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Letters

Cosmic questions

I was struck by the morphological similarity between the computer simulations of the distribution of galaxies ("Seeding the Universe," SN: 3/24/90, p.185) and the distribution of bright filamentary matter in supernova remnants (Crab, Gum, and Veil nebulas).

Since we are dealing with explosions in both cases, could this point the way to a simpler concept of what's going on to produce the large-scale structure of the cosmos?

John L. Hitchcock
Lecturer in Physics
University of Wisconsin
La Crosse, Wis.

"Speeding to an open universe" (SN: 1/20/90, p.45) explains measurements which imply that the "mean mass density of the universe is less than one-third that required to reverse its outward expansion." The surprising thing, perhaps, is not that this observation suggests the universe is open, but that the

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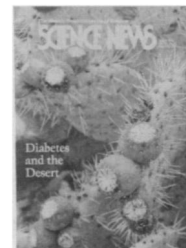
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Cover: The purplish fruit of the prickly pear cactus was once a dietary staple of southern Arizona's Pima Indians. Today, Pimas suffer the world's highest incidence of adult-onset, Type II diabetes. Some scientists think a return to traditional plant foods may help prevent the disease in this and other diabetes-prone populations around the world. (Photo: Gary Paul Nabhan)



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question is still open.

There is no *a priori* reason to expect that the universe would be open, closed or flat. Yet as I watch the results come in from ingenious new approaches to settle the issue, each one weighs in with a value that, in an astronomical measurement sense, is not far from implying flatness.

Not to cast aspersions on Bothun's result (which appears to be delightfully innovative), but many such careful calculations have been later shown to be in error by factors of 2 or 3 due to circumstances for which the original researchers could not have accounted. It is intriguing, though, that he finds we are only a factor of 3 — not 30 or 3,000 — away from flatness.

The real cosmological significance of this result may be confirmation that, if the universe isn't flat, then it is mighty close to being so. Theorists should ask themselves why this should be.

R.E. Chatham
Falls Church, Va.

A couple of the letters in the March 31 SCIENCE NEWS prompted me to clarify some of the basics of cosmology.

The existence of a beginning, or singularity, as suggested by the Big Bang theory of the universe, is deduced not from religiously based assumptions but rather from singularity theorems proved by Hawking himself. Hawking has pointed out that these theorems may be evaded by quantum effects, and that the universe may have begun smoothly, without any discontinuity. COBE data give information about an era when the universe was a few thousand years old, whereas quantum effects are unlikely to be important after times of 10^{-12} seconds. Hence COBE cannot directly confirm the "no boundary" initial condition suggested by Hawking.

It seems likely that matter made from protons, neutrons and electrons, whatever the initial inhomogeneities, is not capable, with-

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out assistance, of evolving from the observed smooth distribution of the past to the concentrated galaxies of today. In contrast, cold dark matter, with inhomogeneities predicted from the inflation theory, predicts large-scale structure, which in many ways agrees with observations. This is why cold dark matter is considered a leading candidate for galaxy formation.

Finally, in the Big Bang theory, expansion is not so much a moving away of the galaxies from each other as it is a stretching of the space between galaxies. There is no boundary to the universe or the matter in it, any more than there is a boundary to the finite surface of the Earth. There isn't an empty void surrounding the matter, because there isn't any "there" there.

Eric D. Carlson
Miller Research Fellow
University of California
Berkeley, Calif.

Reading about domain walls, cosmic strings and soft bosons, I get the feeling contemporary cosmologists are frantically erecting ever more epicycles to patch a cracking crystalline sphere. No one seems ready to ask the obvious question: Is the Big Bang a bust?

Is this because the Big Bang is still a tenable theory, or is it because so many papers, hypotheses and careers are riding on its success? Frankly, about the only thing the Big Bang's got going for it these days is the ubiquitous microwave background, although findings three years ago of unaccountable

anomalies at some frequencies call even that sacred cow into question.

"Seeding the Universe" suggests there is no viable alternative model of the structural formation of the cosmos. I can think of at least one: the plasma universe model, which demonstrates with surprising grace how vast electromagnetic filaments can account for the shapes of galaxies and galactic clustering. Perhaps we need to shift our focus from shadowy pools of axions and photinos, antimatter, and black holes that *must* be there because they're so mathematically elegant, and instead look at what actually *is* there: plasma and electromagnetism. Plasma cosmologists, unencumbered by the theoretical preconceptions astrophysicists carry, are able to look at the universe from a bracingly fresh perspective.

If tearing down our current cosmological myth is the necessary first step toward finding a theoretical structure that does not need continual buttressing, then every day we put off doing so delays our approach to the answer. Life is short, and my curiosity is killing me.

Linda Johnsen
Menlo Park, Calif.

Blowing off pain

Party blowers may be more than a "distraction" for Dr. Jacobsen's young cancer patients ("A favor for kids with cancer," SN: 4/7/90, p.221). Women who experience "natural" childbirth know that taking a deep breath and letting it out slowly greatly reduces pain from uterine contractions during labor. Slow, deep breathing is also taught in stress management

classes.

I notice that the children were taught "to blow slowly on the party toy." Perhaps, then, these children were more relaxed, with less tension in their muscles, so that the needle pricks actually hurt less.

Elaine V. Woodall
Brooklyn, Conn.

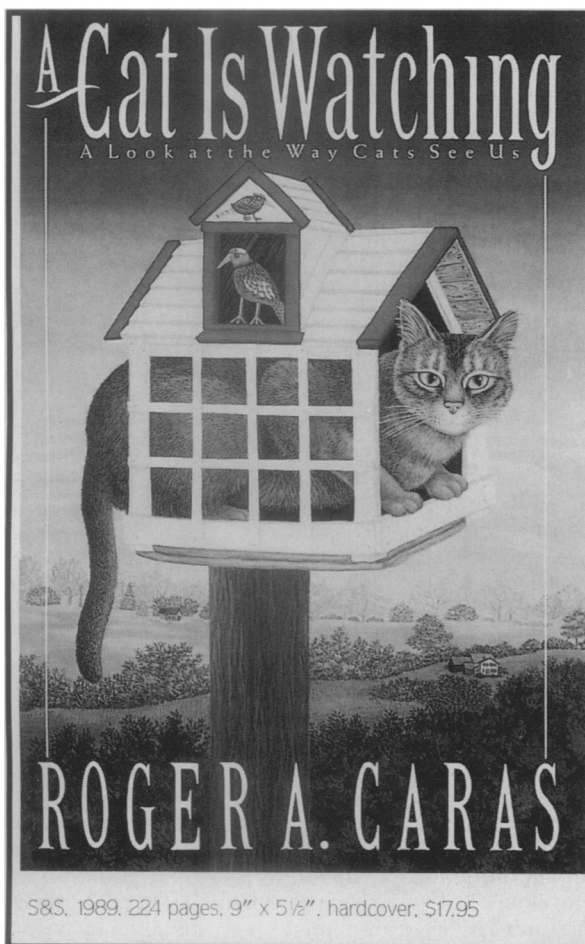
Spinning and spotting

The effects described in "A new look at moving violations" (SN: 3/17/90, p.174) have been well known to dancers for many years. Dancers utilize a technique known as "spotting" in order to reduce dizziness caused by spinning. While spotting, a dancer fixes his or her gaze upon one particular feature of the room. This is why most classical dancers constantly turn their heads from side to side as they spin across the stage. Ballroom dancers, who do not want to give the appearance of constantly turning their heads, can fix their gaze on the partner's eyes. The moving reference of a partner's eyes seems to be just as effective at reducing dizziness as picking out a fixed point on the wall of the room.

Sam Bucher
Eugene, Ore.

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All letters subject to editing.



A warm and fascinating look at the world of the cat from the cat's perspective by wildlife expert and TV correspondent Roger Caras. With a combination of biology, psychology and personal anecdote, the author of *A Celebration of Cats* shows how cats view people and the world around them. We get a cat's-eye view of how they hunt (and learn that if mice ran in circles, cats couldn't catch them), eavesdrop on cat conversation (nine consonants, five vowels, two diphthongs, and one triphthong) and tune in to cats' "sixth sense" (their remarkable ability to find their way home, even when they've been transported miles away). Filled with dozens of engaging anecdotes about the scores of cats in Caras' own life, *A Cat Is Watching* is the most charming and informative cat book of the year. — from the publisher

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CatIsWatch

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