Essays of an Information Scientist, Vol:4, p.104-108, 1979-80 Current Contents, #15, p.5-9, April 9, 1979

Current Comments

How to Write and Publish a Scientific Paper: A "cookbook" for authors from ISI Press

Number 15 April 9, 1979

The importance of clarity in scientific writing has received a lot of attention. I have always believed that information is best conveyed through simple words and short sentences.[1,2] Too many scientists habitually use jargon and complex sentences. This does not mean that I fail to appreciate the adroit use of elegant terms.

In the late fifties and throughout the sixties, numerous books appeared on how to make scientists more efficient communicators. But if you consider the large number of universities that now offer courses in scientific writing,[3] a curiously small number of books have been written on the subject lately. Except for style guides published by various scientific societies, such as the *CBE Style Manual*,[4] few books are now available on how to write for scientific journals. While 13 books on the topic are listed in *Books in Print*, over half of these are over five years old.

One recent book worth mentioning is *Writing Scientific Papers in English*,[5] by Maeve O'Connor, the senior editor at the CIBA Foundation, and my friend F. Peter Woodford, who is now with the British Department of Health and Security in London. The book includes some discussion about the editorial side of scientific publication, a topic which most books ignore. However, this book stops short of presenting a nuts-and-bolts account of how to go about publishing what one has written.

ISI Press™ will soon release a book that provides a step-by-step approach to writing *and* publishing a scientific paper. *How to Write and Publish a Scientific Paper* was written by Robert A. Day. Since 1961, he has been the managing editor of the *Journal of Bacteriology* and six other journals published by the American Society for Microbiology (ASM). Day is a member of the Council of Biology Editors, and served as chairman from 1977-78. He is also the Vice-President of the Society for Scholarly Publishing, Suite LL, 1909 K Street, NW, Washington, DC 20006.

The book has its roots in an article Bob wrote in 1975 for the *ASM News*. "How to Write a Scientific Paper"[6] attracted over 3,000 requests for reprints. Encouraged by this response, Bob expanded his ar-

ticle and added emphasis on how to publish a scientific paper. His book is written in the same "how to," or "cookbook" fashion as his article. The book's contents page appears in Figure 1.

Figure 1. Contents page from *How to Write and Publish a Scientific Paper.*

Contents

As you can see, the book covers a broad range of topics in areas such as style, organization of the scientific paper, and the world of scientific publishing.

Day's book explains how each section of a journal article is supposed to function and how best to organize it. For example, Day asserts that the "discussion" portion of the paper should explain the significance of the work in question. It should not repeat the contents of the "results" section. The "introduction" should include, among other things, the author's principal findings. Many authors make the mistake of withholding their findings until late in the paper. But as Day points out, a scientific journal is not the place to publish a mystery thriller. This does not mean that a scientific paper should be entirely devoid of the excitement of discovery. But you don't write for a leading bacteriology journal the same way you would for *Scientific American* or *New Scientist.*

Day's basic assumption is that reporting experimental findings is not so much a literary endeavor as an exercise in the organization of information. "A scientific paper," he writes, "is not literature.... If the ingredients are properly organized, the paper will almost write itself." [6]

Day also treats matters of jargon and misspelling. He points out some common mistakes authors make. However much an author might be tempted to use a jawbreaker like *chemotherapeutic agent,* journal editors and readers will appreciate the use of the shorter term *drug.* An appendix lists wordy expressions to avoid. For example, *accounted for by the fact* means *because,* and should be written that way. Another appendix lists scientific

terms that are commonly misspelled, like *kieselguhr* (better known as diatomaceous earth).

After presenting a detailed account of how to write a scientific paper, Day describes the problems of publishing a journal article. He draws on his long experience as a managing editor to provide this information. Veteran scientists may have learned the ropes of scientific publication through painstaking trial-and-error. But even the most experienced author may find manuscripts subjected to occasional publication delays. And for the young, inexperienced author, dealing with journal editors can be a frustrating experience. Day's book is designed to alleviate much of the frustration found at each step of the publication process.

As Day points out, after the scientist performs the experiments, records and reports the data in a well-organized paper, he or she wants that paper to be noticed by his or her peers. To this end, Bob includes a discussion on how to select a journal in which to publish. He notes that the subject of the paper ought to fit precisely within the stated scope of the journal. (*Journal Citation Reports*® , a section of the *Science Citation Index*® , can tell you which journals are most relevant to your subject.)

Day identifies other factors that must be considered in selecting a journal. He cautions against choosing a journal that is so obscure that no indexing or abstracting service covers it. *Current Contents*® has made it possible for the scientist to publish in smaller and newer journals without fear that the paper will be buried. However, it is still desirable to publish in the most prestigious journal possible. Day tells you how to gauge the prestige of a journal and how to estimate the journal's circulation if figures are not available.

Bob's description of the manuscript review process will prove especially helpful to the young scientist. He follows a hypothetical manuscript from the moment it arrives on the editor's desk until a decision to accept or reject is made. Day explains the difference between an editor and a managing editor. The editor is generally involved with the manuscript in the pre-acceptance phase, and the managing editor is usually involved after the manuscript has been accepted. The distinction is important to an author if only because it indicates to whom one should complain if something goes awry.

The book explains that even a cogent, well-written manuscript can run into publication delays if the author adds unnecessary or improperly executed tables and graphs. Some scientists think that tables and graphs add credibility to their writing. But as Day points out, experienced reviewers and readers will not be fooled if three out of four lines on a graph represent the normal condition. In that case, the function of the odd line can easily be expressed in a few words.

Having discussed when illustrations are desirable and when they

are not, Bob describes how to prepare them effectively. He tells how to crop and frame a photograph, and how to write instructions for the printer to avoid mistakes in reproduction. Getting these things right the first time can speed up the publishing process.

The book also includes a section on how to write a review paper and pays special attention to organizing the information properly to fit the paper to its intended audience. There is also a chapter on how to write a thesis. Ph.D. candidates will appreciate Bob's candor. He advises them, among other things, to search departmental libraries for past theses and study how those papers were organized. After all, what worked in the past might work again.

Bob and I seem to share certain concerns. Perhaps this stems from his experience as a journal editor and his awareness of the needs of indexing organizations like ISI® . The proper ordering of authors' names is important for assignment of credit. I agree, for the reasons I've outlined before.[7] According to Day, the first or "senior" author should be the primary progenitor of the work in question. The name of the leading associate should appear second. The third author should have taken a lesser role in the experiments than the second, and so on. Bob also decries the practice of listing the names of people— laboratory heads, for example—who took no part in the experiments or the original conception of the research. While such a practice may be regarded as good grantsmanship, he writes, it is basically dishonest.

Another concern Bob and I share is the matter of how authors' addresses should be listed.[8] Day, unlike many authors of books on writing for scientists, takes up this issue in detail. He believes that journal articles should clearly identify the authors' addresses and connect each author with his or her address. This practice makes it possible for *Current Contents* and other services to provide accurate address information. You should arrange addresses in the same order used for the authors. If an article has three authors from two institutions, a simple code should be used to indicate which author is at what address to eliminate ambiguity.

What I appreciated most while reading Day's manuscript was the generous sprinkling of humor he provides. I happen to value a sense of humor, especially in science.[9] Most of the books available on the subject of scientific writing are unnecessarily dull. Bob's "cookbook" approach, combined with his sense of humor, distinguishes this book from others on the subject. Apparently, Day was determined to write an informative book that will actually be *read*, and not just desperately consulted at the last moment.

I believe this book will prove useful to the young researcher and to the veteran scientist alike. Its publication by ISI Press reflects our continuing concern with improving the effectiveness of scientific communication.

REFERENCES

1. **Garfield E.** On style in scientific writing. *Current Contents* (2):5, 10 January 1977.
2. **Aaronson S.** Style in scientific writing. *Current Contents* (2):6-15, 10 January 1977.
3. **Friedman S M, Goodell R, & Verbit L.** *Directory of science communications courses and programs.* Binghamton, NY: State University of New York at Binghamton, 1978. 46 p.
4. **CBE Style Manual Committee.** *Council of Biology Editors style manual: a guide for authors, editors and publishers in the biological sciences.* New York: Council of Biology Editors, 1978. 265 p.
5. **O'Connor M & Woodford F P.** *Writing scientific papers in English.* Amsterdam: Elsevier, 1978. 108 p.
6. **Day R A.** How to write a scientific paper. *ASM News* 41:486-94, 1975.
7. **Garfield E.** The ethics of scientific publication. *Current Contents* (40):5-12, 2 October 1978.
8. ----------. The place for an author's address is upfront—where it can be counted! *Current Contents* (47):5-6, 22 November 1976.*
9. ----------. Humor in scientific journals, and journals of scientific humor. *Current Contents* (51):5-11, 20 December 1976.*

*Reprinted in: **Garfield E.** *Essays of an information scientist.* Philadelphia: ISI Press, 1977, 2 vols.

A soft-cover edition of *How to Write and Publish a Scientific Paper* will appear in late April. A hard-cover edition will appear in May. The price of the soft-cover edition will be $8.95 plus postage; the hard-cover edition will cost $15.00 plus postage. The International Standard Book Number (ISBN) for the soft-cover edition is 0-89495-006-1. The ISBN for the hard-cover is 0-89495-008-8. You can use ISI stamps, UNESCO coupons (add 10%) or a personal check to order.