

SCIENCE NEWS

THE WEEKLY NEWS MAGAZINE

AUGUST 5, 2006 PAGES 81-96 VOL. 170, NO. 6

titanic lakes
hawaiian-paradise protection
alaskan ice age survivors
air freshener fallout

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THE WEEKLY NEWSMAGAZINE OF SCIENCE

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AUGUST 5, 2006 VOL. 170, NO. 6

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Cover Everybody likes to read at the beach. The writers of *Science News* took a look around their beats and came up with some wide-ranging recommendations of books for readers to pack for their late-summer vacations.

(Dean MacAdam) [Page 88](#)



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This Week

Titan's Lakes

Evidence of liquid on Saturn's largest moon

New radar images indicate that Saturn's giant moon Titan contains lakes of liquid hydrocarbons. The finding provides the first compelling evidence for bodies of liquid on the surface of any object besides Earth, say the researchers who analyzed the images.

Located in Titan's north polar region, the lakes range in width from just under a kilometer to 32 km and extend up to 90 km. Titan's surface, at a frigid -180°C , is much too cold for liquid water. The lakes probably consist of methane, possibly mixed with ethane, says planetary scientist Stephen Wall of NASA's Jet Propulsion Laboratory in Pasadena, Calif.

The lakes are a source of the methane gas that accounts for 5 percent of Titan's smoggy atmosphere, say Wall and his colleagues. Over millions of years, sunlight breaks down atmospheric methane, and scientists have long sought a source that could replenish it. They've suspected that much of the moon might be covered with methane seas.

NASA's Cassini spacecraft, which began touring Saturn in the summer of 2004, dispelled that notion. But radar images taken by the craft on July 22 show a landscape that resembles lake-strewn Minnesota, says Wall.

If the lakes are indeed composed of methane, the hydrocarbon would cycle between Titan's surface and atmosphere just as water cycles on Earth.

"We have found on Titan the equivalent of a hydrological cycle, and that's a big deal," says Wall. The finding adds yet another reason to study Titan as a window on the frozen, prebiotic Earth.

Although Titan's hydrocarbon haze hides the moon's surface in visible light, radar penetrates the smog. Radar-dark regions, such as the ones just found by Cassini, can denote either a smooth, liquid surface or an accumulation of powder or sand that absorbs light. However, several signs from Cassini paint a lakelike portrait, says Wall.

Not only are the dark areas shaped like lakes, but they also have channels leading out of them. A smooth, dry powder or sand couldn't sculpt channels, Wall says.

Furthermore, some of the lakelike areas show what appear to be multiple shorelines, as if the body of liquid has been receding. Millions of years ago, when methane was more plentiful, lakes might have covered much more of the moon, suggests Jonathan Lunine of the University of Arizona in Tucson, who collaborated with Wall.

Finally, the images hint at patterns created when wind kicks up waves on a liquid surface.

The images are "the best evidence to date for methane lakes," comments planetary scientist Alfred McEwen of the University of Arizona.

The location of the lakes jibes with predictions that liquid methane would be sequestered near Titan's poles because the temperatures there are slightly lower than elsewhere on the moon, says Lunine.

Cassini won't produce radar images of areas near Titan's south pole until 2008. But this October, the radar system will look at the north polar region from a different angle. If such observations over several years show changes with season or brightness changes that could be caused by waves,

they'll strengthen the evidence that liquid methane currently resides on Titan, says McEwen. —R. COWEN

What's New in the Water?

Survey tallies emerging disinfection by-products

By analyzing drinking-water samples from U.S. treatment plants, a multi-institute research team has identified some unexpected by-products of disinfection processes. The data indicate compounds that toxicologists should target for further study, the researchers say.

Reactions between disinfection chemicals, such as chlorine and ozone, and natural organic matter in water create a wide variety of by-products. Primarily through laboratory studies, researchers have identified more than 500 of these disinfection by-products.

The Environmental Protection Agency regulates a handful of the by-products, including trihalomethanes (THMs), that have been shown to be toxic to animals and are preva-

lent in U.S. water systems.

For the new study, the team tested water from 12 treatment plants for the 50 unregulated by-products that EPA scientists ranked as most likely to cause cancer. To increase the likelihood of finding these by-products, Stuart W. Krasner of the Metropolitan Water District of Southern California in La Verne, Susan D. Richardson of EPA's National Exposure Research Laboratory in Athens, Ga., and their colleagues chose plants that had large amounts of natural organic matter, bromide, and iodide in their incoming water.

"We wanted to get an idea of the worst-case scenario," says Richardson.

For comparison, the researchers measured the concentrations of regulated disinfection by-products.

Among the unregulated compounds that the researchers found in the water were iodine-containing versions of THMs. The median amount of these by-products was 400 parts per trillion, which was lower than the 31 parts per billion (ppb) of regulated THMs. The researchers noted that the plant with the highest concentration of iodinated THMs, 19 ppb, used only chloramines to treat the water.

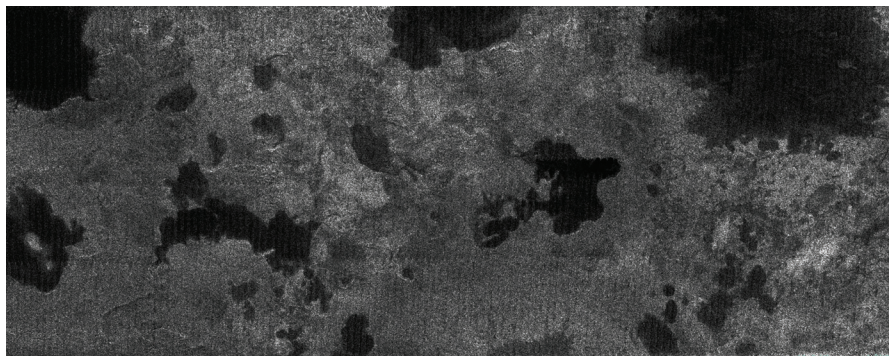
Some plants are switching from chlorine to chloramines because they reduce the production of the regulated THMs.

In an upcoming *Environmental Science*

QUOTE

“It's the most up-to-date view of the occurrence of emerging disinfection by-products.”

PAUL WESTERHOFF,
Arizona State
University



JPL/NASA

LIQUID MOON Radar-dark patches sprinkled throughout this area of Titan's north polar region are probably methane lakes.

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This Week

✂ *Technology*, the researchers also report finding 28 disinfection byproducts not previously detected. These include iodine-containing acids such as iodoacetic acid. Other work has linked iodoacetic acid to birth defects in mice.

Toxicity studies are now under way for the iodoacids, iodinated THMs, and other compounds that the researchers found. The results of those tests and further measurements of the chemicals' concentrations in drinking water will indicate whether attempts to decrease effects of regulated by-products may have introduced problems caused by emerging ones, says Krasner.

"If you disinfect water, you are going to have by-products," he notes. "The more we understand, the more we can get efficient disinfection and minimize as many by-products as we can."

"It's a milestone paper," comments Paul Westerhoff, an environmental engineer at Arizona State University in Tempe. "It's the most up-to-date view of the occurrence of emerging disinfection by-products."

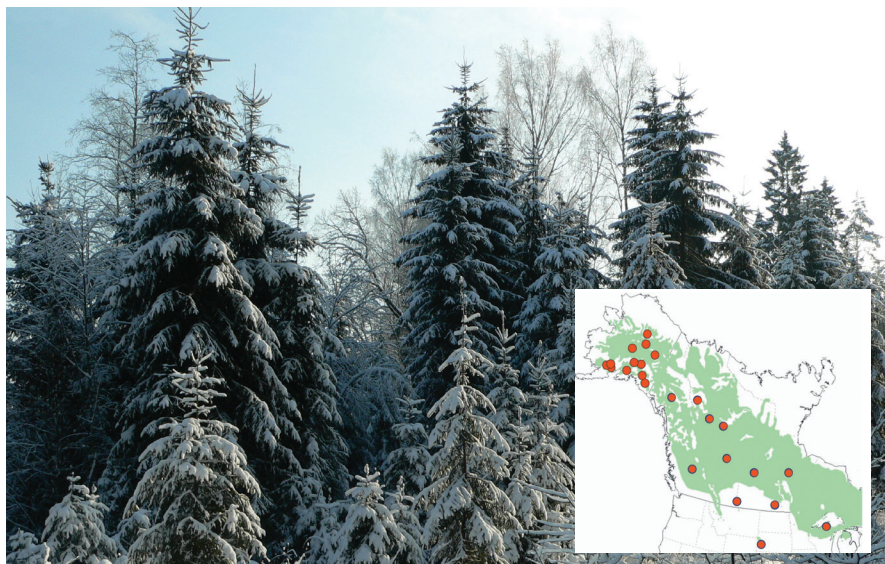
Says environmental engineer David A. Reckhow of the University of Massachusetts at Amherst, "They found a number of interesting compounds that surprised many of us." What's needed, he says, is a better understanding of the human-health impacts of these compounds and their prevalence in U.S. drinking waters. —A. CUNNINGHAM

Northern Refuge

White spruce survived last ice age in Alaska

Genetic analysis of white spruce trees at sites across North America suggest that that species endured the harsh climate of Alaska throughout the last ice age, a notion that scientists have debated for decades.

Picea glauca, the white spruce, is one of the most common trees in Alaska's forests today, says Lynn L. Anderson, a plant geneticist at the University of Illinois at Urbana-Champaign. However, scientists haven't unearthed Alaskan fossils of that species dating from the most recent ice age, which lasted from 25,000 to 12,000 years ago. During that time, most of Alaska was either a treeless tundra or covered in ice. The lack of white spruce fossils led some researchers to speculate that the species



ICE AGE SURVIVORS White spruce trees, common in high-latitude North American forests today, endured in Alaska during the last ice age, a new genetic analysis suggests. Inset shows Alaskan and other sites (red dots) sampled in that study.

was wiped out in Alaska during the ice age and that trees from elsewhere recolonized the region once the climate warmed.

Other scientists had noted that Alaskan lake sediments from the last ice age contain trace amounts of white spruce pollen, a hint that small numbers of spruce survived. However, the grains might have blown in from distant forests.

To weigh in on the debate, Anderson and her colleagues looked at three stretches of DNA from chloroplasts, the cellular structures that produce energy in plants. The team analyzed 326 samples taken from white spruce trees at a dozen sites in Alaska and a dozen sites elsewhere in North America.

Overall, the team identified 17 combinations of genetic variations in the samples that they analyzed. While five of these combinations, called haplotypes, were in trees at all sites, seven showed up only in the Alaskan samples and five appeared only in non-Alaskan trees.

The haplotype differences suggest that today's Alaskan spruce forests arose from trees that survived locally during the ice age, says Anderson. At the rate that genetic mutation occurs in chloroplasts, it probably wouldn't have produced seven new haplotypes in just 12,000 years, the scenario required if the species had been wiped out in the region during the last ice age.

Moreover, if today's Alaskan white spruce trees were descended solely from those in distant forests, the genetic variations found in their chloroplasts would be a subset of the genetic diversity found in trees elsewhere. That's not the case, Anderson and her colleagues report in an upcoming *Proceedings of the National Academy of Sciences*.

Researchers who had suspected that small stands of white spruce survived in Alaska during the last ice age didn't have

compelling proof, says Herbert E. Wright Jr., a paleoecologist at the University of Minnesota in Minneapolis. "These findings should be convincing enough to settle the debate," he adds. —S. PERKINS

Microbial Mug Shots

Telltale patterns finger bad bacteria

In their everyday battles against harmful bacteria, physicians, food producers, and others need to know quickly which foe they're facing. Yet the procedures currently used to identify bacterial colonies are often time-consuming and expensive.

Technicians must wait hours or days for suspect bacteria to grow into a colony for testing in a laboratory. However, by taking a picture of a colony with laser light, a new technique created by Bartlomiej Rajwa of Purdue University in West Lafayette, Ind., and his colleagues identifies the colony without further delay.

In their method, the researchers shine a laser beam through a petri dish dotted with bacterial colonies, project an image of one colony at a time on a screen, and record that image with a digital camera. This approach requires no stains or costly custom chemicals, the team reports. The components of the prototype device are inexpensive, so the technology could be widely affordable.

The researchers describe their prototype system and initial results in the current, May/June *Journal of Biomedical Optics*.

Identifying tiny biological entities from patterns of scattered light isn't new. For

ISTOCKPHOTO; (INSET) ANDERSON ET AL.

instance, widely used machines called flow cytometers distinguish and count various human-cell types by using light scattered as cells pass through a laser beam, notes biophysicist Robert M. Zucker of the Environmental Protection Agency in Research Triangle Park, N.C.

To differentiate colonies of bacteria about 2 millimeters across by the complex light patterns they create, the Purdue team devised a method similar to automated face recognition. The researchers recorded the pattern of light emerging from each bacterial colony and compared it with 120 mathematically derived shapes. In that way, they generated a classification code for each colony.

Similar codes identified colonies made up of the same species of microorganisms, Rajwa explains. The researchers don't hypothesize which structural features of bacteria or their colonies cause the differences in the patterns.

In tests described in the new report, the system identified with about 70 percent accuracy worrisome colonies of *Listeria*—a genus of foodborne bacteria in which only some species are harmful.

Zucker calls the new technique "promising" but not yet accurate enough.

Al Brunsting, an engineer with Panduit Corp. in Orland Park, Ill., says that he's "skeptical" of the approach. One concern is that its developers haven't shown that a colony's pattern would be unchanged if measured under varying conditions.

Rajwa says that the pattern-recognition algorithm accommodates considerable variability. What's more, he adds, his team has recently upgraded its system to a version that's "vastly superior" to the one reported in the journal. The new system classifies *Salmonella*, *Vibrio*, *Bacillus*, and other bacteria. It achieves 98 percent accuracy for many types of bacteria, Rajwa says. —P. WEISS

Stung Lung

Volatile chemical may cut respiratory capacity

A chemical in some air fresheners and pest-control products may slightly impair lung function in millions of people, a nationwide study suggests.

The compound, para-dichlorobenzene, is

used to make mothballs, urinal deodorizers, and air-freshening blocks for household use. At room temperature, the strong-smelling chemical gradually changes from a solid to a gas.

Para-dichlorobenzene was previously detected in the blood of more than 95 percent of the participants tested in a U.S. study called NHANES III.

Scientists at the National Institute of Environmental Health Sciences in Research Triangle Park, N.C., looked for effects of the chemical and 10 other volatile organic compounds commonly detected in U.S. residents. Led by internist and epidemiologist Stephanie J. London, the team analyzed NHANES III data from 953 adult volunteers.

The researchers compared the recorded blood concentrations of each of the 11 chemicals to several measures of lung function, including forced expiratory volume in 1 second (FEV1). They also considered related factors, such as exposure to cigarette smoke.

The tenth of the study's participants who had the most para-dichlorobenzene in their blood—more than 4.4 micrograms per liter—

had about 4 percent lower FEV1 values than did the tenth of participants with the lowest blood concentrations—averaging 0.1 µg/l. That difference in FEV1 amounted to an average of 0.15 l. The average FEV1 of people in the study was 3.44 l, the researchers report in the August *Environmental Health Perspectives*.

While "it's not some huge effect," London says, "at the borderline [of healthy lung function], losing 4 percent of your FEV1 could be a problem."

FEV1 is low in people who have chronic obstructive pulmonary disease or who are regularly exposed to cigarette smoke. The FEV1 deficit associated with para-dichlorobenzene exposure is on par with that linked to secondhand smoke, London says. One-quarter of the volunteers were smokers, and others had been exposed to secondhand smoke in various amounts. The link between para-dichlorobenzene and reduced lung function persisted even when the researchers took those factors into account.

"This is an interesting new finding that will need to be replicated," comments Ralph J. Delfino of the University of California, Irvine.

Delfino and London agree that para-

dichlorobenzene may not be the culprit behind the reduced lung function that London's team reports. Rather, there may be other environmental hazards that are common in homes and workplaces that have products emitting para-dichlorobenzene, London says. —B. HARDER

Racial IQ Gap Narrows

Blacks gain 4 to 7 points on whites

A statistical analysis of four national intelligence tests indicates that the difference in scores between blacks and whites decreased by about a third between 1972 and 2002. The findings challenge a century-old argument that the racial gap in performance on IQ tests is primarily genetic and therefore invulnerable to social change, say the researchers who performed the new study.

They examined data that have only recently become available to researchers, says William Dickens of the Brookings Institute in Washington, D.C. Using test results from a random distribution of people in the United States, he and James R. Flynn of the University of Otago in New Zealand tallied the increases in IQ scores of blacks and whites over 3 decades. Each of the four tests analyzed included two or three groups of people that took the test at different times.

Previous measures of the intelligence gap, which had used localized populations tested only once, found blacks 15 to 18 IQ points lower than whites, Dickens says.

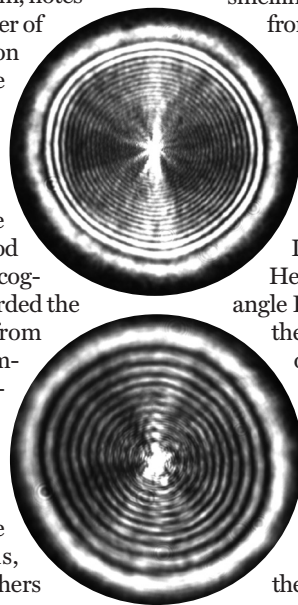
In the new analysis, all four tests reflected a similar gap in 1972 but indicated that blacks have since gained ground in IQ.

"The whole distribution of black cognitive ability is moving up relative to whites," says Dickens. "There's no reason to believe [the gap] isn't going to get more narrow as we move forward and as measures of social equality continue to improve."

Neither increased rates of mixed ancestry nor changes in test content explain the narrowing gap, Dickens and Flynn argue in the October *Psychological Science*.

Last year, a review by J. Philippe Rushton of the University of Western Ontario in Canada and Arthur Jensen of the University of California, Berkeley concluded that intelligence is determined predominantly by genetics. The researchers argued that the IQ gap had held steady for a century, despite social-equality efforts, and noted that studies of adopted children and twins have attributed 80 percent of the gap to genetics.

The new data, by contrast, instead indicate that environmental factors contribute greatly to IQ scores, says Flynn. "It's excit-



WHO'S WHO FOR GERMS

A potentially cheap and fast new system can tell bad bacteria from good ones by analyzing patterns made as a laser beam penetrates microbial colonies. These patterns represent colonies of harmless *Listeria innocua* (top) and illness-causing *Listeria monocytogenes* (bottom).

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ing to show that the gap isn't written in the stars," he says.

But the new findings contain many holes, Rushton and Jensen maintain in a rebuttal published with the study. For example, Dickens and Flynn "cherry-picked" their results by leaving out four tests that don't support their conclusions, Rushton says.

Dickens answers that the tests that he and Flynn omitted were less reliable than the ones that they included.

A 4-to-7-point closure in the gap would be "truly astounding," says Linda Gottfredson of the Delaware-Johns Hopkins Project for the Study of Intelligence and Society.

However, the conclusion "just doesn't fit" with data showing that in the past 30 years, U.S. black children between the ages of 9 and 17 have approached white children in reading scores but not in science and math, she says. If general intelligence, as measured by IQ tests, were really rising, scores would have increased in all subjects.

A fundamental problem with studies of IQ-test results is that "nobody really knows what intelligence is," says psychometrician Peter H. Schönemann of Purdue University in West Lafayette, Ind.

The new findings "won't change that many minds," says Doug Detterman of Case Western Reserve University in Cleveland, who is editor of the journal *Intelligence*. More important than measuring a gap, he says, is identifying the specific environmental factors or genes that contribute to intelligence. —E. JAFFE

Autism's Cell Off

Neural losses appear in boys, men with disorder

The brains of males with autism contain unusually few neurons in the amygdala, an inner-brain structure involved in emotion and memory, a new study finds.

Although previous research had suggested that wayward amygdala development contributes to autism, the new investigation shows for the first time that the disorder features low numbers of neurons in that part of the brain, say neuroscientists Cynthia M. Schumann of the University of California, San Diego and David Amaral of the University of California, Davis.

Schumann and Amaral used a computer-

aided microscopic device to count neurons from representative sections of the amygdala in the preserved brains of 9 males who had been diagnosed with autism and of 10 males who had no psychiatric or developmental disorders. The individuals ranged in age from 10 to 44. In both groups, brains were obtained within 2 days after death.

Autism, which usually becomes apparent by around age 3, interferes with a person's ability to communicate and to interact with others. Autism and related disorders affect an estimated 0.6 percent of children, primarily boys.

The brains of those with and without autism displayed comparable amygdala volume and brain-cell size, Schumann and Amaral report in the July 19 *Journal of Neuroscience*. However, fewer amygdala neurons appeared in the group with autism.

This new evidence "demonstrates that the structure of the amygdala is abnormal in autism," remarks psychiatrist Thomas R. Insel, director of the National Institute of Mental Health in Bethesda, Md.

Previous studies of six preserved brains of individuals with autism had hinted at a lack of amygdala neurons, compared with the brains of people without autism. However, that work identified amygdala areas with

low cell density but didn't count individual neurons. Moreover, most of those brains came from people who had both autism and epilepsy, which also damages the amygdala.

The new findings raise a key question, Schumann notes. "Are there lower numbers of amygdala neurons in autism because fewer have developed in the first place, or have some been lost in a degenerative process?" she asks.

Schumann suspects that in autism, the number of neurons in the amygdala rises precipitously during early childhood and declines sharply later in life. Earlier brain-scan studies showed amygdala enlargement in youngsters with autism by around age 6.

One intriguing hypothesis holds that precocious amygdala growth in autism causes children to become preoccupied with potential dangers and thus to feel overly anxious and fearful. After several years, a constant rush of stress hormones into the brain kills many amygdala neurons.

Further research needs to test this hypothesis by examining amygdala-neuron numbers in more brains and in brains that represent a wide age range, Schumann says. Other brain areas, such as the frontal lobe, may also incur cell losses that contribute to autism, she adds. —B. BOWER



Hot and hungry bees hit hot spots

As bumblebees buzz around, their body temperatures tend to be warmer than 30°C. In this infrared image, the brighter the region the higher the temperature, such as on the bumblebee's upper back. According to new lab experiments, the bees prefer warm flowers and can learn color cues to finding them. A majority of bumblebees chose to visit the warmer of two otherwise identical feeders that differ by 4°C or more, report Lars Chittka of Queen Mary, University of London and his colleagues. Artificial flowers of different colors but the same temperature attracted bees about equally. However, when researchers coordinated either pink or purple color with warmth, bees preferred the warm-color flower. Insect preference for warmth may have influenced the evolution of flower characteristics, say the researchers in the Aug. 3 *Nature*. —S. MILIUS

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Explore the surprisingly contentious debate over the nature of scientific knowledge in this 24-lecture series, *Science Wars*

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Intelligent design also enters the picture. In the next-to-last lecture Professor Goldman asks: What are the minimum criteria that define a hypothesis as scientific, and does intelligent design qualify? Having

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BOOKS FOR LATE SUMMER

From genius genes to tyrannosaur musings

BY THE SCIENCE NEWS WRITERS

Whether you go to a house at the beach or a cabin in the woods, selecting books to take along is a crucial part of vacation planning. As a *Science News* reader, you probably consult the "Books" section at the back of recent issues. But for your late-summer trips, we thought you might appreciate additional suggestions from our writers. Asked for their advice on science-related books, not necessarily new, they've come up with a surprising range of choices that you should—or perhaps shouldn't—consider packing. Happy travels.

— J.A. Miller, Editor in Chief

Who's Your Daddy?

THE GENIUS FACTORY:

The Curious History of the Nobel Prize Sperm Bank

DAVID PLOTZ

Random House, 2005

Nature or nurture: Which one has more pull? That question might have been answered by a project initiated in the early 1980s. The original idea was to coax some of the world's most intelligent and accomplished men—Nobel prize winners—to provide sperm to inseminate a select group of smart, driven, young women. The sperm bank's founder, ophthalmologist and eccentric millionaire Robert Graham, had expected to produce a crop of genius babies. However, this eugenics experiment was doomed from the beginning.

Only three Nobel prize winners deigned to contribute to the endeavor, and the sperm from these geriatric donors didn't get anyone pregnant. In a push to keep the specialized sperm-bank business afloat, Graham changed his focus. He decided to simply recruit accomplished men, then eventually to accept donations from practically any man who considered himself gifted—no questions asked.

As storyteller David Plotz details in *The Genius Factory*, 215 babies were born of the endeavor. They now range in age from preteens to early 20s. Plotz tracked down many people associ-

ated with the project and concluded that the "genius" genes aren't all they have been cracked up to be.

For example, Tom Legare, a pseudonym Plotz uses for one of the sperm bank's kids, flounders in school, becomes a teenage parent, and struggles with finding a focus in life. Legare's half-brother Alton, created by sperm from the same donor but born to a more affluent mother, who lives in a better school district, seems to excel at almost anything he tries. Most of the kids produced with the bank's help hover in the average range of intelligence and accomplishments, "genius" dads notwithstanding.

Plotz also points out that qualifying to donate to the sperm bank didn't guarantee success in life. Only one of the three Nobelists who made deposits to the bank ever acknowledged his involvement: William Shockley, winner of the 1956 prize in physics, whom Plotz describes as a confirmed racist whose lack of business acumen ultimately overshadowed his scientific successes.

The author manages to dig up a sordid assortment of other donors, including a Nobel winner's son who has no discernable job other than donating to multiple sperm banks. When Plotz eventually locates Tom and Alton's genetic father, he finds a man living in a filthy, one-bedroom house who had produced so many offspring through channels other than sperm banks that he can't afford to support them.

It's clear from the detailed and thorough reporting that Plotz was fascinated by his subject matter. This enthusiasm is contagious—it's easy to get caught up in the soap opera lives of many of the characters. However, some parts of the book, especially those giving background information on the bank's history, become tedious. Overall, the thought-provoking text gives readers plenty to contemplate about how genes and environment shape people and their lives. —C. BROWNLEE

Code Breaking: A Toy Story

POPCO

SCARLETT THOMAS

Harcourt, 2005

It's a rare novel that includes not only a cake recipe but also a table of the first 1,000 prime numbers, a cryptic crossword puzzle, the frequency of occurrence of letters of the alphabet in English, and references to Fibonacci numbers, the continuum hypothesis, logic paradoxes, and other mathematical lore.

These elements play important roles in the entertaining, clever, and beguiling novel *PopCo*.

The story's heroine, Alice Butler, is a one-time crossword-puzzle compiler who works for a



cool, up-and-coming toy company. She has already made her name as the creator of the product lines known as KidSpy, KidTec, and KidCracker, which are aimed at children who want to be spies, detectives, or code breakers.

Along with a coterie of other top “creatives” at her company, she finds herself at a secluded estate in the English countryside, charged with inventing the next great thing for teenage girls. As she goes through her vaguely sinister mind-camp experience, her thoughts return repeatedly to her own unusual background: a treasure-seeking father, a cryptanalyst grandfather, and a mathematician grandmother striving to prove the Riemann hypothesis, perhaps the most famous unsolved problem in mathematics.

As the stories of the past and present tangle and unwind, readers get fascinating glimpses of several different worlds, along with quick lessons on famous cryptograms, the psychology of marketing to girls, some fine points of sailing, homeopathic remedies, and the inscrutable game of Go. And there are puzzles for readers to ponder and solve as Alice tries to figure out who is sending her eerie messages, written in simple codes, and whether her grandfather left her a hidden key to a long-lost pirate treasure.

The author weaves genuine mathematics into a compelling, quirky story. She makes it seem natural for sophisticated mathematical ideas and discussions to come up in everyday life. A few of her examples and explanations may appear mathematically naive, but they don't get in the way of the story.

PopCo is exhilarating with its unusual blend of modern commerce, mathematics, high-seas adventure, romance, and girl-coming-of-age sensibility. However, the ending seems a bit flat and perfunctory, given the richness and intrigue of what comes before. Although the finale resolves all the mysteries and dilemmas posed in the story, elements of it aren't believable. Nonetheless, *PopCo* is a highly original, fast-paced story that will be entertaining and accessible even to people proclaiming a fear of math. —I. PETERSON

Thinking about Tomorrow

FIELD NOTES FROM A CATASTROPHE: Man, Nature, and Climate Change

ELIZABETH KOLBERT
Bloomsbury Publishing, 2006

More than a century ago, the first scientist to calculate that industrialization would warm the planet was pleased by the prospect.

In a pithy and powerful introduction to global warming, author Elizabeth Kolbert includes the story of Swedish chemist Svante Arrhenius. When he started studying climate dynamics in the 1890s, scientists already knew that atmospheric carbon dioxide traps heat and warms the Earth. Working with pen and paper for a year, Arrhenius arrived at figures for how much the doubling of atmosphere carbon dioxide from burning of fossil fuels would eventually raise the average global temperature. Surprisingly, given that some of his assumptions were dead wrong, Arrhenius' results and today's findings match.

Arrhenius wrote, “We hope to enjoy ages with more equable and better climates.” He was working in a different era, Kolbert reminds us, and experiencing Scandinavian weather.

She presents the case for human-driven climate change primarily through evidence that she witnesses firsthand and testimony from the experts she visits. None of them looks forward to Arrhenius' equable climate.

The book grew out of three articles published in 2005 in the

New Yorker. Kolbert writes in the preface that the articles and book have the same goal: “to convey, as vividly as possible, the reality of global warming.” She builds her case powerfully from material presented in an understated, observational tone.

Kolbert's concrete observations give the book surprising charm. The sections aren't just boluses of doom. A few deft details in each section evoke a personality or a place.

Kolbert opens the book with scenes from her travels around Alaska.

She visits the Inupiat village of Shishmaref (population 591), where hunters tell her they used to drive snowmobiles some 20 miles across seasonal ice to catch seals. Now, by the time the seals arrive, the ice at just half that distance has thawed to the consistency of a slush-puppie ice drink.

What's more, the ice no longer forms early enough in winter to protect the village from storm surges. Incoming water has ripped houses into the sea, and the residents have voted to abandon their homes and relocate.

Kolbert touches on many elements in the current climate debate: melting glaciers, climate models, changes in animal ranges, ice-core data, signs that ancient civilizations collapsed during climate changes.

Then, she gets to the politics of reducing carbon emissions and planning for climate change.

She visits the Netherlands, which has at least a quarter of its land below sea level. The government is preparing for higher water in the years ahead by devising scenarios that expand water surge-protection areas. She drops in on Dutch families living in experimental floatable houses that can rise with the storm waters and then settle gently as the floods recede. Side by side, with curved metal tops, the homes look like a row of toasters, says Kolbert.

Compared with Europe, the United States doesn't seem to be taking the issue seriously, Kolbert reports. U.S. federal policy seems to share Arrhenius' misguided nonchalance.

This is a sobering book, but it's not without hope. Engineer Robert Socolow compares cutting carbon emissions with the challenge that the United States once faced in wiping out child labor. He tells Kolbert: “I think it's the kind of issue where something looked extremely difficult, and not worth it, and then people changed their minds.” —S. MILIUS

Murder and Old Bones

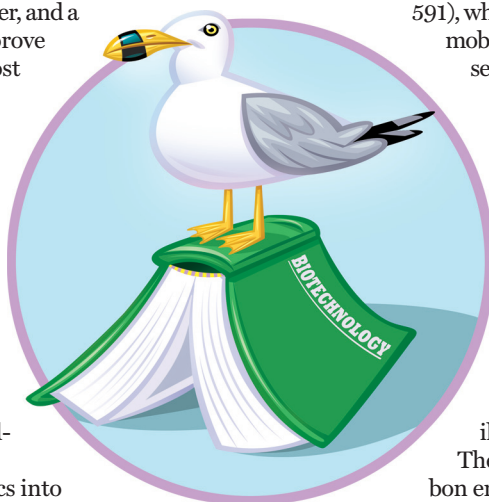
TYRANNOSAUR CANYON

DOUGLAS PRESTON
Forge Books, 2005

Veterinarian Tom Broadbent rides his horse through a remote New Mexico canyon one evening in search of peace and quiet. Four shots ring out nearby. When he takes a quick detour to investigate, he discovers a man, apparently a prospector, shot in the back and lying facedown in the sand. Broadbent momentarily revives the mortally wounded man, and after the prospector realizes that he's not in the grip of his killer, he forces Broadbent to take a small, leather-bound notebook filled with page after page of cryptic numbers. “It's for Robbie My daughter ... No one else ... For God's sake not the police ... You must ... promise.”

Thus begins the novel *Tyrannosaur Canyon* and a fervent race to locate what would be a historic paleontological find. The cast of characters includes an assistant museum curator who yearns to redeem his career with a fantastic discovery, the bright yet unappreciated female postdoc who does all the glory-grabbing curator's lab work, illegal fossil hunters and distributors, and an ex-CIA-cryptologist-turned-novitiate at the local monastery—a character quite handy for a veterinarian who needs to decode a notebook full of numbers.

Broadbent has trouble convincing detectives that he's not



involved in the prospector's death. Meanwhile, the prospector's murderer, in his quest to retrieve the notebook, makes life difficult for Broadbent and his wife. Near the end of the chase come the guys from a shadowy government unit that flies black helicopters and missile-equipped drone aircraft. Gradually, the book's prologue about a missing moon rock begins to make sense.

To accompany all this action, the book often flashes back 65 million years to describe the thoughts of one of the largest tyrannosaurs ever to have walked the planet.

A friend recommended *Tyrannosaur Canyon* to me because of the author's keen eye for geological detail, but it's the rollicking yet suspenseful story that should earn this novel a spot in your travel bag. —S. PERKINS

Decoding Decision Makers

BLINK

MALCOLM GLADWELL

Little, Brown, 2005

THE WISDOM OF CROWDS

JAMES SUROWIECKI

Doubleday, 2004

Two *New Yorker* staff writers wrote books in the past few years about decision making. One volume sold big. The other didn't. Guess which book says something profound about how we think.

Malcolm Gladwell's bestseller *Blink* celebrates snap judgments and selected psychological research on rapid thinking. The author rightly points out that much thinking takes place in the blink of an eye. His anecdotes, however, add up to an unsatisfying theme: Sometimes snap judgments work out great, sometimes they fizzle.

It's interesting to read Gladwell's account of bigwigs at a major museum getting suckered into buying an allegedly 6th-century B.C. Greek statue that a few art authorities later recognized as a fake with just a glance. But experts in various areas, including art authentication, frequently disagree in their determinations. Why do some achieve more accuracy than others do, both in deliberative and intuitive judgments? What about the many complex decisions for which no clear answer exists? Gladwell's anecdotes yield no answers.

Part of the problem lies with his assumption that the unconscious mind works like a monolithic computer, quickly processing all of a person's relevant prior experiences and knowledge to foster snap judgments. Research not mentioned in this book suggests that rapid decisions don't result from instant number-crunching in the brain but from unconscious learning over time that makes it possible to, say, discern when your boss is angry at you or whether the guy in the green convertible is about to change lanes.

Gladwell also extols the Implicit Association Test as a gauge of unconscious racial attitudes without mentioning that social psychologists heatedly disagree about what that test actually measures and how the mind makes the rapid associations that the test traffics in.

In its favor, this book is written clearly and jargonfree. Like a late-afternoon latte, *Blink* goes down smooth but leaves the reader hungering for something substantial.

Satisfaction comes in the form of *The Wisdom of Crowds*. Its author deftly blends research and anecdotes to defend the beleaguered notion of collective intelligence. He argues that under the right conditions, groups are smarter than the sharpest individuals. Collective insight thrives when group members possess a diversity of relevant knowledge and insight, make independent decisions, draw on personal experience without any direction from above, and tabulate their private judgments into a collective verdict by some consensus-achieving method.

Surowiecki shows how, on the day in 1986 when the space shuttle Challenger exploded, group intelligence enabled the stock market, through its determination of a reduced stock price, to label one company as responsible for the disaster. That company, Morton Thiokol, was eventually found to have made defective seals for the shuttle's booster rockets.

The author also details how scientific collaboration led to the remarkably fast identification of the severe acute respiratory syndrome, or SARS, virus in 2003.

Other sections describe situations in which collective thinking misfires, such as the periodic tendency of investors to create portfolio-busting stock market bubbles.

Surowiecki uses research on collective wisdom to mount a rousing defense of capitalism and democracy.

So why does Gladwell's book, but not Surowiecki's, set cash registers ringing? Sometimes, it seems, the crowd just needs to wise up. —B. BOWER

A Curious Gaze at the Heavens

FIND THE CONSTELLATIONS

H.A. REY

Houghton Mifflin Company, 1976

ZOO IN THE SKY: A Book of Animal Constellations

JACQUELINE MITTON

National Geographic Society, 1998

ONCE UPON A STARRY NIGHT: A Book of Constellations

JACQUELINE MITTON

National Geographic Society, 2004

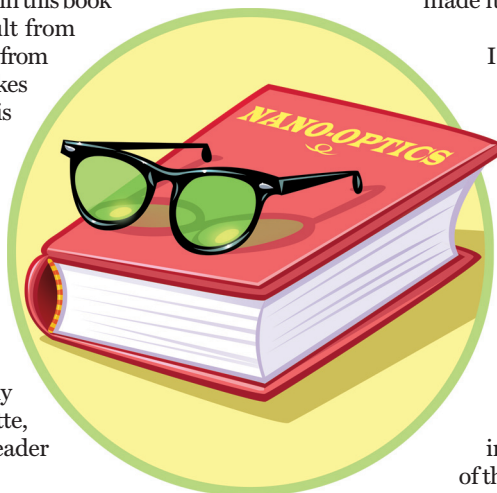
If summer takes you to a place where the stars shine bright, let me recommend a guide to the heavens. Actually, you may want to look up at the skies even if you find yourself citybound.

A Greenwich Village rooftop isn't the best place to gaze at the heavens, but that's where I learned to use a telescope. It was during my one and only observational-astronomy course, and I was in my sophomore year at New York University. The roof of Shimkin Hall, one block south of Washington Square Park, featured an old water tower and a concrete observing area with several 6-inch telescopes. It also had a great view of the Empire State Building, which came in handy during those not infrequent evenings when a combination of the city's smog, bright lights, and clouds made it fruitless to peer into the night sky.

But if the viewing was less than memorable, I still recall the book somewhat sheepishly recommended by my astronomy teacher Olav Redi. *Find the Constellations* by children's author H.A. Rey, best known for *Curious George*, is hardly a college-level text. It's a thin book with simple pictures and words: "At night time, when the stars are out, the sky all of a sudden becomes a huge Picture Book. You can look up and see a lion and a whale, an eagle, a swan, a dog, a hare, and a lot other pictures; that is, of course, if you know how to find them."

To my untrained eyes, the book was invaluable for its straightforward depictions of the constellations, with and without lines connecting the stars into the shapes that give the constellations their names. Without those diagrams, I couldn't have picked out the Great Bear, let alone the bear's paws. The book's year-round views of the sky, as seen from the middle and northern United States (latitude 40°), gave me the first real feel for the celestial sphere—the movement of stars day to day and season to season relative to Earth.

I recently purchased a used copy of *Find the Constellations*. For two more-recent publications for beginning sky watchers, I rec-



commend *Zoo in the Sky: A Book of Animal Constellations* and *Once Upon a Starry Night: A Book of Constellations*. Both books have gorgeous illustrations by Christina Balit, and Jacqueline Mitton provides charming descriptions of the Greek and Roman gods and goddesses whose stories underlie longstanding interpretations of the heavenly patterns. —R. COWEN

A Journey through the World's Backwaters THE ENDS OF THE EARTH

ROBERT D. KAPLAN
Random House, 1996

It's nice to know that someone is willing to investigate down-and-dirty parts of the world that most of us would rather not set foot in.

In *The Ends of the Earth*, Robert D. Kaplan explores what he calls "the coming anarchy"—a collision course of population growth, tribal disputes, disease, crime, and environmental degradation in the developing world.

Ten years after its publication, the book remains a vivid lesson in human geography. It reads like an adventure story, riddled with interviews of corrupt local officials, cynical expatriates, and smugglers—plus tidy doses of history to carry the reader through. Kaplan provides a smooth read and context for today's unsettling headlines from faraway places.

Kaplan does his reporting the old-fashioned way, hopscotching across West Africa, the Middle East, and Asia with a notebook. He finds that cultural animus has supplanted national identity in many countries whose people—cut loose by the end of lucrative Cold War alliances—find themselves living hand-to-mouth.

The desperation is often palpable. Riding in a taxi in Abidjan, Ivory Coast, Kaplan finds his view suddenly blocked by a dozen hands on the windows as the car pulls up to a bus station. Young men "yanked open the door and demanded money for carrying my luggage a few feet to the bus, even though I had only a light rucksack. I was to find youths like these throughout urban West Africa: out of school, unemployed, loose molecules in an unstable social fluid that threatened to ignite," he writes.

Yet amid garbage and buzzing flies in Conakry, Guinea, Kaplan sees hope. He locks eyes with "a miraculously healthy-looking teenager" standing near a zinc-roofed shack. "To thrive in this miasma, merely to survive, indicated a vitality that I would never be able to muster," he says. "I smiled back at what I knew to be my genetic superior."

As some countries endure a daily struggle, others try to recover from the past. In the streets of Phnom Penh, Cambodia, Kaplan notices dozens of amputees—victims of land mines. In the mid-1990s, that country still had about 10 million mines in the ground left over from civil wars. It's an economic problem: A land mine costs less than \$4 to install, but hundreds of dollars to remove.

Fortunately, Kaplan in his travels found some good news to temper the bad. His impression of Turkey is refreshing. Entering a shantytown built into a steep hillside of Ankara, Kaplan finds not a slum but a stacked, middle-class neighborhood: "The architectural bedlam of cinder and sheet metal and cardboard walls was deceiving. Inside was a home. I saw a working refrigerator, a television The other homes were like this, too." He writes, "Crime was infinitesimal."

In the region of the former Soviet Union between Iran and Russia, Kaplan picks his way through nations with irrational

borders and that lack a clear national identity. Those areas are predominately populated by people of Turkic race who speak Persian languages and practice Islam, a religion that began in Arabia.

In a shabby nightclub in Uzbekistan, Kaplan asks his translator what the army officers in uniform at the next table are saying. "They are discussing which is the best country from which to hijack a plane," the man says. The coming anarchy indeed. —N. SEPPA

Ice Age: From Heroic Scientists to Black-Op Spies FIFTY DEGREES BELOW

KIM STANLEY ROBINSON
Bantam Dell Books, 2005

"I am no longer skeptical ... have no doubt at all. Climate change is the major challenge facing the world." This quote from the naturalist and film producer David Attenborough, which I spotted on May 24 in a British newspaper, especially resonated with me because I was finishing Kim Stanley Robinson's *Fifty Degrees Below*. Attenborough's declaration addressed issues at the core of Robinson's science fiction book.

The novel takes place in the aftermath of a flood that has devastated Washington, D.C. Think Hurricane Katrina-type wrath wrought on lawmakers and monuments. While the mostly abandoned city is drying out, orangutans, jaguars, and other animals that escaped the National Zoo run wild. Disenfranchised people of various strata forge nontraditional living arrangements to cope with a suddenly destabilized climate.

Among the refugees is Frank Vanderwal, a sociobiologist who returns to work at the National Science Foundation after the storm. He constructs a tree house in the city's Rock Creek Park, a forested strip that also houses the escaped animals. Eventually, coping with the beasts—as well as with thugs and spies—becomes a badge of honor for Vanderwal. His new lifestyle lures him into an evolving postflood counterculture to which even his closest colleagues never catch on.

By day, Vanderwal and his coworkers track continuing climatic catastrophes, such as quick melting of Arctic ice into the North Atlantic, stalling of the Gulf Stream, and a feedback loop that produces melting at the poles. Along the way, Washington experiences a prolonged winter deep freeze, portending worse weather to come.

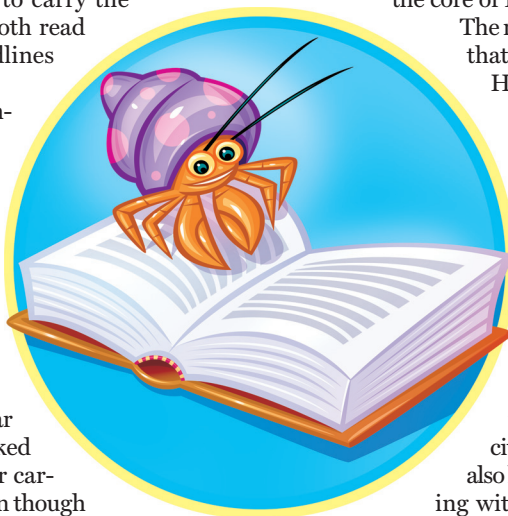
Vanderwal's agency responds with uncharacteristic activism that would surely warm Attenborough's heart. The agency sponsors unusual studies and a global collaboration to restart the Gulf Stream and recool the poles.

Being set in Washington, the story has political subplots. A major one includes Tibetans who migrated from a home destroyed by climate change. They eventually settle in the capital's Virginia suburbs, and their wizened spiritual leaders imbue the story with a hint of mysticism.

Vanderwal also develops love interests, one of whom reveals that the sociobiologist and his nonconformist friends are under surveillance by the military.

Despite a chaotic plot, the book hangs together as a page-turner. And despite its conceit and partisan outlook, it doesn't seem geeky or preachy on the topic of global warming.

Although this book can stand alone, it is the second in a trilogy, so the fate of Earth and Vanderwal's mental health remains uncertain. Overall, Robinson's engaging book is a fast-moving, upbeat romp driven by science. —J. RALOFF



PRESERVING PARADISE

Huge patch of Hawaiian reefs gets monumental protection

BY JANET RALOFF

Dozens of sun-drenched atolls and reefs jut out of Hawaii's northwestern waters, creating an archipelago some 1,400 miles long. Virtually free of human habitation, those islands' sandy beaches may look like ideal spots to get away from it all. But to marine biologists, this region is the place to find it all—lush biodiversity and ecosystems little stressed by human presence.

On June 15, President George W. Bush designated the waters throughout this region as the Northwest Hawaiian Islands Marine National Monument. The largest marine protected area in the world, it spans from Kure Atoll in the west to Nihoa Island in the east. Its area—139,000 square miles—is nearly the size of Montana.

Within 5 years, commercial and recreational fishing in the region must end. Bans immediately take effect on other activities, including tourism, that might harm or harass the ecosystems' inhabitants.

Such no-fishing, no-disturbance zones—known as marine reserves (*SN*: 4/28/01, p. 264)—are pivotal to the preservation of unspoiled underwater communities and to the recovery of heavily overfished or disturbed ones, notes marine ecologist Jane Lubchenco of Oregon State University in Corvallis. So, the creation of this gigantic new reserve “is a very, very big deal,” she says.

EVOLVING PROTECTION More than a century ago, many northwestern Hawaiian islands—major bird rookeries—were mined for excrement used in guano, a fertilizer. In 1909, President Teddy Roosevelt quashed such activities, which were despoiling the islands, by designating the archipelago's terrestrial sites a national wildlife refuge. That federal protection, which remains in effect today, has recently expanded into the aquatic world.

In 2000, President Bill Clinton issued a pair of executive orders to safeguard that region's coral reefs. The affected area was slightly smaller than the new monument. Clinton's rules prohibited any increase in fishing and any mineral exploration, dredging, or other reef-damaging activities.

Roosevelt's and Clinton's actions set the stage for President Bush to make this area into a marine sanctuary. However, that designation is subject to time-consuming congressional review. Moreover, companies that fish the area had planned to challenge the commercial fishing, which is permitted in some sanctuaries.

So, the day before Bush had planned to announce his sanctuary proposal, the administration opted for a different tack, explains Ben Sherman of the National Oceanic and Atmospheric Administration in Silver Spring, Md.

Under the Antiquities Act of 1906, a presidential proclamation can, by fiat, turn federal territory of special significance into a monument. Such designations take effect immediately, and rules for protecting them are not subject to appeal, Sherman says.

“Our duty is to use the land and seas wisely, or sometimes not use them at all,” Bush said at the proclamation ceremony.

The monument designation can provide far greater protection than a sanctuary designation. The virtual phase-out of fishing is one example, Lubchenco says. Only people working in the area, such as

researchers, will be permitted to conduct what the rules call “sustenance” angling—fishing for survival during long stays at sea. That catch must be consumed within the monument, and it mustn't diminish the quality or integrity of the ecosystem from which it's gleaned.

No corals—alive or dead—may be removed. Before any vessel can enter the monument, its hull must first be checked for nonnative species and any aliens found must be removed. Boating will be restricted almost exclusively to researchers, Sherman says.

His agency will draw on satellite imaging and other Department of Homeland Security intelligence to enforce restrictions on the passage

of vessels through these waters, he adds. Also prohibited: any interference with local wildlife, such as “luring or attempting to lure a living resource by any means.”

WHAT'S SO SPECIAL? The monument is home to an estimated 7,000 species, one in four of which isn't found anywhere else. In terms of this diversity, Lubchenco says, this reserve “gives us a window into what much of the Pacific Ocean was probably like”—before people began depleting top predators, the biggest fish (*SN*: 6/4/05, p. 360).

These waters are the primary habitat for 1,400 Hawaiian monk seals, nearly all the surviving members of this species. The area is also home to 70 percent of U.S. coral reef habitats and the healthiest large coral reefs on Earth. More than 150 species of algae can be found in the monument, including some that occur only here.

Creating this new monument will likely go down as “the crowning environmental achievement of the Bush administration,” says Elliott Norse, president of the Marine Conservation Biology Institute in Bellevue, Wash. “It also sends a message to the world that we can make big places in the ocean safe for their inhabitants.” ■

J. BLAIR/CORBIS



UNSEALING THEIR FATE? — The expanded protection for habitat of the Hawaiian monk seal—the most endangered U.S. marine mammal—might halt its population decline.

OF NOTE

ARCHAEOLOGY

Ancient rains made Sahara livable

Today, no one lives in the parched eastern Sahara desert of Egypt, Sudan, Libya, and Chad. But between 10,500 and 7,300 years ago, monsoon rains transformed this region into a lush magnet for people, a new investigation suggests.

A gradual decline in rainfall and water sources from 7,300 to 5,500 years ago pushed Sahara residents into a few still-verdant outposts, say Rudolph Kuper and Stefan Kröpelin, both of the University of Cologne in Germany. This population shift contributed to the rise of Egyptian civilization by around 5,000 years ago, the researchers propose in an upcoming *Science*.

To study climate and population changes in the region, Kuper and Kröpelin combined their own radiocarbon dates for 150 ancient Sahara settlements with independently obtained age estimates for other prehistoric sites in the region.

Data from ancient lakebeds and streams indicate that monsoon rains began abruptly around 10,500 years ago, the researchers say. Foraging groups then streamed into the savannalike eastern Sahara. At that time, Egypt's Nile valley consisted of uninhabitable marshes.

By around 7,000 years ago, however, declining Sahara rainfall and water sources sparked an exodus of mobile foragers to the Nile valley, where dried-up marshes gave way to farming villages along the Nile River, the scientists say. —B.B.

CHEMISTRY

Follow the lead

A new water-soluble, lead-sensing chemical is the first to detect the toxic metal in live cells, chemists report.

Christopher J. Chang of the University of California, Berkeley and his coworkers synthesized a molecular sensor that combines a fluorescent dye with a receptor

that binds to lead. On its own, a solution of the sensing molecules weakly glows green in response to visible light. Upon binding to lead, the sensor glows 18 times as brightly.

In lab tests, the sensor detected lead in water at concentrations as low as 15 parts per billion, which is the Environmental Protection Agency's limit for the metal in drinking water. Chang and his team also demonstrated that other metal ions, such as iron and potassium, don't interfere with the selectivity of the sensor.

To test the sensor in living cells, the researchers grew two cultures of human



GREEN NO MORE New evidence indicates that regular rain in the eastern Sahara, which now includes Egypt's Great Sand Sea shown here, made the landscape more welcoming to people 7,000 years ago than it is today.

embryonic kidney cells, added the sensor to each sample, and then exposed one of the cultures to a nontoxic amount of lead. When viewed under a confocal microscope, the metal-containing culture glowed, while the unexposed culture remained essentially dark, the team reports in the July 26 *Journal of the American Chemical Society*. The cells survived exposure to the sensing chemical.

Chang would like to design brighter sensors with more colors that could track lead within living cells. "What we are really interested in is, on a cellular level, the mechanism of lead toxicity," he says. —A.C.

SCIENCE AND SOCIETY

Named medical trials garner extra attention

AVIATOR. SHOCK. AWESOME. Some medical researchers tag clinical studies with eye-grabbing acronyms to make them easier to refer to and remember. A new study suggests that an acronym also heightens the frequency with which other researchers cite a trial in subsequent publications. In essence, scientists have a bias toward discussing studies with short and catchy labels.

The extra attention lavished on studies tagged with acronyms could encourage doctors to apply the knowledge generated by those studies, researchers at the University of Toronto suggest in the July 6 *New England Journal of Medicine*. However, if acronyms encourage doctors to pay attention to named studies at the expense

of unnamed ones, "this subtle linguistic tool could undermine evidence-based practice," Matthew B. Stanbrook and his collaborators say.

For their analysis, the researchers selected 173 randomized cardiovascular trials published since 1953. About a third of them had been labeled with an acronym.

The labeled trials were more frequently funded by pharmaceutical companies and tended to be larger and of better quality than the unlabeled studies. Taking those and other underlying differences into account, the Toronto researchers calculate that trials identified by acronyms get mentioned in the medical literature 66 percent more often than other studies do.

Not surprisingly, the new study's name has an acronym: Acronym-named Randomized Trials (ART) in Medicine. —B.H.

PLANETARY SCIENCE

Close look confirms two eyes on Venus

A spacecraft that recently arrived at Venus has confirmed the presence of an unusual storm feature—two giant, hurricane-like eyes within a storm at the planet's south pole.

The European Space Agency's Venus Express first observed the vortex soon after the craft entered orbit around Venus on April 11. Express' initial, distant path provided a global view of the planet, including a glance at the double vortex. In late May, the craft flew over the south pole and took a closer look at the storm.

Two previous missions to Venus more than 2 decades ago, Pioneer-Venus and Mariner 10, caught a glimpse of storms above the south pole, but the double-vortex pattern had never before been discerned.

A spectrometer on Express provided snapshots of the double vortex at various depths by observing the storm at several infrared wavelengths. The instrument reveals that the temperature and cloud density associated with the vortex vary with altitude. It's as if "we were looking at different structures, rather than a single one," says Express researcher Pierre Drossart of the Paris Observatory in France.

High-speed winds that blow westward around the planet, combined with the rise and fall of hot air in the atmosphere, are known to create vortices, but how the double vortex formed at the poles remains a puzzle.

The European Space Agency released the latest observations on July 12. —R.C.

MEETINGS

Euroscience Open Forum
Munich, Germany
July 15-19

BIOMEDICINE

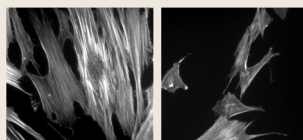
Drug rescues cells that age too fast

People with the rare genetic disease Werner syndrome appear to age at up to five times the normal rate. Furthermore, their cells and tissues undergo early senescence and death. Scientists have now identified a potential drug that slows aging processes in lab tests of cells from Werner patients.

David Kipling's team at Cardiff University in Wales discovered that early deaths of Werner patients' cells trace, in part, to an overactive enzyme—P38 MAP kinase—that's involved in stress and inflammation. The researchers learned of an agent that inhibits the enzyme, so they tried treating Werner cells in test tubes with the compound, known at this point as SB203580.

Although Werner cells typically look stressed, as indicated by fiber bundles within, those treated for a few weeks with SB203580 regained a youthful appearance. If daily doses of treatment continued, the cells also had normal life spans.

The findings "give us a road map to potentially develop a therapy," Kipling says. Moreover, he notes, because cancer and other conditions can also overstimulate the kinase, drugs that control it might someday be useful against several diseases. —J.R.



BAD FIBER Bundles of fibers, a Werner syndrome hallmark, are abundant in an untreated cell (left). Most disappeared in a treated cell (right).

The team determined that more than half the study participants routinely go to bed at least 2 hours later or wake at least 2 hours earlier than the times set by their biological clocks.

The scientists then administered follow-up lifestyle questionnaires to 500 participants. People with significant social jet lag were at least three times as likely to be smokers as were people who didn't experience the sleeping problem. Some 30 percent of people experiencing 2 hours of social jet lag daily were smokers, and the smoking rate spiked to 60 percent in people typically living at least 4 hours out of sync with their bodies' clocks. —J.R.

TECHNOLOGY

Tapping out a TAI-CHI tune

Alain Crevoisier had reckoned that it would be easy to turn almost any hard surface into a keyboard, drum head, or other input for a computer-controlled musical instrument. Just place a few sensors somewhere under a tabletop to read sound waves traveling through it. Then, assign spots on the table to correspond with various digital sounds stored in the computer. Begin tapping, and the computer would triangulate the positions of those taps to figure out what sounds to play.

In fact, creating such a system proved quite difficult, says Crevoisier, an artist and engineer at the University of Applied Sciences Vaud in Yverdon-les-Bains, Switzerland. But now, after working with researchers from seven research centers in five countries for the past 2 years, Crevoisier and his colleagues have created prototype kits for transforming household surfaces into computer-input devices.

The team calls its new systems tangible acoustic interfaces for computer-human interactions (TAI-CHI). The devices are made of inexpensive acoustic sensors wired to specially designed computer chips. The sensors, which could operate wirelessly, pick up sound waves moving through a solid surface that can be any shape and can be made of wood, plastic, glass, metal, or even the plaster of a wall.

Crevoisier's colleague Ming Yang of Cardiff University in Wales is looking to use TAI-CHI systems for more than making music. The technology allows the creation of virtual buttons anywhere in a room to control devices such as a lamp or ceiling fan, he notes. The system can even acoustically interpret what's being written on a sensor-tagged marker board and reproduce that script on a computer screen. Eventually, Yang predicts, diners will relay orders to restaurant kitchens by tapping to select items from a menu painted on a tabletop. —J.R.

BEHAVIOR

Virtual reality for earthquake fears

A team of researchers is developing computer-generated, virtual reality technology to prepare 12-to-16-year-old Greek children, including those with special needs, for a terrifying event they're likely to encounter: an earthquake.

The researchers created a computer model of a local school filled with virtual students. The model triggers sounds, rolling motions, and tumult associated with a major quake. Psychologist Ioannis Tarnanas of the Western Macedonia Research Center in Kozani, Greece, then recruited 50 children with Down syndrome and 90 children without that disorder to don headphones and scene-projecting goggles to experience a quake hitting the virtual school.

By chance, a real earthquake occurred a few months after the children had received the training. The researchers then assessed differences in coping and emotional security between children who had and hadn't been prepared by the virtual reality training.

Tarnanas found that the trained children outperformed their untrained counterparts in coping with a real quake, according to answers to questionnaires given each group. For instance, among children without Down syndrome, trained students were 45 percent better at following their teachers' quake-safety instructions. Children with Down syndrome showed nearly as big an improvement with training. In a separate measurement, 87 percent of the virtually trained children with Down syndrome were panic-free after the real quake versus just 20 percent of untrained students with the disorder.

Concludes Tarnanas, "We showed [that] virtual reality is useful for children, even those with special needs, in reducing natural [panic] about unexpected events." —J.R.

BIOLOGY

Social jet lag: Need a smoke?

People who have a hard time waking in the morning because their bodies' internal clocks are out of sync with their sleep schedules are said to have "social jet lag." Researchers in Europe have determined that the phenomenon strongly correlates with smoking.

Battling one's biological clock can leave people weary in the same way as traveling across several time zones can, says Till Roenneberg of Ludwig-Maximilian University in Munich. Roenneberg's team developed a questionnaire to determine when a person's internal clock is genetically set to have him or her to sleep or be awake. The researchers then gave the questionnaire to some 40,000 people to collect details about their sleeping schedules.

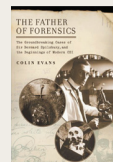
Books

A selection of new and notable books of scientific interest

THE FATHER OF FORENSICS: The Groundbreaking Cases of Sir Bernard Spilsbury and the Beginnings of Modern CSI

COLIN EVANS

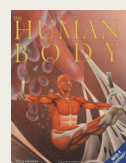
Building on the increasing popularity of forensic science in the media, Evans provides a glimpse into the beginnings of crime-scene investigation. The author credits the field's transformation to Sir Bernard Spilsbury, an obscure Oxford graduate who became renowned as a real-life Sherlock Holmes in the early 1900s. With details of some of Spilsbury's most famous murder cases, Evans demonstrates the contributions that the investigator made to forensic techniques. For instance, he was first to recognize the signs of death by rapid drowning, the secrets held in blood spatters, and the best toxicological technique for revealing arsenic poisoning. Over the course of his career investigating English crimes, Spilsbury performed more than 25,000 autopsies and was an almost daily presence in newspapers. Unfortunately for legions of future forensic specialists, Spilsbury left behind little in written records. Evans' biography will appeal to fans of crime history. *Penguin, 2006, 326 p., b&w plates, paperback, \$14.00.*



THE HUMAN BODY: Uncovering Science

CHRIS HAWKES

How many kids know that the heart beats up to 10,000 times a day? Or that the brain operates on the same amount of energy as a 10-watt lightbulb? More young people will know those facts and many others after reading this richly illustrated book. Hawkes shows how the body's various systems and structures cooperate to produce a remarkable living machine. The large-format book looks inside the body with the help of detailed color images and descriptions of the workings of cells, the skeleton, skin and hair, the brain, the nervous system, and muscles. Hawkes also describes the body's sensory systems, chemical controls, production of energy from food, reproductive processes, and immune protections. It presents especially vivid illustrations of the brain, the digestive system, and a fetus. For ages 12 and up. *Firefly, 2006, 52 p., color images, hardcover, \$16.95.*

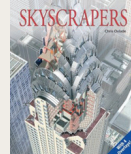


SKYSCRAPERS: Uncovering Technology

CHRIS OXLADE

In this lavishly illustrated book, Oxlade introduces young readers to the amazing feats of engineering that are behind the world's tallest buildings. People have always aspired to build upward, as evidenced in the many famous towers and pyramids. Oxlade explains early building styles and how the first skyscrapers were built from masonry and metal. He then addresses the various waves of skyscraper

building that have occurred since the 1880s. The book also features some unusually shaped skyscrapers—such as the twin Emirates towers in Dubai and Barcelona's Torre



Agbar—and includes details about amazingly fast elevators. Oxlade describes how skyscrapers are constructed to cope with high winds, extreme temperatures, and earthquakes. A section on the World Trade Center details why the twin towers collapsed and suggests what will replace them. Finally, a section shows and discusses drawings of planned buildings that could steal the crown as world's tallest. For ages 12 and up. *Firefly, 2006, 52 p., color images, hardcover, \$16.95.*

THE HOUSEPLANT ENCYCLOPEDIA

INGRID JANTRA AND URSULA KRÜGER

Houseplants bring fresh air and life to indoor environments, but many would-be gardeners go without these benefits because they find it too challenging to keep indoor plants alive and flourishing. This step-by-step guide to more than 1,000 houseplants is intended to make the task easier. With advice on where to place given plants within a home, instructions for how to select plants appropriate for specific air temperatures and sunlight and moisture conditions, and tips on which plants can be poisonous to people or pets, this guide goes beyond basic upkeep. The authors, gardening and plant specialists, include tips on pruning, watering, pest and fungus control, and propagation of seeds and cuttings. The core of the book is a 250-page, alphabetical listing of common houseplants, which includes at-a-glance symbols indicating requirements for sun, water, atmospheric humidity, and fertilizer and whether or not the plant is poisonous. Each entry also includes the plant's scientific name, native habitat, flowering time, and potential uses. *Firefly, 2006, 384 p., color images, paperback, \$29.95.*



SEEKING THE SACRED RAVEN: Politics and Extinction on a Hawaiian Island

MARK JEROME WALTERS

In a poignant style, veterinarian and journalist Walters tells a cautionary tale about how politics and conservation can intersect in a way that turns the best intentions into unpredicted results. His tale revolves around the 'alalā bird, a species related to ravens and held sacred by native Hawaiians as a spirit guide to the afterlife. Before Europeans arrived in the 1700s, the 'alalā flourished in the cloud forests of the Hawaiian highlands, protected by its spiritual significance and remote habitats. By 1975, fewer than 15 of these birds were known to remain in the wild. Walters takes readers along as he travels to Mauna Loa to interview locals about the 'alalā's significance to Hawaiian spirituality, biologists on their task of shoring up the bird's recent passage into reintroducing captive birds to the wild, and others on conservation attempts that have backfired. Battles between government agencies, private-land owners, and biologists led to the bird's recent passage into virtual extinction in the wild, Walters asserts. *Island Press, 2006, 293 p., hardcover, \$24.95.*



LETTERS

Rod is the spoiler

While I applaud the work that is looking at the biochemical correlates of aggressive and delinquent behavior, it is important to emphasize that environmental factors still predominate when we are searching for the roots of violence ("Violent Developments: Disruptive kids grow into their behavior," *SN: 5/27/06, p. 328*). Although there is no single factor underlying aggressive behavior in children, my own 30-plus years looking into the relationship between excessive parental discipline and delinquency has convinced me that the violent, recidivist, male juvenile delinquent who was not raised on the belt, board, cord, or fist is nonexistent.

RALPH S. WELSH, DANBURY, CONN.

Odd shape

When I looked at the photo for "As waters part, polygons appear" (*SN: 6/3/06, p. 348*), I didn't see a "pentagonal shape" in the swirling water. I saw a sine wave, wrapped around a circle. I was immediately reminded of the Bohr-de Broglie model of electron orbits forming standing waves. Rather than swirling water and glycol forming "unexplained" polygons, isn't this simply a standing-wave phenomenon? **ELLERY FRAHM, MINNEAPOLIS, MINN.**

Combinations of circles and standing sine waves might explain the observed shapes, agrees Tomas Bohr of the Technical University of Denmark. But his team has been unable to use the circle-sine wave model to explain how shapes vary as experimental parameters change. —P. WEISS

Rash statements?

It's big news that poison ivy thrives where there are higher concentrations of carbon dioxide ("Pumped-up Poison Ivy: Carbon dioxide boosts plant's size, toxicity," *SN: 6/3/06, p. 339*)? Did everyone forget elementary school science and plant life's dependence upon carbon dioxide? Do I advocate buying and driving the most carbon dioxide-emitting vehicle you can find? No. I guess I would just like to see more common sense and less common scare in your article.

SCOTT BILLINGSLEY, SAN ANTONIO, TEXAS

Poison ivy in enhanced carbon dioxide didn't just grow. It grew much more than woody plants did under the same conditions. That difference between a weedy vine and woody plants could mean changes in the forest communities of the future. —S. MILIUS

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From the company that first introduced
noise reducing headphones.

The next step.

NEW Bose® QuietComfort® 3 Acoustic Noise Cancelling® Headphones

Now you have a choice. We began researching noise reduction technology 28 years ago. Since then, we've been leading the industry in advancing the category we created.

New QuietComfort® 3 headphones represent the latest achievement. They rest on your ears rather than surrounding them. And while they are smaller than our highly acclaimed QuietComfort 2 headphones, there is no compromise in noise reduction, sound quality or comfortable fit.

*QC2 headphones (left).
New QC3 headphones (right).*

So now you have a choice: QC™2 headphones for around-ear use, and new QC3 headphones if you prefer a smaller, on-ear alternative.

The challenge of reducing size. Studies show that many people prefer on-ear headphones. But with conventional technology, smaller earcups compromise performance. So we launched a research project to explore something we were not sure was even possible – overcoming the performance limitations of smaller size and on-ear design.

The result is our new QC3 headphones. For the first time, you have the option of on-ear headphones that match the noise reduction and audio quality benefits of our award-winning QC2 headphones.



Hear the difference Bose technology makes. You will notice a dramatic decrease in engine roar on a plane. The cabin becomes more peaceful. Connect your CD player, MP3 player, or listen to the in-flight movie. You'll hear detail you may have never experienced while flying.



*Fold-flat design
for easy storage.*

But use them at home or at the office, too. Although the noise reduction will be more subtle, you should notice distractions fading softly into the background. No headphones will eliminate all noise, but patented Bose® noise reduction and audio technologies, working together, can make any listening experience more enjoyable.

Try them for 30 days at no risk. Choose new QC3 headphones for an on-ear fit, or QC2 headphones for an around-ear design. Both come with our 30-day Excitement Guarantee. Take advantage of **12 easy payments**, with no interest charges from Bose.* And ask about our optional Cell Connect cable for use with select music-enabled mobile phones. QuietComfort headphones. Engineered exclusively by Bose, the most respected name in sound.

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