andertals having larger brains than ours, but this disproves that if you take into account body size," says Leslie Aiello of University College London. In a commentary in *Nature*, Kappelman suggests that the result will require "critical re-thinking" about the behavior of Neandertals, implying that it "was probably decidedly non-modern—and more dependent on brawn than brains."

The decline in both brain and body size since the days of the Neandertals and Cro-Magnons may be due to tools or social skills that reduced our ancestors' reliance on sheer brawn, says Ruff. And as the body shrank, so did the brain. Trinkaus points out other factors that may have contributed to the trend in recent millennia: for example, poor nutrition as agriculture replaced the varied fare of hunter-gatherers with a poorer diet. Other researchers have found that stature was smallest in the Neolithic and Middle Ages, although Ruff suggests that better nutrition has allowed some populations to bounce back to their Pleistocene heights, including Americans and northern Europeans.

Kappelman and Richard Smith of Washington University in St. Louis believe that the trends in brain and body size that the Ruff study has traced are real. They are less convinced by Ruff's absolute values for body mass, however, because he calibrated his equations on living humans. The modern, sedentary lifestyle may have thrown off the relation between body mass and skeletal features. Kappelman suggests that athletes might be a better basis for the equations.

But those concerns, he adds, won't affect the most important conclusions. Body and brain size reflect the different ways our ancestors adapted to their environments—suggesting that "they were behaving differently than us," says Kappelman. And, as far as the human physique goes, the march of progress is definitely a myth.

–Ann Gibbons

ASTRONOMY

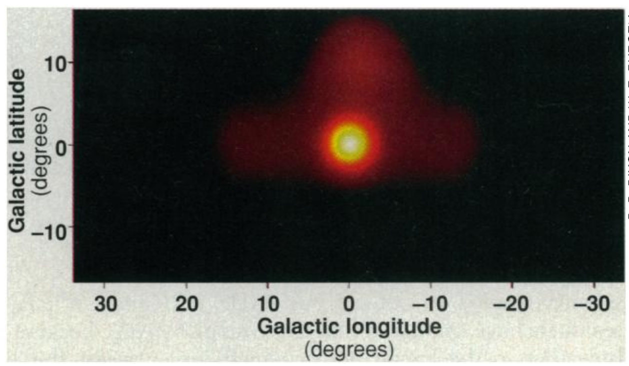
Antimatter Hints at Galactic Turmoil

WILLIAMSBURG, VIRGINIA—Compared with some of the universe's more turbulent neighborhoods, the Milky Way is a tranquil suburb. But last week's announcement here that the orbiting Compton Gamma-Ray Observatory (CGRO) had spotted a wayward cloud of positrons—the antimatter equivalent of electrons—near the galactic center hinted that, like many suburbs, the galaxy is not as placid as it seems.

Some astronomers are speculating that the cloud may be a legacy of thousands of stellar explosions that rocked the galactic center about 10 million years ago, creating positrons and driving them outward. It's not the only possible explanation, and it received mixed reviews at the Fourth Compton Symposium on Gamma-Ray Astronomy and Astrophysics, where the cloud was announced. "It's a neat discovery," says Neil Gehrels, an astrophysicist at the NASA Goddard Space Flight Center in Greenbelt, Maryland, but the supernova scenario "is a bit of a stretch" because it requires the fragile antimatter particles to survive a long trip through space. But whatever the cloud's true story turns out to be, it is likely to leave the galaxy looking more tumultuous than before.

The positrons prompting this new view of the galactic center can be seen only when they meet with electrons in a violent encounter that annihilates both particles, producing gamma rays concentrated at an energy of 511 kiloelectron volts. Since the 1970s, detectors lofted by balloons and satellites above Earth's gamma-ray–absorbing atmosphere have picked up this death cry coming from the center of the galaxy. Astronomers speculated that the massive black holes thought to lurk there were responsible: They theorized that matter is superheated as it falls into the black holes, generating gamma rays that collide and spawn positron-electron pairs.

These instruments yielded only rough indications of the amount and location of the positrons. After NASA launched the CGRO in 1991, astrophysicists set out to use the satellite's Oriented Scintillation Spectrometer Experiment (OSSE), which has a finer spatial resolution than its predecessors, to pin down the precise locations of the antimatter. But when OSSE searched near the center of the galaxy, it found only about half of the positrons tallied earlier.



Misplaced antimatter. A gamma-ray map of the center of the galaxy traces the antimatter fountain.

So the researchers, led by astrophysicists William Purcell of Northwestern University and James Kurfess of the Naval Research Laboratory (NRL) in Washington, D.C., broadened their search. They have now found the missing positrons in an unlikely spot—about 3000 light-years above the galactic center. "We were very surprised to see this," Purcell says, because the region appears to lack any sign of a black hole or other positron source.

Some researchers argue that a black-hole source may yet be discovered. But Charles Dermer and Jeff Skibo of the NRL are skeptical. For one thing, they say, black holes hiccup out positrons, as clumps of matter fall in, but months of OSSE observations haven't detected any variation in the amount of antimatter.

Dermer and his colleagues envision a different source: supernovae at the center of the galaxy. Exploding stars make radioactive isotopes that emit positrons as they decay. And a volley of supernovae sometime in the last 10 million years could have turned the galactic center into "a cauldron of violence," says Dermer, propelling "a fountain of hot gas" that would have swept the positrons out of the galactic plane.

The picture has some observational support. Astronomers have seen chimneys of hot gas escaping from the galactic disk, presumably powered by supernovae. And glimpses of the dust-shrouded galactic center have revealed hints of turmoil there. Radio emissions suggest a flow of gas streaming in the general direction of the cloud. X-ray observations also suggest that the ionized gas there has been heated to 10 to 100 million degrees or more by past violence. The annihilation fountain, says Dermer, "knits together those observations into a coherent picture."

The model faces some difficulties, however, including the question of how the positrons get so far from the galactic center without encountering matter and annihilating. Astronomers also wonder whether the Milky Way was capable of forming massive stars—the kind that explode—fast enough to explain the burst of supernovae. But Dieter Hartmann, an astrophysicist at Clemson University in South Carolina, says that while "there's no rigorous, solid evidence" of such a starburst, "the assumptions are reasonable."

Perhaps the biggest question is whether the antimatter cloud really does hover over the galactic center, because the gamma rays do not reveal the distance of the positrons. If its apparent link to the center turns out to be just a chance alignment, the hunt will be on for other pockets of violence in our quiet cosmic suburb.

–Erik Stokstad