DO SCIENTIFIC EDITORS CROSS THE LINE?

I have been contemplating the Reference Frame column "What's Wrong with This Prose?" by N. David Mermin (May 1989, page 9), for a couple of months, wanting to respond to it but not knowing quite how to do it. (I figured there was no hurry—Mermin states that it took him about a year to write his article.) I knew that the article was unfair to *Physical Review*, and that *someone* should take the trouble to respond. Since I am both an author and an editor (of *Physical Review A*), I thought that I might be able to express an alternative point of view with which Mermin might not be burdened. I did hesitate before undertaking this response, because I happen to admire Mermin's PHYSICS TODAY contributions and I also happen to sympathize with many of his barbed comments, generally aimed at the purportedly stuffy and overprotective attitudes of our journals.

My resolve to respond was reinforced by two incidents. First, *Physical Review* received an unsolicited letter from an author stating that in his experience the technical editors were unfailingly helpful and courteous and that he appreciated their work. He just wanted to let us know this, in view of the Mermin blast. Second, after the Mermin column appeared I started to query some friends and acquaintances at APS meetings and elsewhere. A pair of colleagues, one a theorist, the other an experimentalist (names supplied on request), both of whom publish regularly in *Physical Review A*, reinforced this opinion—they were very appreciative of the efforts made by the technical staff to improve and sharpen their prose. In general I have not noticed a ground swell of authors threatening the sort of grass roots nonviolent resistance to APS technical editing advocated by Mermin.

I am not claiming that authors don't get upset over some tampering with their prose, not to mention other, more substantial grievances that authors sometimes rightly hold against editors. Restricting this note to technical issues, from my own experience I can attest that once in a while an overenthusiastic technical editor can, by adhering to editing guidelines, significantly alter scientific meaning. This of course drives our conscientious and precision-trained authors up the wall. In my own last manuscript a word was changed, innocently enough, from "an" to "the." This significantly changed the meaning, putting an entirely different slant on a concept that my coauthors and I had been carefully nurturing. However, and here is where the editor also followed guidelines, there was a stamped note next to the change: "Author: Please check." We checked, and changed it back without further hassle. In fact, I gather that Mermin was given the same option, "Author: Please check"—so let him check!

I also admit to having an ongoing conflict with one of my own associate editors over hyphens. I happen to believe—and have accused him of this to his face—that he is hypen happy (hypen-happy?). But I do exercise my privilege of altering proofs to delete two out of three of these hypens that he gratuitously (in my opinion) adds.

Now to be more specific about Mermin's complaints and his incitement to civil disobedience. I note that he publicly confesses to what I consider to be an unfair practice. He claims that he *deliberately* avoids comparing proof copy with original manuscripts, so that he gets "one more shot at elusive perfection" to improve his prose. In my opinion this is a tricky maneuver. In the process of polishing the prose, won't he occasionally change meaning? How could he not? Peer review, whatever you think of it, is our current practice. Our journals run on peer review. Mermin's creative urges could result in peer review bypass, since it is unlikely that the improved proofs will suffer further refereeing. It was my understanding that authors check proofs for accuracy, not for polishing of prose.

Turning to some other specifics of the Mermin charges:

▷ Mermin invokes the Constitution of the United States—"it being chock full of beautiful single-sentence paragraphs"—to protest an editor's graft-

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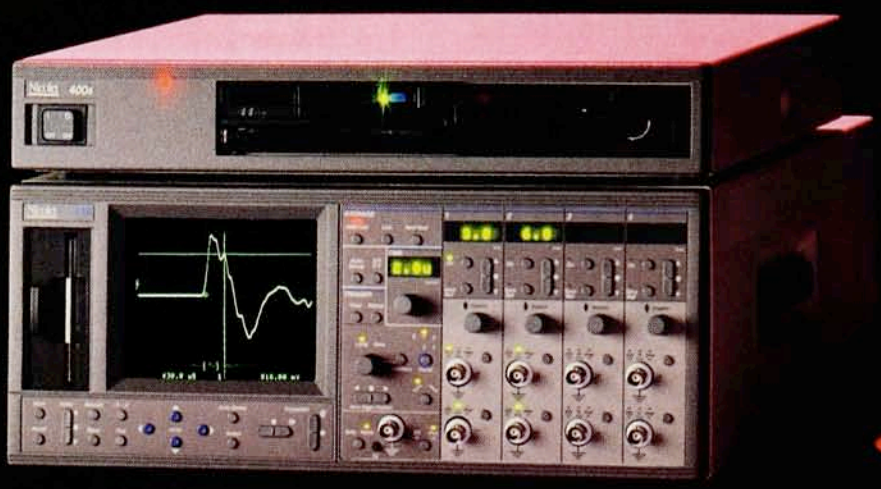

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ing one such paragraph of his to the bottom of another paragraph. Our Constitution is indeed a wonderful document, thrilling to read and reread, and very likely more important than even our own beloved *Physical Review*. Bear in mind, however, that nine distinguished jurors have lifetime commitments to interpret this marvelous, short document—not to mention the thousands of legislators and lesser jurors who are continually trying to figure out what it is that the Constitution actually means. We practice a profession where such need for interpretation should be, and is, very minimal, and we do have to keep it that way.

▷ Mermin had given Mother Nature the female gender, naturally enough; the copy editor had "desexed" and depersonified the reference. Also, Mermin felt that the adjective "charming" best described a particular paper; the copy editor didn't care for it. These may be arguable calls, but I think I know what the copy editor was trying to accomplish. Scientific articles are meant to transmit scientific results *unambiguously*. Readers come from a tremendously broad variety of backgrounds. Colloquialisms, even some phrases that are almost second nature to one group of readers, may be incomprehensible to another, or worse, may convey a different meaning. I don't know about "Mother Nature"—is Nature female everywhere? How would "charming" translate into Chinese or Russian? I can imagine a scientific translator groping for the right word, which would probably have a different shading from what Mermin had in mind. I note, by the way, that the editor actually phoned Mermin to discuss that single word. This is an example, I believe, of the courtesy our editors generally extend our authors. Clearly the editor was aware of the author's sensitivity and was trying to reach some sort of an understanding with him.

▷ With regard to the conflict concerning geometry notation (the editor didn't like Mermin's use of unmodified pairs of letters to represent a line segment), I would probably have used the same notation as did Mermin—but why make a Federal case out of this? (Translator: I dare you to get *that* right!) However, as you can imagine, our technical editors don't see things quite so simply. I showed a draft of this letter to one such editor, and here is an abstract from a note she wrote to me: "Mermin claimed that changing his simple '$BD = AF$' notation to '$d(AF) = d(BF)$' simultaneously violated three cardinal rules of scientific writing: unnecessary notational complexity, unnecessarily unconventional notation and not following universally known nomenclature. . . . I think what raised a flag to the editor was not the 'use of unmodified pairs of letters to represent a line segment' but that these pairs of letters entered into an equation. . . . The editor used the ideas presented in one of our style and notation memos, which form the backbone of our guidelines and policies pertaining to manuscript presentation. Accordingly, unnecessary notational complexity was not introduced; rather, terms were modified to clarify. Unnecessarily unconventional notation was not introduced; rather, standard and universally known nomenclature was followed. What was brief and potentially confusing was made slightly longer but unmistakable in intent."

Now I would like to address the more general question of technical editing. Some advocate eliminating such editing. This might work if authors all wrote as well as Mermin does, but alas, this is far from the case. Many of us (I certainly don't exclude myself) did not benefit from very thorough training in grammar and composition. Even those of us who did in many cases backslid seriously as our energies became directed toward science as a practice rather than the transmission of science through the written word. This is exacerbated by the fact that maybe half of our authors who write in English do not have English as their native tongue. Accordingly, technical editing plays a crucial role in preparing manuscripts for such universally read and highly respected journals as *Physical Review*. It is too much to ask our technical editors to be on the lookout for the Mermins, those precious few scientists who are good not only at science but at its reportage as well.

Apart from this matter of simple skill in communication, should we allow authors creative leeway without limit? I do not advocate overzealous adherence to editorial guidelines, but I do believe that science is best served by the use of standards in communicating scientific results, particularly in our archival journals.

It is not necessary to be charming, or to write single-sentence paragraphs or single-word sentences, in order to write an interesting article.

Period.

BENJAMIN BEDERSON
New York University
New York, New York

7/89

David Mermin's own graceful style strengthened his plea against dreary

scientific writing made even duller by unimaginative editing.

I'm struck by his comment that bad editing aims to eliminate any signs that authors are human. The misguided desire to appear inhumanly objective has long acted to eliminate personal pronouns from scientific reports or to allow only the royal or editorial "we."

This tendency still runs deep, a lesson I learned in writing a book chapter for a major scientific publisher. As sole author, I naturally wrote in the first person, to produce what I thought was supple prose. My horrified editor, however, insisted that I change to the meaningless royal "we." The result was a much stiffer piece with no better a presentation of the physics.

Personal pronouns, colorful but accurate words and vivid imagery can all enliven our prose, because they draw on our humanity. We can encourage their use by dropping outdated rules of scientific writing and editing. Then we'll communicate more effectively and pleasantly among ourselves and, especially, with the rest of the world.

SIDNEY PERKOWITZ
Emory University
6/89 *Atlanta, Georgia*

N. David Mermin had some good points in his May column "What's Wrong with This Prose?"

For years my physicist husband, Bill Huff, has been receiving PHYSICS TODAY and *Medical Physics*. He occasionally drags in other magazines in related fields, and I usually pick up each issue, leaf through it and quickly lay it down.

Why? These magazines are downright intimidating. Solid blocks of print strung out in half-page columns are hard to read, especially when interspersed with 25-cent words that I'm hazy on. The mental picture I form of their target reader is an elderly male, deadly serious, who strokes his beard and nods thoughtfully as he reads these weighty sermons. Add muttonchop whiskers, a dusty vest and no sense of humor.

Sure, these magazines are not written for us scientific semi-illiterates. If you're writing about a certain process, you gotta include the pertinent formulas. But they're also not written for the physicists I know personally—highly intelligent, mischievous people whose dreadful sense of curiosity pushes them to peep into skunk holes, laser bores and cobalt "pigs." (I said intelligent, not always prudent.) Why isn't scientific literature mirroring these lively people?

As a longtime magazine writer and newspaper columnist, I have to write "bright." That means short paragraphs, sprightly word choice and colorful anecdotes.

Maybe it's time to bring science writing out of the dark ages and give it a little personality—to match its readers.

SANDY HUFF
5/89 *Safety Harbor, Florida*

I think you have given more than enough editorial space to David Mermin's narcissistic kvetching. His most recent Reference Frame column is nothing but a thinly disguised advertisement for himself. I know no physicist who has found his professional creativity impeded by the AIP *Style Manual.*

EDWARD A. FAGEN
University of Delaware
5/89 *Newark, Delaware*

DAVID MERMIN REPLIES:

▷ Trying to write well is one of the noblest manifestations of narcissism, and if writing a series of columns titled "What's Wrong with . . . ?" isn't kvetching, I don't know what is, so I proudly accept the title of Narcissistic Kvetch offered me by Edward Fagen. (Is an advanced degree in narcissistic kvetching an NKvD?)

▷ My kvetch was addressed precisely to the notion, explicitly stated, I'm sorry to say, by Benjamin Bederson, that having one's prose clumsily tampered with is among the less substantial grievances an author might have. For anyone who takes writing seriously there is no grievance more substantial.

▷ Of course copy editing serves an essential purpose. I never advocated eliminating it—the results would be disastrous. But it is one thing to fix slips and typos and make the manuscript consistent with the technical rules of style, and quite another to substitute gratuitously the copy editor's prose for the author's. The distinction can be a subtle one, and there will always be marginal cases, but copy editors today (not just those at *Physical Review*, and not just those at scientific journals) have gone much too far in the direction of rewriting. Some of them do it very well, but when they do it they convert a creation of the author to one of their own. This is simply unacceptable.

▷ "Author: Please check" is fine. But most emendations are not identified in this way, thereby adding to the agony of proofreading the burden of catching all the minor vandalisms performed on one's manuscript. In

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any event the default position for anything except obvious mistakes should be to invite the author to make the change, rather than to make it and invite the author to change it back.

▷ When I recommend as referee that a paper be published, I have enough confidence in the author not to demand that any last-minute stylistic changes be submitted to my scrutiny. Can there be any functioning peer who would maintain that it is peer review bypass (I leave it to the PHYSICS TODAY copy editor to decide where to put in the hyphens) to check proofs against one's personal platonic ideal rather than against the original manuscript?

▷ It is not the one-sentence paragraphs that make it necessary to have a full-time board of experts to interpret the Constitution of the United States. Furthermore, the need for such interpretation of our own professional literature is certainly not minimal; much of what we write is of necessity sketchy, incomplete, conjectural. The habit of careless writing allows an author to introduce far more ambiguity than is inherent in the subject, and by discouraging vivid writing the journals contribute to this problem.

▷ If standards of writing in our scientific journals are aimed at the lowest common denominator of a polyglot international readership and only words with "precise" cognates in all major foreign tongues are acceptable, then there is no hope. Obviously one should avoid obscure colloquialisms, particularly when making points of central importance. But I do not believe that the antipathy of *Physical Review* to "charming monograph" and "Nature herself" has anything to do with the possible puzzlement those phrases might provoke in those who speak English as a second language. It has precisely to do with the stifling (and relatively recent) convention that scientific prose should be mechanical and inhuman.

▷ I stand by my claim that changing "$BD = AF$" to "$d(BD) = d(AF)$ (where d is distance)" is unnecessary and offensive, and I doubt that many readers would disagree.

▷ I am disturbed by the point of view implicit in all these letters, positive and negative, that it is possible to separate the writing of the article from the science the article is attempting to describe. It is a rare article indeed that merely reports simple, clear-cut results. Most articles deal with the motivation underlying the research, they contain conjectural elements, they leave loose ends dangling, they pass judgment on earlier work, and, in short, they reflect the ambiguity, confusion and unavoidable untidiness of science as it is practiced in the real world. Good writing tightens up more than the prose; it tightens up the thinking and the science. Copy-editing practices that discourage and frustrate authors who try to pay serious concern to their prose do not merely make articles less sprightly; they undermine the scientific process.

DAVID MERMIN
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Ithaca, New York

12/89

Coming to Terms with Chaotic Systems

The review by James Trefil of *The New Physics* (July 1989, page 67) shows that physicists have been ill served by mathematical education and are somewhat naive about the subject. Trefil writes that when we refer to a system as "unpredictable" in the chaotic sense, we mean that "it is extremely sensitive to initial conditions" so that "the future of the system is, for all practical purposes, unpredictable." But he adds, "We also know that if the initial state is defined with mathematical precision, the system is perfectly predictable."

What is "mathematical precision"? I assume this means zero errors in the initial conditions, the structure of the governing equations and the parameters. What Trefil is getting at is that none of these can be error free in any physical model. In some systems the growth rates of the probable errors of the state "vector" will be exponential or faster; in others they will rise as some fixed power of the time—to consider just some possibilities. So far so good.

But can one have "mathematical precision" in a mathematical model? Trefil assumes this is so, but in fact it is more the exception than the rule. The only calculations that have perfect precision are those restricted to rational numbers. For dynamical models this leaves us difference equations and only the most trivial differential equations. Even the harmonic oscillator, if it has rational coefficients, has an irrational period; so it cannot be extrapolated error free without an infinite computer budget. And if the rational numbers are represented by some floating-point scheme as is used in computer hardware and compilers, the number of perfectly precise models becomes even more circumscribed.

In both theory and fact, rounding