

NETWATCH

edited by JOCELYN KAISER

Birds Netted Online

North American bird-watchers have long supplied ornithologists with data on bird populations, starting with the Audubon Christmas bird counts nearly a century ago. Now scientists are turning to the Web to collect bird sightings from the public, and they say early results suggest a boon for research.

Last fall, the Cornell Lab of Ornithology and the National Audubon Society, which until now have relied on mailed-in paper reports from birders, plunged into online citizen surveys with a Web project called BirdSource (birdsource.cornell.edu). The program allows "instantaneous processing and archiving" of data, says Cornell Lab director John Fitzpatrick. That means instant maps (posted on the Web) useful for research and to keep birders interested and the ability to take in much more data than ever before.

Already, several thousand volunteers have helped document an unusual "superflight" year last winter when eight or so species of northern finches migrated to the United States from Canada in record numbers all at once, proba-

bly because seed crops in Canada had failed. "We're already writing two papers based on these data," Fitzpatrick says. This month, the scientists launched a survey to track 51 species of warblers moving north from Latin America.

Some experts have always questioned the reliability of birders' reports "simply because they're not professionals," says U.S. Geological Survey wildlife biologist John Sauer. The Web is "widening the pool" to more casual birders, he says, and BirdSource will need to check data quality, for example, by surveying volunteers' skills. "But they're keenly aware of that," he adds. Fitzpatrick says his group already uses a filter to "exclude records with obvious errors."

Fitzpatrick thinks this kind of "dynamic documentation" will prove useful for tracking other species over many decades, like butterflies and flowering plants. "There are things we would like to know about populations that are impossible to study through traditional scientific means," he says. "I'm convinced that citizen participation via the Web can give us huge new insights."

NEWS

HOT PICKS

What they're thinking. Wondering how many Americans believe in heaven? Get data on how attitudes break down on this and a huge range of subjects, from abortion to race, at the site for the General Social Survey, a study started in 1972. www.icpsr.umich.edu/GSS/home.htm

Congressional advice. From climate change to magnetic fusion and overall R&D budgets, the Congressional Research Service (CRS) churns out masses of useful reports on science issues for lawmakers—but it doesn't provide them to the public. Fortunately, the Committee for the National Institute for the Environment does. Over 300 CRS reports are now available from its electronic library. www.cnie.org/nle/crs_main.html

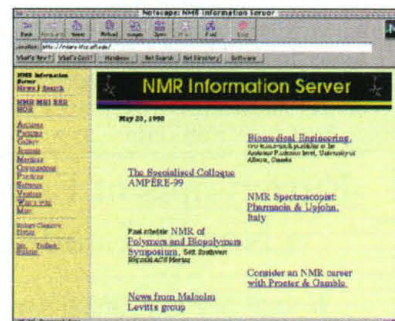
Hard hitting. What are the chances TWA Flight 800 was felled by an asteroid? You'll find analysis of this question, links to catalogs of Near Earth Objects, reports, and more at this NASA site on asteroid and comet impact hazards. impact.arc.nasa.gov

SITE VISIT

All About NMR

Nuclear magnetic resonance (NMR) spectroscopy, the powerful analytic tool used to deduce molecular structures from the spin states of atomic nuclei, has spawned Web sites on everything from structural biology to magnetic resonance imaging (MRI)—the flashy NMR offshoot that lets doctors look inside the body's tissues. But how to keep track of it all?

Try The NMR Information Server, started in 1994 by microbiologist Marian Buszko of the University of Florida, Gainesville, as a Web directory for NMR and its sister techniques, including MRI and electron spin resonance. That's still the site's core: a Yahoo-like listing of links ranging from spectra databases to educational backgrounders and journals. But Buszko has since added much more, including conference notices, job ads, a Who's Who of NMR scientists, and research news updates written by investigators. "It's really a hub for magnetic resonance-related information," says Buszko, who adds to the site daily. The pièce de résistance, he adds, is an interface he's designed that allows visitors to learn about NMR by watching in real time as data are collected on a spectrometer in his lab—this month, for example, it features chemical changes in tumor cells. NMR researcher Ronald Nieman of Arizona State University in Tempe praises the site's comprehensiveness: "It's usually the place I go to first" for NMR information.



www.nmr.ufl.edu

Microbial warfare. A white blood cell eating a fungus. Viruses attacking a bacterium. Bacteria succumbing to penicillin. It's all on **CELLS alive!**, a site that portrays with drawings, micrographs, and movies the lives of microbial invaders and the body's efforts to fight them off (www.cellsalive.com).

NET PICS

The scanning electron micrograph below, part of a lesson on making antibodies, depicts two immune system warriors—a human macrophage (gray) topped by a round lymphocyte—as they approach a chain of the bacteria *Streptococcus pyogenes*. Other topics range from parasites to how HIV attacks cells. **CELLS alive!** is run by microscopist Jim Sullivan, whose company Quill Graphics supplies video microscopy for customers such as the Learning Channel and Fox TV's popular *X-Files* show. "I've gotten let-



ters from fifth graders and postgraduate biologists alike," Sullivan says. "I'm fascinated that it attracts such a broad range of people."

SCIENCE ONLINE

The Enhanced Research Commentary by G. Anderson and G. Seidel on page 1400 describes advances in cloning farm animals, including the cloning of calves from genetically altered fetal fibroblasts. The online version links to Web sites exploring all aspects of cloning—from procedures for microinjecting DNA into a cell to a summary of the cloning debates by James Watson originally published in *The Atlantic Monthly*. www.sciencemag.org/cgi/content/full/280/5367/1400

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