



Writing Broadside

I just came back from a week-long nature poetry workshop at Squaw Valley (California) with the Squaw Valley Community of Writers (1993). At that workshop, Gary Snyder—nature poet, essayist, and former Beat poet—delivered a broadside on nature poetics. In it he encouraged writers to not only push on their writing but to embrace science—get the science right. A number of scientists attended the workshop, most notably geologist Eldridge Moores, the human hero of John McPhee’s *Assembling California* (1993). It was fascinating to see poets, fiction writers, and essayists sitting on the edges of their seats listening to scientists, trying to get the science right, trying to learn what to read and what to do to be more science literate.

We could sit back and chuckle, knowing that it is a lifetime’s work to get the science right in the sense of becoming a scientist, but I admire the writers who realize that they cannot shut off their left brain while trying to be nature writers. These writers are trying.

Over the years I’ve tried to push scientists to work on their writing skills, and judging by what I read—or more correctly, judging by what I cannot read—I’ve not gotten far. As computer scientists we are writers, probably half-time writers. Many computer scientists spend nearly all their time writing, and some of them are pretty good. But a significant number of these decent computer science writers are decent in the same way that someone who picks at a guitar for 5 or 10 years can eventually play something that resembles a tune—they are persistent diletantes.

If you spend more than 25% of your time writing or a crucial part of your résumé is a list of publications, you are a writer. More than 2,300 years ago Thucydides wrote:

A man who has the knowledge but lacks the power clearly to express it is no better off than if he never had any ideas at all.
(Thucydides 1981)

If your writing is unreadable, you will limit the number of people who read and understand your work. It's hard to believe you would choose to limit your readership. Some computer scientists I know tell me people should and will work to understand their results.

This spring I was on the ACM OOPSLA program committee, and I tried to read all the papers—actually I failed and read only about 75% of them. In order for a paper to be considered by the committee as a whole at the face-to-face meeting, each reader had to rate the paper well. Did your paper fail to get into OOPSLA? Could it be because I couldn't read it and gave it a low mark? How many other people have put aside your paper because it was poorly written? How many of those who persevered won't say a good word about you because you write poorly? Sadly, if this is the case, it is likely that you failed to take your career seriously.

Now the broadside. A broadside is a forceful argument or something printed on one side of a single sheet of paper. This is a broadside in both of these senses: I am arguing forcefully that you should take writing seriously, and at the end I will present a short list of things I believe you should do to improve your own writing. You can print those points on one sheet and put it over your desk.

I have a number of familiar suggestions for what to do and one or two very unfamiliar and maybe controversial ones.

First, read a book about how to write. The traditional and expected suggestion is to read Strunk and White's *Elements of Style* (1979). I never found this book to be useful except to inspire me to think about writing. People who read it come away inspired by its most forceful rule:

Omit needless words

I have read almost every book on writing there is. I have studied writing as hard as I've studied anything in my life. And I say to myself, *yes, this is good advice* because after years of study I know what *omit needless words* means.

It is definitely good when people say about your writing that it contains no needless words, but how would you go about eliminating them? How would you know a word is needless? In *Zen and the Art of Motorcycle Maintenance* (Pirsig 1984) we learn that there is a point you reach in tightening a nut where you know that to tighten just a little more might strip the thread but to leave it slightly looser would risk having the nut coming off from vibration. If you've worked with your hands a lot, you know what this means, but the advice itself is meaningless. There is a zen to writing, and, like ordinary zen, its simply stated truths are

meaningless unless you already understand them—and often it takes years to do that.

Sure, read *Elements of Style* and every book on writing you can get your hands on, but there really is only one I've seen that tries to teach what it means to omit needless words, to write clearly and simply. That book is *Style: Toward Clarity and Grace* by Joseph M. Williams (1990). Williams seems to know what makes writing clear and graceful and he can explain it. Sometimes he explains where bromides like *avoid passives* come from and tells us how to figure out when to ignore them—for example, when it's a good idea to use passives. He does this by providing a theory of clear writing that we as scientists can use. If you decide to read only one book on writing, this is the one.

You need to learn grammar. There are many ways to do that and many books that can help you. *Chicago Manual of Style* (1982), *Modern English Usage* (Fowler 1987), *Transitive Vampire* (Gordon 1984)—they all do the job. Pay attention to grammar; it's not hard.

Read a lot. And not just science. In 1990 I read an essay in the *New York Times Book Review* that said that to really appreciate good fiction writing and to improve your own writing, you should read poetry. I found this intriguing and started reading the works of the five or so poets mentioned: W. H. Auden, Marianne Moore, Elizabeth Bishop, William Butler Yeats, and Robert Frost. Of these I found Frost the most illustrative and accessible. The point to reading poetry is in several parts.

First, modern and contemporary poetry is about compression: Say as much in as few words as possible. Poets avoid adjectives, adverbs, gerunds, and complicated clausal structure. Their goal is to get the point across as fast as they can, with the fewest words, and generally with the constraint of maintaining an easily spoken verbal rhythm.

Second, poets say old things in new ways. When you read good poetry, you will be amazed at the insights you get by seeing a compressed expression presenting a new way of looking at things.

Third, poets love language and write sentences in ways you could never imagine. I don't mean that their sentences are absurd or unusual—rather, the sentences demonstrate the poet's keen interest in minimally stating a complex image or point. I've seen sentences that state in five words something it would have taken me 20 words or more to say.

Fourth, the best poets balance left- and right-brain thinking. This might come as a surprise to some, but the best poetry is not new-age sentimentality. Moreover, contemporary poetry rarely requires a knowledge of Greek mythology or obscure tribal myths and traditions.

After I had read poetry for a year or so, my technical and scientific writing got much better. I would say that nothing improved it more than did reading poetry.

Since then I have developed a keen interest in contemporary poetry, and my writing skills have continued to improve (I think) ever since.

The best writers in computer science have a strongly developed knowledge of writing. The best writers include Guy Steele Jr., Don Knuth, and Stanley Lippman. Lippman studied creative writing as an undergraduate. All three scientists write technical material that is a joy to read. It is easy to find examples of bad writing. One of the most influential computer scientists in my field (programming languages) wrote a crucial paper that I have never been able to read.

Next, practice writing. Document the last program you wrote. Use a real typesetting system—Tex or Framemaker—and produce real documentation. Describe something in a paper you just read. Spend an hour or two a week just writing—anything. Answer your e-mail carefully—edit it, revise it. Writing takes practice. Do you think a violinist listens to music and reads a book and then steps onto stage to perform? Professional writers are always writing, so it's no wonder they are good.

The best way to understand a subject or idea is to write about it. A good way to practice writing is to write about something you don't understand. If you don't understand inheritance or encapsulation, write about it. You will both learn the subject and improve your writing.

My last piece of advice is something I've never heard of in the sciences, and to be honest, I'm not sure how well it would work there. Here goes.

How do you think fiction and poetry writers become good? Naturally it includes a lot of writing practice and studying good writing and working with a teacher, but established writers also use workshops.

A workshop is a group of people who periodically get together and read and critique manuscripts by fellow workshopers. Usually the workshop group stays together a long time, although this isn't necessary. But, the longer a workshop group is together, the better their comments will become, and the better each participant will become at knowing which comments to ignore and which to attend to.

Participating in a workshop is better than giving your work to individual people, because a person tends to soften critical comments, particularly if he or she has a long-term relationship with the writer. In a workshop there can be a feeding frenzy when comments are harsh, and, although this might be tough on people with frail egos, it is crucial to producing accurate comments and feedback, and the writing (and the content) can rapidly improve.

I recommend that we all start workshops, particularly around conference-paper submission time. Find people who are in your subfield and also in nearby subfields or even in unrelated ones. Hand out the material a few days in advance, but not too far in advance—real readers rarely take a long time to try to figure out your paper, so neither should the workshopers. Start the comments by having

someone summarize the paper. Then have people state what is new to them, what works about the paper. Finally, let people start saying what they didn't understand, what isn't clear. Talk not only about the contents of the paper but also about the writing. Make specific suggestions—for example, propose rewrites of specific passages.

If the paper contains a major result, be harder on the writing: An important result deserves to be widely read, and wide readership implies less knowledgeable readers. You can provide a lot of background material if you know how to compress—remember, poetry teaches you compression.

Start a workshop in graduate school, particularly at dissertation time. Learn to write while you're in school. It is your profession; act like a professional.

This year's OOPSLA program committee chairman, Ralph Johnson, proposed that the call for papers require people who submitted papers to show them to someone else, preferably an OOPSLA-published writer. This proposal was rejected, and so were 91% of the submitted papers.

Work on your basic skills.

RPG's Writing Broadside

- Your profession includes writing, so learn how to write. No one is naturally talented enough to get by on instinct alone.
- Study writing by reading books on writing. I suggest *Style: Toward Clarity and Grace* by Joseph M. Williams.
- Study writing by reading good writers, and not just science writers. Read Knuth but also John McPhee and Rick Bass. Try to understand how they do it. Think about the good writing you read.
- Learn proper grammar; there are zillions of books on grammar.
- Get a couple of good dictionaries and use them. I have about a half dozen I use routinely. Some poets look up every single word in their poems to make sure they are using language accurately.
- Learn to revise and edit; there are books on this, but I suggest workshops.
- Read poetry. Nothing teaches you better the power of good writing and the skills to write compressed sentences. Poetry workshops are full of fiction and essay writers who are there to learn language skills.
- Practice writing. Write every day. If you are a top-notch computer scientist, you probably read technical papers nearly every day. You are a writer too, so practice.
- Workshop your writing. Writers learn by workshopping. Every night across the country writers sit in groups of 3 to 20, reading and critiquing each other's work. Not only are these professional writers but amateurs who simply want to improve their diaries.