

## Critical Reviews: The Author's Point of View\*

LEROY B. TOWNSEND

Department of Chemistry and Department of Biopharmaceutical  
Sciences, University of Utah, Salt Lake City, Utah 84112

Received June 13, 1968

**The steps, procedures, and problems involved in the preparation of a critical review are presented in detail. After a commitment for publication in an appropriate journal has been received, the author must decide more specifically what will be included in each subdivision of this general area. Problems encountered in the preparation of a critical review include: the literature search, suggested procedures to be followed in evaluating a published article, publication of previously published material, arrangement of references, the inclusion or exclusion of tables, format for tables, and various other minor problems which are inherent in the preparation of a critical review.**

A definition of review by Webster is "to go over or examine deliberately; specifically to write a critical examination of" and one of Webster's definitions of critical is "in precise use, critical implies an effort to see a thing clearly and truly in order to judge it fairly; in less precise but acceptable use, critical implies harshness in judging and in the latter sense hypercritical is often preferred." My definition of a critical review is: "The documentation or compilation of all significant publications in a specific area with a careful and impartial examination of each individual publication, with interpretation or evaluation as needed in view of advances in the area subsequent to the original publication date," and is obviously a more accurate definition of a comprehensive critical review. However, I contend that most of the problems and procedures presented in this article are equally applicable to both the critical review and the comprehensive critical review.

The next point which should be raised at this time is whether a potential author of a critical review should possess certain qualifications and if so, what are they? The author of a critical review will be required to judge the validity or logic of another author's interpretation of certain observed or derived facts, and therefore should be very conversant with that particular area or type of chemistry. If the potential author is currently involved in research in the area under consideration, he will undoubtedly be better qualified to evaluate certain older publications and make allowances for the status of the area at the time of publication. If an interpretation is in order because of facts revealed subsequent to the original investigation, then he will be more inclined to avoid a hypercritical evaluation. Also, if the potential author is currently conducting research in the area, he will be qualified to answer the question, "Is there actually a need for a review article in this area?" The active researcher also will be better qualified to establish the exact scope of the proposed review article. This assignment of realistic boundaries for a review article is essential to avoid a too lengthy review article or the presentation of only a compilation of references and data.

A review manuscript is usually submitted directly to the editor for publication. The editor, with the aid of referees or editorial board members, determines whether a need exists for a review in this particular area. But, writing a review article in any area is a task of considerable size and involves a tremendous amount of time. A potential author could have expended most of the total effort required for completion of the manuscript only to have another review article on the same subject appear. Or, the editor may think that the scope of the review is either too limited or too extensive and will require a major revision before editorial acceptance. These hazards can be avoided by obtaining a commitment of publication from an editor prior to the preparation of a completed manuscript. For *Chemical Reviews*, the procedure has been established as follows: The author submits a brief outline indicating the major areas and scope or boundaries of the potential review, estimates the number of references and the approximate number of pages which will be in the finished manuscript, and indicates a tentative date when the manuscript could be submitted for publication. An author considering publication in journals which usually contain only original research articles but occasionally publish a review article—e.g., *Journal of Heterocyclic Chemistry*, *Journal of Pharmaceutical Sciences*, etc.—should definitely contact the editor before initiating the preparation of a manuscript.

This brings us to the procedures involved in conducting a thorough and complete literature search for a review article, the most important aspect of writing a critical review and especially a comprehensive critical review. The procedure for searching the older literature has changed very little in the past 30 to 40 years; in the field of chemistry this means that the author will invariably go first to *Chemical Abstracts*. For the literature not yet incorporated into the latest issue of *Chemical Abstracts*, *Chemical Titles* is very helpful. This can be supplemented by *Index Chemicus* (a publication of the Institute for Scientific Information), which presumably covers only new chemical compounds but usually includes the entire reaction scheme or flow sheet from the original article. One feature of *Index Chemicus* which is especially helpful is structural formulae. Other excellent sources of information

\* Presented before the Division of Chemical Literature Symposium on Critical Reviews, 155th National Meeting, ACS, San Francisco, Calif., April 1, 1968.

are *Current Chemical Papers* (Chemical Society) which appears monthly and is divided into small well-defined sections (carbohydrates, amino acids, heterocyclics, alkaloids, etc.); *Current Contents* from the Institute for Scientific Information, a collection of the contents pages of the current issues of a large number of journals, and particularly useful in the latter stages of preparation of the manuscript; and the *Chemical-Biological Activities Information System (CBAC)*, which furnishes rapid and well-indexed information of chemical-biological interest, is published biweekly, and is of considerable importance if the area being reviewed is biologically oriented. A number of more recent services for searching the literature are being offered by the Institute for Scientific Information, such as their *Science Citation Alert (ASCA)* and the *Science Citation Index*.

Of course, if an author is actively engaged in research in the area being reviewed, he will already be using all of the above sources of information and be aware of any new developments or published research in the area.

Sometimes it is necessary to obtain the original article or patent, to evaluate more accurately the actual significance of the work. The real significance of reading the original publication or patent is the opportunity for the potential author to form his own interpretation instead of relying on the abstractor's interpretation. One of the first indications that an evaluation of published work should be undertaken is when there exists a discrepancy between the discussion and experimental section. If this proves to be of little consequence or minor in nature, it can usually be disregarded. However, if in the author's opinion the discrepancy should be corrected in the review article, he should evaluate and then contact the author of the original article to see if he concurs with the review author's evaluation and interpretation. This procedure should eliminate the possibility of unnecessary or unexpected embarrassment for all parties involved. The author of the review article should present the basis for his interpretation.

The initial literature search procedures have now been covered (current status may be maintained by using the above current awareness journals) and the author must now ask himself: "How extensively should each individual section in the original outline be expanded, especially regarding the interpretation and actual content?" This can usually be ascertained most accurately by considering the type of journal to which the review is being submitted for publication. For a review article being submitted for publication in a chemical journal, the chemical aspects should definitely have first priority over other aspects—e.g. biochemical and biological, which assume secondary importance in regard to evaluation and interpretation. If the same review article was being submitted for publication to a biochemical journal, then the biochemical aspects should receive first priority with the chemical aspects being assigned a secondary position. The factor which is usually responsible for the actual extent and content of not only the individual sections but of the entire review article is one of economics, particularly if a page charge is required for publication. This consideration will usually decrease the length of the article with a concomitant elimination of some historical background, personal interpretations, references, and evaluations in the discus-

sion section, resulting in a review article which is incomplete and may be more of a hindrance to potential users than a help.

Another question arises as to when previously published material should be republished in a review article. Republication should be kept to a minimum and included only if its exclusion (graph, table, structure, etc.) would result in an indefinite conclusion or incomplete presentation. Previously published material should definitely be included if it results in the clarification of a certain point or will furnish brevity to what would otherwise be a lengthy discussion. The publication of previously published material is subject to certain restrictions and it is necessary for the review author to obtain written permission to republish this material from the holder of any copyrighted material. This permission must be obtained prior to publication, cited in the review article, and then filed for future reference.

The inclusion of structural formulae will vary from topic to topic but will usually result in the introduction of a substantial degree of clarity to the article. The structures should be as close as possible to the discussion pertaining to the structures. Tables used in a review article will of necessity vary according to the type of data which are to be presented, but should be arranged primarily for clarity, simplicity, and with the potential user in mind.

After the above procedures and questions have been considered and either implemented or discarded, the job of compiling the collected references and data into the first rough draft should be undertaken. The brief outline submitted for a prior commitment of publication provides an excellent format to follow for the first rough draft. It allows the author to write the review in separate sections which correspond to the main divisions as contained in the original outline. At this point, if the author feels that certain sections or points are misplaced or presented in the wrong order and have disrupted the continuity of the article, he must revise the draft accordingly. At this time, new ideas on interpretations or presentations should be inserted as well as any new material. This procedure will furnish a workable draft for the incorporation of any final references and any new subject matter.

It is desirable to have someone familiar with the subject read this copy and if willing offer suggestions on revisions. After the final copy has been typed, all structures and references should be checked for accuracy and then the manuscript sent off to the editor.

When to close the books is a hard decision for the author as there is always an important publication which may appear in the immediate future or a weak interpretation on one section which could be improved by certain revisions. But after submission, the author still has a few months to evaluate his effort, usually with the firm conviction that he could have submitted a better effort. Any corrections or changes which the author discovers during this interim should be noted on his copy of the manuscript for inclusion in the galley proof.

Referees' comments can pose problems. If minor corrections are suggested, then there exists the problem of whether to incorporate these suggestions or offer a rebuttal. The author should make an extreme effort to be objective as the referee is only trying to improve the quality of the review article. If a more extensive revision is suggested

by the referees, then there exists the choice of either incorporation of the referees' comments or of actually doing a major revision with the inclusion of any material which has been published subsequent to the initial submission of the review article. If the latter course is pursued, it should be approved by the editor prior to initiation since the author may find himself in the position of actually submitting the manuscript as though for the first time with all of his previous problems to encounter once again. After the revised manuscript has been returned to the editor it is set in type and shortly thereafter the author will receive the galley proof. This proof should be checked very carefully for correct content, for typesetting errors, and for errors in the structural formulae, and the corrections or changes previously noted by the author on his copy of the original manuscript should now be entered on the galley proof.

There are some problems inherent in the publication of a critical review, particularly if the author is currently involved in research in this area. For example, there is now a complete literature search in existence for other investigators currently in the area as well as anyone contemplating future research in this area. Some of the most rewarding and interesting research originates from an obscure reference which other investigators are unaware of. Also, a critical review usually emphasizes or points out the most promising areas of future research or certain areas which have been neglected by previous investigators. This poses the possibility of someone else publishing certain portions of the author's projected research before he can complete it. However, if this does happen, the author can take consolation in the fact that he must have written a good review article and that his and the editor's initial assumption that the area should be reviewed has been justified.

In summary, I should like to reiterate some of the steps involved, the questions which must be answered, and the problems which may face a potential author of a critical review.

1. Determination of need for review in this area and the scope of the review.
2. Capability of the potential author for writing a critical review.
3. The need for obtaining a commitment of publication prior to writing the review.
4. Evaluation of individual sections on the basis of the journal in which the review will be published.
5. The procedure for and necessity of a thorough and complete literature search, including an assessment of the resources available in the potential author's library.
6. Factors involved in the evaluation of previously published articles.
7. The basis on which previously published material should be republished in the review article.
8. How to determine if structures and tables should be included or excluded.
9. The need for establishing a procedure for writing the first rough draft.
10. The steps involved in the conversion of the first rough draft into the final copy.
11. What to do about the referees' comments and the problems associated with the galley proof.
12. Reprint requests.

These are the major steps and problems which a potential author of a critical review article should consider very carefully before committing himself to the tremendous task which is inherent in the writing of a critical review article. If the challenge is accepted, I am sure the author will find this endeavor to be a most rewarding experience.

## Critical Reviews: The Editor's Point of View\*

HAROLD HART

Department of Chemistry, Michigan State University, East Lansing, Michigan

Received June 13, 1968

**Rapid expansion of the chemical literature has increased the need for well-written reviews of all types, particularly of critical reviews. Such reviews extract from the morass of verbiage those contributions which are most significant and focus attention on major problems and ignore trivia. They not only summarize the field at the time of writing, but suggest new directions in research which may be most profitable. In the selection of a subject, a case is presented for timeliness, broad appeal, and unconventional organization as factors which may enhance a review's critical value and its impact on science. Authors preferably should be established investigators familiar with the nuances of the subject, or bright young investigators initiating research in the topic being reviewed. Influences which an editor can exert are discussed.**

One cannot arouse much argument with the question—Do we need critical reviews? Every research chemist will argue that we do (provided, of course, that sharp criticism does not strike too close to home). Most chemists probably also agree pretty well on what constitutes a critical review;

or at least they will easily recognize that whereas some reviews are primarily compilations, others present material with a distinctly new twist, thus stimulating new thought and research. Most reviews, of course, fall somewhere between these extremes which, incidentally, are not necessarily mutually exclusive; comprehensive reviews can also be critical.

\* Presented before Division of Chemical Literature, 155th National Meeting of ACS, San Francisco, April 1, 1968.