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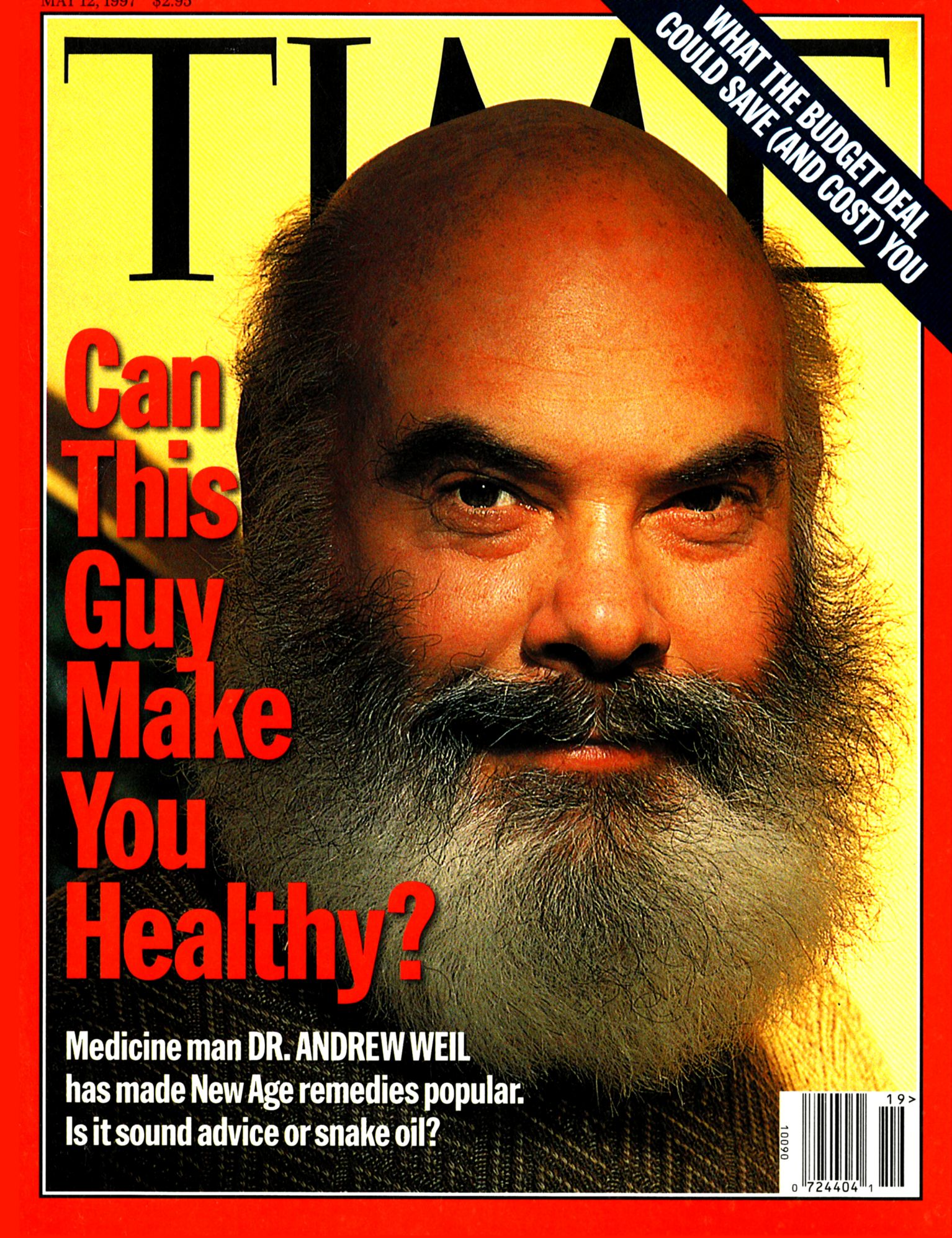
TIME

WHAT THE BUDGET DEAL COULD SAVE (AND COST) YOU



Can This Guy Make You Healthy?

Medicine man DR. ANDREW WEIL has made New Age remedies popular. Is it sound advice or snake oil?

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Great Beams of Antimatter

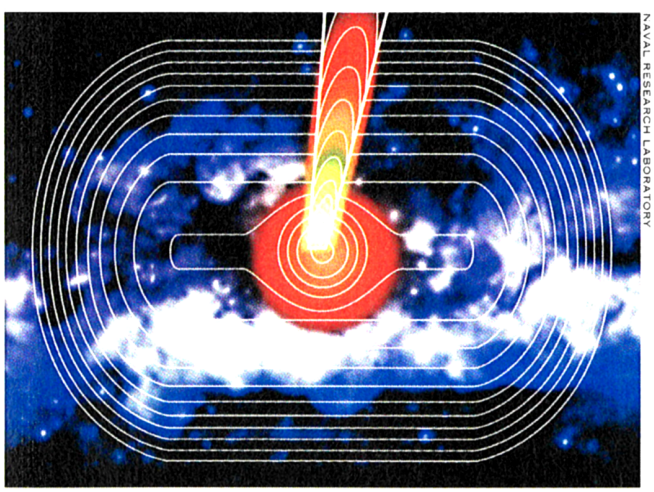
A vast plume of exotic particles is shooting out from the center of the Milky Way. What's it doing there?

ASTROPHYSICIST WILLIAM PURCELL KNEW that if he looked at the center of the Milky Way, he would see what is known as antimatter: bizarre subatomic particles that resemble ordinary protons and electrons but carry an opposite charge. But when NASA controllers trained the orbiting Compton Gamma Ray Observatory on this core region and beamed the data back, Purcell saw something on his computer screen at Northwestern University that nobody could have predicted: a veritable colossus of antimatter, a vast fountain spewing out from the center of our galaxy and reaching trillions of miles into space.

What could have produced such a huge outpouring? That's what mystified astrophysicists meeting in Williamsburg, Va., last week. As most college freshmen know, antimatter is unstable stuff. Whenever antimatter and matter collide, they annihilate each other, disappearing in a blast of intense radiation. Thus while the Big Bang probably created almost as much antimatter as matter, virtually all of it, scientists believe, was consumed in a frenzy of annihilation long ago. In today's universe, antimatter must be created anew. And it is—in the form of subatomic particles, at least—in giant particle accelerators on earth and, in space, by one of several physical processes.

When massive stars explode as supernovas, for example, they create a periodic table's worth of radioactive elements, some of which decay into antielectrons, known as positrons. A black hole, scientists believe, can also produce electron-positron pairs by superheating the material that spirals into its gravitational sinkhole. It was the radiation produced by annihilating positrons and electrons, not the antimatter itself, that was actually observed by Purcell at Northwestern and his collaborators at the Naval Research Laboratory in Washington.

The real mystery, scientists say, is not that the positrons were created. It's that they were lobbed so many thousands of light-years above the galactic plane, like water droplets scattered by a giant geyser. Scientists offered several competing explanations last week. Rice University astrophysicist Edison Liang thinks black holes may be the key. While most of the stuff that falls into a black hole stays there, he observes, some of it gets blasted out in the form of a hot wind. Liang's hypothesis draws strength from the fact that there appear to be a good half a dozen black holes near the center of the Milky Way.



NAVAL RESEARCH LABORATORY

STAR BURST: Computer model of the galactic fountain

A competing theory, which Purcell favors, suggests that exploding supernovas may be the force that creates the positrons and catapults them to such great heights. There are certainly plenty of massive stars close to the Milky Way's core that are capable of generating explosions with sufficient force. The rate at which such explosions would have to occur, however, is mind-boggling: around one a century, Purcell estimates. Since supernovas have never been observed to go off at that rate in our galaxy, this theory suggests that the antimatter fountain originated in a more violent epoch in the distant past.

It's a puzzle, in other words, that could take years to solve. And that's what Purcell and others find most exciting. The Milky Way—so familiar and in many ways so humdrum—still hasn't lost its ability to surprise. *—By J. Madeleine Nash*

PHOTOFEST

HERE HE COMES: Science imitates old children's cartoons

Mighty Mouse

Muscle-bound mutants could point the way to beefier cows and humans

FROM THE OUTSIDE, THE NEW STRAIN of mice looked a little, well, lumpy. But when scientists peeled back their fur and skin, what had seemed like extra baggage in the shoulders and hips turned out to be pure muscle—two to three times the muscle mass of the average pip-squeak rodent. These were not your ordinary genetically engineered laboratory mice; these were Mighty Mice.

Dr. Se-Jin Lee and his colleagues at the Johns Hopkins School of Medicine didn't set out to create muscle-bound lab specimens. As reported in last week's *Nature*, they wanted to find out how a particular protein, a growth factor called myostatin, regulates the development of tissue. So they produced a strain of mice in which the gene that codes for myostatin had been deleted, or "knocked out." The resulting mutant animals grew up normal in every way—except for their extraordinarily well-developed musculature.

Why hasn't evolution produced more mice with rippling chests? "We're just starting to look into this," Lee explains. The burly mice seem to be a little slower and less timid than their normal counterparts. "That probably wouldn't be much of an advantage in the wild," says Lee.

It could prove to be an advantage to farmers, however, since chickens and cows make their own myostatin. In the future, artificially brawny beef cattle could be a profitable source of fat-free meat.

Humans make myostatin as well, and researchers speculate that a myostatin-blocking drug could one day add muscles to the frames of people wasting away from cancer or AIDS. A drug that could triple muscle mass might also find a market among body builders, but that's a long way off. Scientists today know only what myostatin does in mice, and they still haven't determined at what cost to the animals' health or longevity. *—By Christine Gorman*