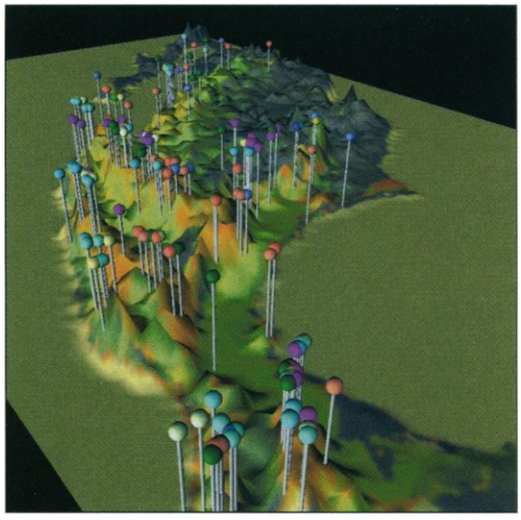
WEB TOOLS

Searching Museums From Your Desktop

As ecological marauders, house finches may not be in the same league as waterway-choking zebra mussels or landscape-strangling kudzu vines. But they, too, are ruthless invaders. Ever since a handful of these Western U.S. natives were let loose on Long Island in 1940, their descendants have steadily penetrated America's heartland, stealing habitat from other birds. To map the interloper's relentless spread, A. Townsend Peterson and David Vieglais of the University of Kansas Natural History Museum in Lawrence might have steeled themselves to the arduous task of collecting decades' worth of finch facts and figures, stored in three museums in different formats. Instead, they used a new tool Vieglais had invented that allowed them to cull the information in a matter of minutes. From this data deluge the duo developed a model that predicted, in retrospect, the meeting of eastern and western finch populations in Kansas in the 1980s.



Net profit. New strategy for tapping museum collections yielded this map of the distribution in Mexico of a bird called the mountain trogon.

The finch model illustrates the power of a new virtual database to put an enormous data trove at researchers' fingertips. Rather than spend weeks or months pestering curators and searching disparate databases, with a few mouse clicks scientists can now troll the holdings of six museums* using an expanded version of the software program Vieglais developed. Called The Species Analyst,† it was released as a prototype last month on the Web. "It's a virtual world museum," says Peterson, one of the project leaders.

Expected to expand to 40 institutions or more by year's end, the network linked by The Species Analyst could become a potent way to bring museum and survey data to bear on pressing policy needs, such as tracking the ecological effects of climate change, designing preserves for endangered species, or managing deleterious invading species like the hardwood-chomping Asian longhorn beetle. "What many of us have been talking about for well over a decade is beginning to be doable: pulling together collections of data seamlessly and being able to apply the data set to science or policy questions on the fly," says environmental policy expert Len Hirsch of the Smithsonian Institution.

The idea behind The Species Analyst is to pull up records from all kinds of biodiversity databases, including those compiled using incompatible software. It taps about 1.5 million records so far, using a computer program written according to a standard protocol (Z39.50) that libraries have long used to share bibliographic databases. The Kansas team's tool sends a query to each database, then pools the data it gets back. Putting the Web site to work is easy: Just tick any of the boxes next to each of the nine collections now on the Web, type a search term such as species name, and hit the query button. In seconds the site will produce a world map showing where the plant or animal has been found, along with a table—available as an Excel spreadsheet—that lists each specimen in the museums' collections and the date, collector, geographic coordinates, and so on.

The data can be merged with habitat and climate information, thanks to new software developed by David Stockwell of the San Diego Supercomputer Center (SDSC). And with $3 million in grants over the next 3 years, mostly from the Commission for Environmental Cooperation, a U.S.–Canadian-Mexican group, and the U.S. National Science Foundation (NSF), The Species Analyst is laying plans to link to other repositories, including GenBank, the federal DNA sequence database.

Museum researchers have some qualms about the extent to which data will be accessible to all comers. According to Vieglais, some scientists want their data excluded until they've had a chance to publish papers. And the network will restrict access to certain information that—if it falls into the wrong hands—could harm species. For instance, ornithologist Leo Joseph of the Philadelphia Academy of Natural Sciences worries that revealing the locations of rare parrots could aid wildlife traffickers.

With these restraints in place, tools like The Species Analyst "should figure significantly" in an NSF effort to set up a network of biodiversity observatories for studying interactions among species (*Science*, 25 September 1998, p. 1935), as well as become a popular resource for most any ecologist, says Kansas Natural History Museum director Kris Krishtalka. There's no question, adds Joseph, that the Web is bringing museum collections into "a very different era." –JOCELYN KAISER

* Smithsonian Institution; University of Kansas Natural History Museum; Museo de Zoología, Universidad Nacional Autónoma de México; Museum of Vertebrate Zoology of the University of California, Berkeley; University of Michigan Museum of Zoology; University of Nebraska Museum

† chipotle.nmh.ukans.edu/nabin

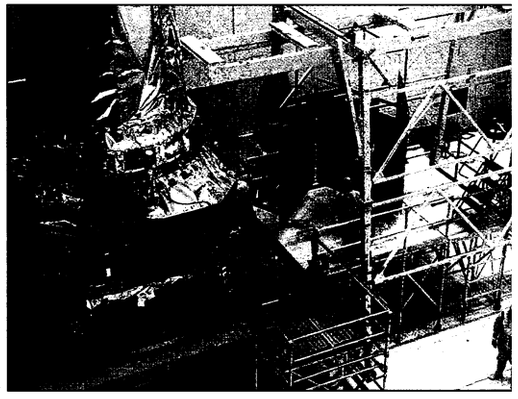
SPACE ASTRONOMY

Heaven Can Wait, NASA Tells X-ray Telescope

Deciding that it's better to be safe than sorry, NASA has indefinitely grounded a $2 billion space telescope until the U.S. Air Force completes its inquiry into an errant launch last month involving the same rocket motor that will place the telescope in its final orbit. It's the latest in a long line of delays for the Chandra X-ray Observatory, originally set to go up last August as the third in a suite of four great NASA probes.

The 5-ton telescope is designed to capture images of supernovas, black holes, galaxies, quasars, and other celestial objects that are more than 20 times sharper than previous x-ray images. It will also be employed to search for the mysterious dark matter that is thought to constitute most of the mass in the universe. But on 26 April NASA decided to scrap a planned 9 July flight aboard the space shuttle Columbia after the Inertial Upper Stage it plans to use for Chandra apparently misfired, leaving a $250 million military spy satellite in a useless orbit. An Air Force official estimated that it could be 6 months before the problem

CREDITS: (TOP) DAVID STOCKWELL/SDSC; (BOTTOM) NASA



Waiting game. The Chandra observatory could spend several months in limbo at the Kennedy Space Center.