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use of categorical pronouncements even in civil litigation. In criminal cases, where much higher standards of proof are required, I believe that biomechanics can play a useful role in very few cases, and in none where tolerance levels are critical except by virtually unanimous agreement of qualified and experienced members of the biomechanical community.

WERNER GOLDSMITH
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DAMASK REPLIES: Werner Goldsmith and I agree on many areas. In the area of disagreement I stand by the statements in my article.

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Multiple Submissions: An Abstract Solution

The Council of The American Physical Society has recently issued a statement, "Integrity in Physics" (June 1987, page 81), which lists the following six sins: plagiarism; data fabrication and manipulation; submission of the same paper or trivial variations of it to more than one publication channel; fictitious coauthorship; a reviewer's lack of impartiality; and slow response of a referee in order to suppress publication.

I wonder, does it occur to the authors of this document that their third commandment is not on good terms with their fifth and sixth commandments? Under the existing refereeing system the author of any innovative idea or experiment remains a virtually helpless hostage of the anonymous referee for an unspecified time. If after several months the paper is rejected (often practically without comments) the author has no means to claim priority—submission to another journal is a brand-new deal with, of course, a new submission date.

Simultaneous publication of the same paper in two or more journals is quite embarrassing for the authors. Nobody really wants this trouble. Yet most would agree that simultaneous submission of "trivial variations" of the same study to more than one journal is often the only practical means to reduce the risk of being victimized by the unfair refereeing system. This is especially so for the novice trying to enter a "hot" and highly competitive area.

A solution that I hope many will find reasonable is the following: Major journals should promptly publish authors' abstracts of all submitted

papers (unless the authors themselves instruct otherwise), leaving the acceptance of the full text to the usual refereeing process. Length restrictions (such as a camera-ready 12×12-cm abstract, or less than 100 words if typeset) and, possibly, an optional small charge could be applied. It would be up to the authors to assure that their priority claims are properly expressed in the available space. I stress that the proposed system is not the same as the publication of abstracts in the APS *Bulletin* (which are not peer reviewed) since journals will publish only abstracts accompanied by the full texts of the papers.

If this system is adopted, editorial boards should not be afraid of a sudden, uncontrolled flood of low-quality papers—in the long run most authors will find it quite embarrassing to have published many abstracts without the full papers following. Besides alleviating many faults of the existing refereeing system, the abstract publishing method would be useful in itself as a new tool for spreading scientific awareness extremely rapidly.

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Cosmic Strings and Superstrings

Paul Ginsparg and Sheldon Glashow's Reference Frame column concerning the mass pilgrimage of theoreticians, "Desperately Seeking Superstrings" (May 1986, page 7), prompts me modestly to suggest a clue that will help them find a "yellow brick path" that leads to their much sought after "Blizzard of Gauze": Look in the works of the "4-B's"—Beltrami, Birkeland, Buneman and de Broglie!

Eugenio Beltrami and Kristian Birkeland have laid the groundwork for understanding the macroscopic vortex strings of the cosmos and the laboratory. In self-magnetizing plasmas, Beltrami vortex strings provide the macroscopic paradigm for type II superconductivity. The three-dimensional, fully electromagnetic, particle-in-cell, vorticity-handling simulation codes of Oscar Buneman and his protégés in this latter part of the 20th century are providing computer-simulation corroboration of observational results on cosmic strings in both the laboratory and the cosmos. The evangelical effect of this imprimatur is precipitating an avalanche of conversions from the red-herring denominations into the community of

believers. Louis de Broglie laid the groundwork for interpreting the quantum mechanical wavefunctions as waves on submicroscopic, cosmic electromagnetic strings.

Recent review papers in the *IEEE Transactions on Plasma Science*¹ enumerate and give references concerning locations where and times when the viewing of cosmic strings (both large and small) is good. These papers show how the 4-B's will help all pilgrims discover and understand these ubiquitous, omnivorous cosmic strings. I further suggest that the "smart money" referred to by the 2-G's might well be invested in the string-like real world of the 4-B's.

Reference

1. *IEEE Trans. Plasma Sci.* **PS-14**(6) (1986). See especially papers by W. H. Bostick, p. 703; A. L. Perratt, pp. 613, 639, 763; A. Egeland and E. Leer, p. 666; P. F. Browne, p. 718; C. G. Falthammar, p. 629; H. Alfvén, p. 629; B. E. Meierovich, p. 683; O. Buneman, p. 661.

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6/87

God as the Ultimate Unifying Force

The conflict between the causality of science and the acausality of religion raises deeper questions about the origins of our universe than those probed by the likes of Niels Bohr and Albert Einstein (John A. Wheeler's article "Niels Bohr, the Man," October 1985, page 66), Paul Ginsparg and Sheldon Glashow ("Desperately Seeking Superstrings?," May 1986, page 7) or "inflationists" such as MIT's Alan Guth. We address this sensitive debate as causal scientists, neither agnostic nor fanatically religious, but accepting the existence of God within the known physical limits of the universe. We believe that God as the ultimate unifying force is a solution as elegant as superstring theories and manmade universes.

For centuries, physicists have studied the symmetries and forces of nature and quantified their characteristics into "fundamental" laws. Bohr tenaciously implored Einstein to accept quantum theory and "stop telling God what to do," but for Einstein God only existed as a force responsible for the symmetry and homogeneity observed in nature, not one responsible for the deeds of human beings. Even Bohr's idea of reality (the quantum solution) was too limited.

It is not coincidence that the Salam-Weinberg electroweak model is

physics's only tangible evidence of modern-day attempts to unify the four forces known to nature. Attempts to incorporate the strong nuclear force and gravity into the quantum domain remain futile because the underlying theories are based on pyramidal models with so many "tunable" parameters that they are crushed under the sheer weight of mathematics. Glashow's criticism of superstring theories is justified, but not for the reasons he thinks. Superstrings will fail to yield the grand unified solution not because they attempt to incorporate gravity into quantum physics (as our colleagues from India and Manoa suggest; March 1987, page 15) or to explore these possibilities on the scale of the Planck mass, but because we simply don't have all the pieces of the puzzle yet.

Einstein's unification dream, far from being "fruitless" (as Glashow puts it), is not possible with the forces we know at present. Another force(s) may exist, unmanifested in the universe's time frame thus far. Manifestation of this missing link, which we believe is an attribute of the supernatural force theologians refer to as God, will enable physicists to incorporate Newtonian gravity into a unified field theory identifying God as the ultimate force. The evidence for our hypothesis is in the holy books today, yet scientists ignore God's hints. Why?

Science and religion must coexist. Constructing pyramids of logic that exclude God's existence is a futile attempt by humans to explain that which they cannot see. Some of our colleagues (Guth, for example) go so far as to construct in their laboratories unverifiable models of universes caused by the pinching off of overgrown aneurysms at undetermined points in time. Guth's contention that the precise density of matter and the smoothness observed in the universe today are not merely flukes of cosmology or due to a simple "toss of the dice" is correct, but God is certainly as elegant a force for causing these effects as the parent-child relationship of Guth's inflationary universes.

Whether we call the ultimate unification force God or something else is irrelevant. But incorporation of His attributes into our models and theories is an inevitability the physics community should not continue to ignore.

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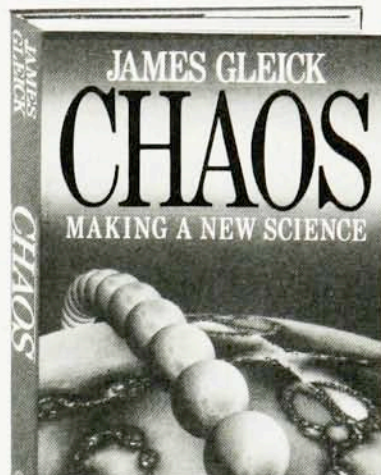
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