

Special Issue

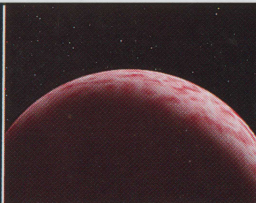
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# DISCOVER

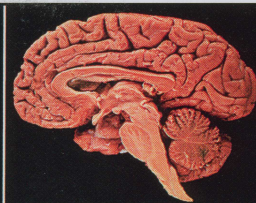
## Year in Science



**No. 16** Will a New Avian Flu Vaccine Even Work?



**No. 2** How Many More Planets Lie Past Pluto?



**No. 69** Can Just One Lone Brain Cell Think?

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Top Science Stories of 2005

**No. 1** Does Global Warming Make Hurricanes Worse?

**No. 5** Does Too Much Sex Damage Male Genes?



**No. 24** Why Do Stupid People Die Young?

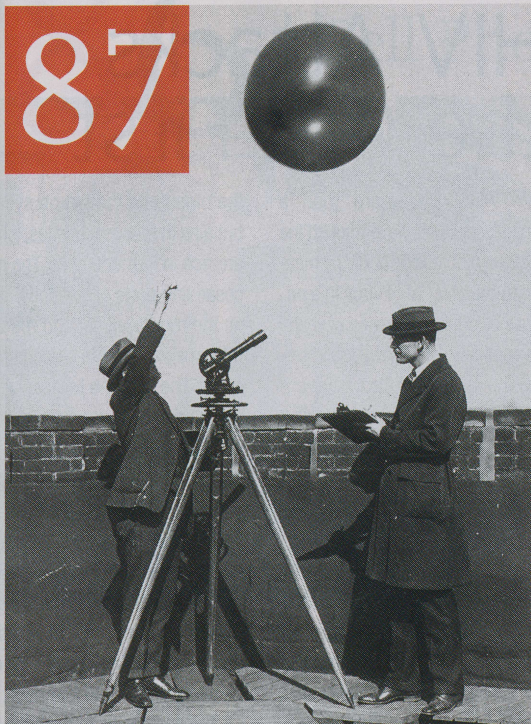
**No. 7** Dark Galaxies: Could the Cosmos Be Full of Them?



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Over the years, gas-filled weather balloons may have gathered faulty data that led to inconsistent climate models.

# Scientists Warm To A New Climate Model

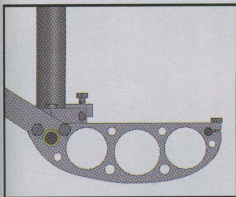
**ENVIRONMENT**—Skeptics who doubt that greenhouse-gas emissions produced by humans cause global warming often point to data from satellites and weather balloons that indicate the troposphere—the lowest 10 miles or so of the atmosphere—has actually been cooling since 1979. But extracting trends from the information recorded by the dozen satellites and thousands of weather balloons launched over the years is a difficult business. “There are a lot of things that can go

wrong with these soundings,” says Steven Sherwood, an atmospheric scientist at Yale University. In August Sherwood and his collaborators published the results of a study that corrected for the heating effect of direct sunlight on older weather balloons. Another study adjusted for the gradual drift of satellite orbits, and a third took the revised satellite data and compared them with 19 existing global climate models. The conclusion: The troposphere is warming after all.

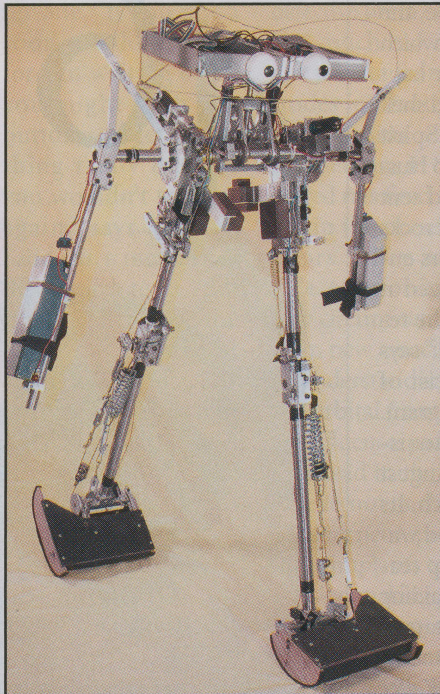
The three papers remove a major stumbling block to a scientific consensus, says Benjamin Santer of Lawrence Livermore National Laboratory, lead author of the climate model study. “Will all of this make a difference to the real dyed-in-the-wool climate skeptics? I doubt it,” he says. “Will it make a difference to the scientific community and to the general public in what they might think about the nature and causes of climate change? I hope so.”

—Alex Hutchinson

# Humanoid Robots Walk Tall



Most of the joints belonging to a three-foot-tall Cornell University humanoid (right) are not powered like those in traditional robots. Instead, they swing freely in a surprisingly human-like manner. One of the few powered joints is the ankle (above). When one foot hits the ground, a spring in the other foot is triggered, propelling the robot forward. MIT and Delft University of Technology in the Netherlands have created similar walking robots.



**TECHNOLOGY**—In 2005 a new generation of robots revolutionized the way humanoids walk, one of the greatest challenges in engineering. They followed Honda’s ASIMO, which wowed a cheering audience last winter by breaking into a two-mile-per-hour trot. ASIMO is based on technology that is much like that of a shuffling windup toy. Every maneuver is part of a programmed pattern, each posture a frozen moment in time, and an enormous amount of energy is needed to keep the body plugging along in a stiff-looking gait. By contrast, a nameless robot unveiled by engineers at Cornell University in February is modeled after antique toy figurines that make their way down a slope, depending only on gravity. The Cornell robot is the first to use principles of passive-dynamic walking to stroll on level ground, employing electrical energy equivalent to the metabolic energy a human would use. Most of the joints

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swing freely, naturally shifting mass like a pendulum. Another robot, named Rabbit, designed at the University of Michigan and the University of Nantes in France, may be the first to run in strides that look human. Its creators have made it dynamic, balancing on two points—it has no feet—and with the ability to adjust to obstacles and changes in terrain. Unlike ASIMO, which cannot balance in a fluid way, Rabbit can be shoved violently and regain its stability. —Susan Kruglinski