the end of the century, and as many as a quarter may become functionally extinct—reduced to one or two percent of their original numbers. Study author Cagan Sekercioglu said habitat loss and man-made hazards are the main culprits. Grassland species are threatened by ever more intensive farming practices; seabirds go after bait on commercial fishing lines and drown on the hooks; the introduction of nonnative species into island ecosystems takes a heavy toll on birds unaccustomed to predators.

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India's vulture population is just one of many species of bird threatened by habitat loss and man-made hazards.

Climate change models didn't figure into Sekercioglu's analysis, but global warming presents a host of worries. Rising sea levels may shrink coastal wetlands and intertidal zones, taking away valuable habitat and feeding areas for many avian species. And as higher temperatures lead to alterations in migratory patterns and timing, there is danger that some birds' life cycles may fall out of sync with their food supplies.

"The main effect this has is that it makes conservation much more complicated," said Audubon Society Director of Bird Conservation Greg Butcher, noting that many North American species are already wintering farther north than before, undercutting the effectiveness of established parks and nature preserves.

One of the most troubling things about disappearing birds is the prospect of a collapse in the ecological services they provide. "Birds eat a lot of insects, they eat a lot of weed seeds, and, especially in forested habitats, birds [provide] an awful lot of value for us that we really couldn't afford to duplicate with pesticides or

other approaches," Butcher observed. From rainforest pollinators to scavengers that clean carcasses before disease can spread, avian species are often at the center of an ecosystem's health.

Birds are also good barometers of larger environmental changes. "Birds are really key indicators of ecosystems and habitat quality," Sekercioglu said. "Among all vertebrates, birds are the least threatened. So if you are losing birds, you are likely to be losing other groups as well."

—TP

## Solar Systems

**b**asking in 300-plus days of sunshine each year, it seems logical that someone in Tucson would try to capitalize on the rays. And that's just what Arizona's second-largest school district has done, installing solar panels on the roofs of a handful of educational facilities.

At a time when renewable energy is increasingly important, the Hohokam and Safford middle schools and Palo Verde High School are among those reducing energy costs, turning their

buildings into walk-through science labs, and helping the environment all at once.

Students can see close up that solar energy is not an abstract concept, said Doug Crockett, Tucson Unified School District (TUSD) assets and energy manager. "We're using these schools as living laboratories so students can see how utilities work, and [we're] making the connections in their curriculum," he explained. "They can see how this is different from buying energy off the grid."

The installations are already generating a greater interest in science among TUSD students, Crockett said. Some of TUSD's science teachers use the photovoltaic systems as teaching aids, and the Palo Verde installation was designed with student input. A Web site will soon allow students to track and quantify the solar energy generated.

All the TUSD solar installations were accomplished with GreenWatt grants from Tucson Electric Power and the Department of Energy, and the sum total of solar energy harvested saves the district about \$7,000 annually. If the funding were available, Crockett said, all the TUSD schools would have installations.

Beyond the financial and educational rewards, the environment as a whole benefits from the wider use of alternative energy sources and the decreased use of polluting nonrenewables, which may be just one reason Crockett has taken a shine to the idea.

—Barbara Stahura