

Counting stars

by [Martin E. Marty](#) in the [June 20, 2001](#) issue

Lacking a good filing system, I sometimes put things I want to remember into books, articles or columns, where I can retrieve them by using an index. (I know, I know, cyberspace will make such devices unnecessary, but the Web came a bit late for my generation, or at least my kind of person.) I have all the annual bound volumes of the *Christian Century* for the 45 years that I've been on its staff, and use its indices regularly.

In this week's column, I'm recording some more information I don't want to lose. The topic is size and numbers. James Glanz's article in a recent issue of the *New York Times* made me think about smallness. Glanz states that "the hottest area in theoretical physics" has not been tested, and he discusses the problems it presents for would-be testers. He refers to "string theory, the ambitious, profoundly mathematical attempt to knit together all of physics—from gravity to quantum mechanics to subatomic forces—into a single sublime formalism," a "theory of everything."

It is hard to test this theory because the "theorized strings" are too small and agitated to be observed directly. I grew up thinking that molecules, atoms, neutrons, electrons and protons were the smallest things; then came quarks and muons; now there are strings (I have no idea what all these things mean, but never mind).

How small are we talking about? Strings are "thought to be vibrating entities smaller than a trillionth of a trillion the size of an atom." Now, if they would just hold still so we could take pictures.

On the other side of size are the big numbers Jim Holt talks about in the February issue of *Lingua Franca*. A million is peanuts. "We can get up to a primo-vigesimo-centillion (10³⁶⁶) or even a milli-millillion (10³⁰⁰⁰⁰⁰³), both of which make the googol (1 followed by 100 zeros) tiny by comparison. Of course, a googol of googols, or 10-googol, is bigger than the milli-millillion.

Objects counted cannot match possibilities envisioned. It is well known to readers of this column that “the number of possible chess moves is 10 raised to the 10⁵⁰ power,” which I was once told was more than there are neutrons in our universe. That was before Hubble’s telescope helped us find or hypothesize a hundred billion more galaxies, each with a hundred billion stars. Give or take a dozen.

Mathematicians who count the possible arrangements of things speak of “exploding” functions that could not be written down with the usual exponential notation “even if the entire universe were turned to ink and paper.”

Will numbers get even bigger in the afterlife? Muhammad, transported to heaven one night, reported, “I saw an angel . . . [that] had 70,000 heads, each head had 70,000 faces, each face had 70,000 mouths, each mouth had 70,000 tongues, and each tongue spoke 70,000 languages; all were employed in singing God’s praises.” That, Jim Holt says, “comes to only 1.6807 septillion languages.”

In the face of such possibilities I have trouble being an atheist. And they remind me that most things that can be tried have not been tried, so there’s no reason to be bored. Unless, that is, columnists like this one go on too long about a subject that is both above their heads and beyond their depth.