# On scientific writing: The need for more conviction and subjectivity

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I have just finished the unusually contemplative task of reviewing several articles on the "science" of scientific writing. It sounds sensible, doesn't it, that scientific writing would require such erudite reasoning as to yield a "science" of its own when performed? I wonder, though, if it really is that sensible. Perhaps scientific writing is no different in essence than other types of writing which, for the most part, are more typically regarded as "art" when done well.

Whether art or science, there's a serious movement afoot to elevate the stylistic quality of such writing in today's technical journals. Editors are investigating new ways of making scientific writing more interesting and dynamic; new ways of standardizing these fresher approaches once they're discovered; and, most especially, new ways of ensuring that readership of such writing doesn't flag any further than it already has in recent years. It is a noble challenge since most would agree (I think) that reading today's literature can often be a study in pure tedium. I'm a bit concerned, however, that efforts to construct some unifying literary formula, through which we can all achieve eloquence, will lead our editors into a rathole of overanalysis- a place where many of us in the technical professions already spend too much time.

George Gopen and Judith Swan, two linguistic specialists, recently reopened this age-old discussion with a provocative article published in the November-December 1990 issue of *The American Scientist* with the title *The Science of Scientific Writing.* This article was a lengthy discussion of the habits and shortcomings that many of us suffer when trying to report on our research. Dean Clark's preceding article nicely summarized most of the salient points of the Gopen/Swan analysis, so there's little need to reiterate in detail. Their major point, to my mind, is that all too frequently we tend to sabotage our own efforts at communicating with potential readers.

We do this by failing to anticipate how a reader will react to our choice of verbiage, the way we construct our sentences, and especially the way we distribute the weighty information throughout our discussion. Gopen and Swan provided a number of illustrations which suggested that even the most complicated subject matter could be rendered more "reader-friendly" without jeopardizing the integrity of the underlying science. Like Clark and J.P. Lindsey, I too applaud their efforts and do recommend the article. I would offer this warning, however. Be prepared to take naps during the read. Even though their suggestions were sensible and concrete, before reaching the end I began to fmd their efforts to refme and re-refme as boring as the original passages had been.

I don't mean to be facetious here. The study of syntactic dynamics, and particularly its evolutionary history in the English language, is fascinating and important to those who earn their living by writing. There is a genuine consensus of opinion among editors, as well as a shared sense of frustration, about many of the bad stylistic habits we scientific writers have. Unfortunately, though, there also seems to be a growing oversight of a more fundamental issue-one which, if addressed, could enliven much of what we read in the literature without the need, as others have suggested, to "apply the scientific method" to our writing efforts.

Intuitive research followed by provocative reporting. That's what we are all looking for, isn't it? How do we get it into the journals? Not by focusing our critique on style, in my opinion, but by insisting that *researchers reveal the quality of their conviction when they write for review by their peers.*

If scientists would write with the same energy and intensity that they put into their research, scientific writing would not need to be treated any differently than writing on any subject. Sure, you say, it must be factual, concise, and to the point: I'd agree with that. Stylistically formularized? Forget it! Objective and decidedly unopinionated? Not necessarily...Fact must always be clearly distinguished from conjecture in any scientific manuscript but I think that, in addition to revealing more conviction about one's research, most scientific writing could be further improved by adding a healthy dose of subjectivity.

Imagine how much more compelling the pages of GEOPHYSICS would be, for example, if every article were required to have an informal summary of the researchers' insights, remaining questions, plans for continued study, and so on. We would not only have the facts gleaned from the various studies but would also gain a feel for *why the work was done in the first place, where it all fits in the greater scheme of things, and perhaps what to look forward to in the way of future works on various problems.*

Why is the subjectively revealed conviction so important? It's not hard to understand. It's the very thing which helps fire the imagination. All the facts in the world would be useless unless *we imagine* ways to make the knowledge useful. To be honest, we tend not to exercise our brains that much unless someone or something captures our imagination along the way. Tricky stylistics won't accomplish this goal. *The art of persuasion must be employed in addition to the mere act of effectively communicating facts.*

The act of communication is actually very simple, isn't it? Just say, clearly and concisely, exactly what is on your mind. In fact, many textbooks on communication have been based upon that simple credo alone. Persuasion is the subject on which one finds far fewer references, however. Though it doesn't require any special genius, it does require much more thought and effort. Most importantly, it requires a certain passion and conviction for what you're writing about. We should always keep in mind that just because the facts have been clearly communicated, that doesn't mean that anyone will necessarily regard them as important.

What compels a reader to regard something as significant?

Evidence of burning curiosity; thoughtful investigation; introspection; persuasive argument. These are the kinds of catalysts that not only connote importance about a piece of work, but ultimately advance the body of knowledge as well. These are the very things missing from so much of today's scientific communication.

Needless to say, if you can bring these elements out with your scientific writing, then you will no doubt have exceeded the norm. I think it's best if we simply appreciate the fact that everybody has their own way of thinking, speaking, and writing...and also forget about shoehoming our reporting into some prefabricated formula. Just say what you need to say in your own words and in your own way. Report with conviction and place your analysis against the backdrop of your own personal experiences. You may not win any awards for style, but you're much more likely to have clearly communicated your observations and also to have persuaded your reader that your conclusions are worthy of consideration. After all, that's what really is important, isn't it?

**Post script.** Here are three suggestions that have often helped me to engage in more persuasive communication on occasions when it was necessary to crawl out from under my own rock and tell others what I'd been up to. Perhaps others will find them useful as well.

- Whatever you've been working on, just tell it like it is in your own words. Get right to the point and keep it short. Don't over-sterilize, don't over-caveat.

- When writing, look directly into the mind's eye of the reader and tell it like it's important for people to know. To accomplish that, share not just the facts but also the experience. Don't bother saying what you don't believe and can't back up with either solid proof or sound speculation.
- If doubtful about something, confess it. Don't be afraid to ask questions or to leave questions unanswered.

I like to think of it this way. Science is *a vehicle with which we pursue truth. Scientific writing is the journal of our travels. Be honest. Share the experience and don't forget to write with conviction and subjectivity.* LE

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