

AMERICA'S LEADING SCIENCE MAGAZINE

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**The Arthritis
Drug Recall**

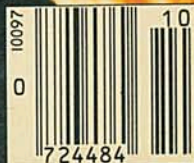
**Volcano Threat
in California**

**Unraveling the
Shroud of Turin**

THE MOMENT OF CONCEPTION

When Sperm Meets Egg

Sperm clinging to the
surface of a human egg



Data Bank on Failures

Spurred by tragedies like the collapse of walkways at the Kansas City Hyatt Regency Hotel, which killed 114 people in July 1981, the University of Maryland has established a bank of technical data on building and structural failures. The aim is to help engineers and builders prevent similar catastrophes.

The bank will collect information about significant structural failures in bridges, dams, and roads, as well as buildings. "Every building failure represents an unplanned experiment," says engineering professor Donald Vannoy, 34, co-director of the project with John Loss of the university's school of architecture.

With National Science Foundation money, the Architecture and Engineering Performance Information Center—custodian of the bank—is gathering records from insurance companies, engineering and architectural firms, government agencies, contractors, and news and scientific organizations. A

Washington insurance firm has agreed to donate its file of 40,000 cases.

Among the major failures Vannoy cites as incentives for starting the data bank were the 1976 Teton Dam collapse in Idaho, roof cave-ins at the Hartford (Connecticut) Civic Center coliseum and Kansas City's Kemper Arena in 1978 and 1979, and the Hyatt Regency accident.

But small structural failures, such as cracked foundations and leaking walls, will constitute most of the center's data. "For every big incident, there are a thousand small ones that probably cost more money but don't make the news," Vannoy explains. When the project becomes self-supporting, possibly by 1984, anyone with a computer terminal will be able to tap the center's resources by telephone for an hourly fee. The center will even collect information about foreign structural and engineering failures, which date at least from the time that Pisa's famous tower began to lean.

Doomed Grebes

Just how much punishment can a vanishing species of waterfowl take before becoming extinct? The question may soon be answered for the Atitlán grebe of central Guatemala. As if the partial destruction of its habitat by the 1976 earthquake and by recent construction were not enough, the flightless giant



The Atitlán grebe

pie-billed grebe, whose only home is Lake Atitlán, in the highlands west of Guatemala City, is now bereft of the devoted game warden who protected it for 14 years.

The warden, Edgar Bauer, was killed during the political conflict in Guatemala last May, and because of the unstable political situation he is not likely to have a successor. According to the Smithsonian Institution, Bauer was personally responsible for rebuilding the rapidly receding reed beds near Santiago Atitlán, the sole breeding and nesting refuge for these birds. The Atitlán grebe declined in population from 230 in 1976 to about 60 in 1980, and without protection it will become extinct within the next five years.

The Big Wheel Spins

By studying the magnetic fields of distant galaxies, British radio astronomer Paul Birch, a graduate student at the University of Manchester, has deduced that the universe may be rotating. At the rate he estimates, one complete cosmic turn would take about 60 trillion years—some 3,000 times the present age of the universe.

To reach his surprising conclusion, Birch studied the orientations of 94 galaxies that emit radio energy. On radio maps such galaxies often look like dumbbells, each with a small, powerful central source flanked by two large lobes emitting radio waves. The lobes are thought to be caused by beams of high-energy particles continuously shooting in opposite directions from the central galaxy. Birch found that in many galaxies the lobes have become bent slightly into S shapes. The direction of bending of a galaxy's radio lobes, clockwise or counterclockwise, seems to depend on where the galaxy is in the sky. In one half of the sky as seen from earth, the vast majority of radio galaxies are truly S-shaped, while in the other half most appear to have been bent the other way, like Z's. The young astronomer

believes that almost all galaxies have been twisted in the same direction but that observers looking out in one direction see galaxies from the "top," while the galaxies in the opposite direction are seen from the "bottom"—thus, opposite rotations. The only thing that could cause twisting, Birch argues, is the rotation of the universe itself.

A spinning universe would revolutionize cosmology. It could help explain where individual galaxies like the Milky Way get their spins; depending on their orientations, they could pick up angular momentum from the rotation of the universe as a whole. Another consequence, Birch says, is that the universe is likely to expand forever, rather than halt its expansion and collapse at some point. If the universe were to contract, it would have to spin faster, like a twirling figure skater pulling in his arms; before long, the galaxies would begin spinning at speeds approaching that of light, and since they could go no faster, the universal contraction would cease.

All this raises profound questions. Cosmologists have always assumed that the universe is the same in all directions, but, if it rotates, the direction of that rotation would seem to have some special, mysterious significance. Is the universe right-handed or left-handed? Either way, the real question is, why? And why, for that matter, was it born with a spin in the first place?

Pining over Nessie

It was bad enough when they explained UFOs as marsh gas and yeti tracks as bear footprints. Now, alas, a new scientific theory is threatening to doom Nessie, the Loch Ness monster. In August, Robert Craig, a Scotch electronics engineer, reported in the British magazine *New Scientist* that old Nessie may be nothing more than a decomposing log.

Craig had wondered why monsters have been sighted in only three of Scotland's 500 fresh-water lochs: Ness, Tay, and Morar. Searching for similarities among the three lakes, he realized that they all are very deep—Ness is about 815 feet—and all are surrounded by Scotch pines, which yield much more resin than other pines.

Craig believes that a dead Scotch pine falling into a loch first sinks to the bottom. Then, in especially deep lakes like these three, the water pressure is



strong enough to squeeze out resin from the wood, which forms a tight coating around the tree. As the wood decomposes, it produces gas that is trapped under the resinous skin, creating buoyant blisters that float the tree to the surface. Just as the tree rears its monster-like head, the blisters burst (because pressure is now greater inside than out), and the monster dives from view, perhaps to return when more gas blisters form. Craig suggests that his theory be tested by dredging the bottom of the lochs for old pine logs.

Farmers Who Starved

The switch from primitive hunting and gathering to settled agriculture is traditionally regarded as one of the milestones of civilization. But Anthony Perzigian, an anthropologist at the University of Cincinnati, has found evidence that the advent of farming may in fact have caused a severe setback in health during prehistoric times.

Perzigian told a conference at Plattsburgh, New York, that he had examined human bones from four ancient Indian communities of the Ohio River Valley. The first group, which lived in about 2500 B.C., relied entirely on hunting and gathering. The second, in the second century A.D., was still chiefly dependent on the old ways but had begun to farm. The other two groups, which existed around A.D. 1250, were genuine farmers.

The bones of the agricultural groups bear clear marks of misfortune: chronic malnutrition, iron deficiency, tooth decay, and severe infections, including tuberculosis. They also reveal signs that society itself changed for the worse. The farmers' remains show many wounds, implying, Perzigian says, "an epidemic of hostility and violent death."

Hard times came, he suggests, partly because the farmers exchanged a varied and nourishing diet for a narrow range of foods vulnerable to crop failures. Poor nutrition, Perzigian points out, predisposes people to infection, and overcrowding in cultivated areas could have contributed to the spread of disease and even to the kind of competition that ends in violence.

Left-handed Risk

Left-handed people are more prone to learning disorders than the right-handed. The reason, scientists believe, is that left-handedness is sometimes the result of prenatal damage to the brain's left hemisphere, which controls the right side of the body; because the left hemisphere is the center of language function in most people, learning disabilities as well as left-handedness may result from its impairment.

Two neurologists now report that left-handed people are also likelier to suffer from various immune-system disorders of the gut—Crohn's disease (a form of ileitis), ulcerative colitis, and ce-

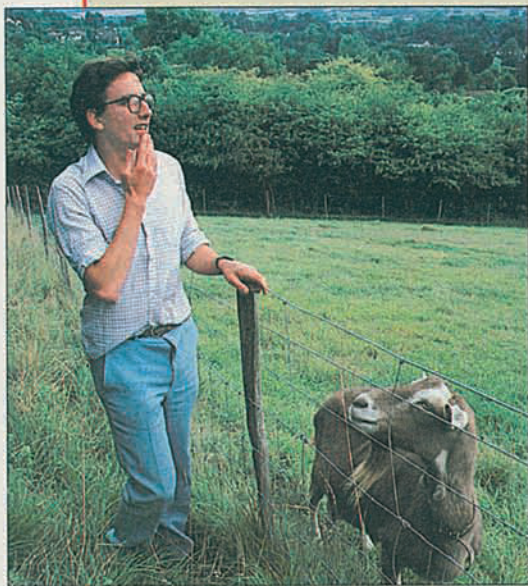


Lobby of the Hyatt Regency Hotel in Kansas City after the walkways collapsed

Simon Says

When, over a polite glass of sherry, people ask **Simon Donaldson** what he does, his invariable reply is, "I do a bit of geometry." Donaldson, 24, a graduate student at Oxford University, recently did a bit of geometry that has set the world of mathematics spinning. Combining elements of the work of four other mathematicians, he proved that there is a second and previously unsuspected form of four-dimensional space. But how to explain this to polite sherry sippers?

Even Donaldson's mother does not know what to make of her son's recent celebrity. "If you can explain to me what he's done," she says, "I'll give my reaction to it." Well, Mrs. Donaldson, here goes: Ever since Einstein, physicists have believed that space and time are united in a four-dimensional space-time continuum. What Simon has shown, to the surprise of the physicists, is that their cherished space-time continuum is not unique; other four-dimensional spaces, and hence other universes, may be possible. More mathematically, Simon has proved that all possible positive non-trivial matrices



Donaldson with his mother's goat

cannot be realized by a smooth four-dimensional manifold. Got that, Mrs. D.? "It may well be useful in cosmology," Donaldson says modestly, but so far nobody has the foggiest notion of any practical application for his work.

A discovery of this magnitude would be the crowning glory of almost any 24-year-old's year, but not Donaldson's. "One of my great achievements this year has been to finish Victor Hugo's *Les Misérables*," he says, "although I skipped Appendix Two, on nunneries."

Crusader for a Cure

"I'd rather be more trouble than less," says 82-year-old **Mary Lasker**, medical philanthropist, sponsor of the Lasker awards, and an energetic promoter of medical research. "I just don't go along with the belief you can't cure things." Her latest crusade is to find a cure for arthritis by creating a separate research institute under the aegis of the National Institutes of Health. She claims to have lined up 43 Senate sponsors for her proposal, more than enough to lead to some action in an election year, but she still faces opposition from within NIH.

A separate institution to study arthritis—which afflicts about 35 million Americans and for which there is still no universally effective treatment (see page 86)—would cost \$5 million a year, out of NIH's \$3.64 billion budget. That is "peanuts," says Lasker. "Aspirin may do some good, but let's have something more definite. It's just extremely dumb, uncaring, and stupid not to try to cure something like this."

Space People

■ Terrestrial gravity exerts about six times the tug of the lunar variety, as former astronaut **James Irwin** is now painfully aware. In 1971, on the Apollo 15 mission, Irwin spent hours bounding about on the moon's surface without a mishap, but the earth has not been as kind. In August, while climbing Mount Ararat (16,945 feet) in search of the remains of Noah's Ark, he plummeted from a cliff. Bruised and missing a handful of teeth, Irwin was lifted off the mountain by a Turkish military helicopter and taken to a nearby hospital. But within days he was able to hobble to a neighborhood Turkish bath.

■ The effect of zero gravity on the fe-



Lasker in her Manhattan apartment

male anatomy was the professed concern of the Soviets when they sent their second woman into space. **Svetlana Savitskaya**, 34, also known as Miss Sensation (for her sensational aerobatic skills), blasted off in August to join **Anatoly Berezovoy** and **Valentin Lebedev**, who had already spent 100 days in their Salyut 7 space station. "The hatch opens," wrote one Soviet newspaper, "and there, in a green, tight-fitting sportsuit, is Svetlana." Upon her arrival, Savitskaya was presented with an apron and pointed toward the kitchen. "We made you a little apron. Wouldn't you like to take up the role of lady of the house?" Berezovoy joked. "If you insist, I'll try it on," said Savitskaya. "But let's specify the work rules first." Presumably, she does not do windows.

General Georgi Beregovoy, the head of the Soviet space program, said that scientists are interested in seeing how well a "representative of the weaker sex conducts herself in space." And, he says mysteriously, on this flight there will be "a number of experiments in which a woman's hand will be quite necessary."

■ Some cynics feel that Savitskaya's flight was planned to take attention away from America's first space-woman, **Sally Ride**, 31, who is scheduled to blast off in the space shuttle in April. Ride, it is true, will not be the first woman in space, or even the second. But she will be the first married one. She and fellow astronaut **Steven Hawley**, 30, were wed in a quiet ceremony in July. □