

SCIENTIFIC REVIEWING

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There is a strong and useful analogy between a scientific review and an incomplete jigsaw puzzle. The assembly of an interlocking jigsaw puzzle of a thousand or more pieces involves recognition of both the complementarity of the outlines of particular pieces and of the fragments of the picture on their surfaces. If some of the pieces are missing, the jigsaw puzzle will remain incomplete. Nonetheless the shapes of the gaps and the partial picture gives clues to how the missing pieces might look and what images they might carry.

The above analogy did not spring forth spontaneously while I was actually assembling a review, sitting on the floor attempting to sort hundreds of papers, according to

content, into a finite number of piles so as to leave a clear path to the door. Rather it surfaced after I was invited to write this essay and enliven it with some personal insights or anecdotes.

The writing of scientific reviews is rarely accompanied by hilarious incidents or sudden revelations which come upon the author when attempting to reconcile conflicting information. It is an unenviable task usually undertaken while one's colleagues are gambling on snow-covered slopes, touring the world, or spending long hours in research directed at making the review obsolete before it appears.

Before setting down my own views on the scientific review, I thought that it would be

prudent to consult authoritative works which had doubtless appeared on this subject. I started with a broad search of the computerized catalog database covering over six million books in the nine-campus University of California system and the California State Library under the subject word "reviewing." A surprise—the search retrieved fewer than 150 titles. Variants on the subject word did not produce additional relevant titles. Almost all of the books were concerned with reviews and the techniques of reviewing books, poetry, drama, and the arts. In a few cases, the reviewing of scientific and medical books received some modest attention. *Reviews and Reviewing: A Guide*¹ includes two quotations relevant to scientific reviewing.

*"The reading public deserves to be helped in learning what constitutes science, to appreciate the nature of scientific controversy, and to understand what are scientific facts and concepts, as opposed to speculations and what is just rubbish..."*² Another view assumes that the reviewer is a competent writer, with well-expressed ideas. *"He must know the subject under discussion and must be able to speak with 'authority' derived from efficiency (sic) in the field. He must be able to appreciate the validity of the points made, perceive the adequacy in coverage, discriminate what is new and original from the derivative, and evaluate the significance of the new. And he must be able to recognize errors. Ideally, he should not be too limited in his narrow field, but have certain broader insights."*³

A point made in an elementary primer on reviewing fits the category of "many a true word is spoken in jest," *"It would seem too obvious to require stating that the reviewer must begin by reading the work (or viewing the picture or hearing the opera) which he is to review. Yet many so-called 'book reports' have been written on unread books."*⁴

Finally, Robert A. Day in his excellent monograph *How to Write and Publish a Scientific Paper*⁵ has a four-page chapter enti-

tled "How to write a review paper" with helpful comments on organization and format. It is hard to know whether his prefatory quote from James Russell Lowell

*Nature fits all her children
with something to do,*

*He who would write and can't
write, can surely review.*

is meant to encourage or discourage potential reviewers among his readers.

The inevitable conclusion that can be drawn from the above perfunctory literature search is that the specific art form of scientific reviewing has generated little critical attention.

Two Requirements

I will now move hesitantly to my own ill-defined impressions. The following remarks on scientific reviewing lay no claim to stating consensus opinions. I feel that a review of a given subject area should be written both for a broad scientific audience as well as for those working in the field. This objective places two initial requirements on the review. First, the readers should not be assumed to understand the jargon and the countless acronyms of the particular subject. The second requirement deals with context. The review should provide an explanation of the manner in which the particular subject fits into the broader field of which it is a part.

In describing a biological system, in particular, it is helpful to distinguish which of its features are idiosyncratic and which conform to patterns more generally observed. One of the charms of research in biology is that it mines the infinite wealth of unique aspects of different organisms. The beauty and functional attributes of these unique aspects can only be fully appreciated when they are broadly considered in the organismal and ecological context. A review that focuses solely on the biochemistry, or physiology, or ecology of an organism is surely less interesting, satisfying, and thought-pro-

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8. ----- . The chemical modification of proteins: group and site-specific reagents. *The proteins*. (Neurath H & Hill R L, eds.) New York: Academic Press, 1976. Vol. 11A. p. 1-103.
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voking than one which attempts an interdisciplinary treatment.

Considerable effort is required to write a comprehensive, critical scientific review. Given the hundreds of reviews now published each year, at best a review brings the author numerous reprint requests (but few later citations), favorable casual comments from a few colleagues, and some criticism from one or two whose work was not mentioned.

What then is the motivation for the effort? Einstein⁶ once wrote, "There exists a pas-

sion for comprehension, just as there exists a passion for music. That passion is rather common in children, but gets lost in most people later on. Without this passion there would be neither mathematics nor natural science."

I believe that it is this passion for comprehension that serves as the hidden persuader to the scientific reviewer. It is the drive to assemble hundreds of ill-related facts into a pattern approaching coherence and in this process to uncover new principles and relationships.

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Editorial Schedule Change

With the first issue of 1991, ISI[®] implemented a schedule change in the front matter for *Current Contents*,[®] *Citation Classics*[®] and the *ISI[®] Press Digest*, including *Hot Topics*, now appear every other week. They alternate with either an essay by Eugene Garfield, a reprint with an appropriate introduction, or an essay by an invited guest.