
GUIDELINES FOR REVIEWING TECHNICAL REPORTS

COUNTLESS BOOKS AND PAMPHLETS have been published in recent years to alert aspiring authors to the need for clarity and precision in technical writing. Far fewer books address the responsibilities of reviewers, even though such responsibilities are second only to those of authors in ensuring accurate communication of ideas. If the prime objective of technical writing is precise communication, what could be more pathetic than a failure to communicate? An author may miss logical flaws and ambiguities that a skilled reviewer will catch before they are committed to print. The Survey, therefore, sees a thorough review as a good review, a light one as a disservice to the Survey, the author, and the reader. Judging the content of a manuscript is the reviewer's greatest responsibility, but the reviewer must naturally consider the presentation of the content as well. A good review is hard but not hostile. The following guidelines are mostly from Malde (1986), but details of Malde's report covered elsewhere in STA are omitted here.

This section concisely addresses the responsibilities of the reviewer, but it also contains helpful suggestions for authors. These suggestions are couched in dry, direct terms, but they should not be construed as dogma. They simply call attention to circumstances that commonly confront reviewers and that may need attention.

REVIEW PRACTICES

TREAT MANUSCRIPTS AS PRIVILEGED DOCUMENTS

Manuscripts must not be exploited; they are sent to reviewers only to solicit advice. Unless agreed to by the author, it is unethical to copy, discuss, or cite an unpublished manuscript, or to use the work described for one's own research. Some editors of scientific journals, moreover, caution reviewers not to contact the author, even if the author is a colleague in the reviewer's organization, because such contact can mislead the author into thinking that problems about the manuscript can be resolved with the reviewer, not the editor. However, constraints are less rigidly applied on interactions between critics and authors of internal manuscripts that are written for scientific

laboratories or government agencies, or that are being prepared within such organizations for outside journals. Within the Survey, reviewers commonly discuss troublesome points with the author of an internal report or with the author's supervisor and if necessary with colleagues in the Survey.

HAVE A POSITIVE ATTITUDE

Act as an impartial, tactful ally of the author, looking for ways to improve the content and presentation of the manuscript. Acknowledge the good points and suggest new insights. Make no personal attacks or statements that impugn the integrity or competence of the author, and avoid acrimony and sarcasm.

BE PROMPT

Reviewing is most effective when the reviewer stays with the manuscript until the review is completed. Reviews of internal Survey manuscripts take precedence over personal research. Editors of most technical journals expect reviewers to meet deadlines of 2 to 3 weeks, but more time can be requested if needed.

DOCUMENT THE REVIEW

In fairness to the author, reviewers should substantiate their statements about a manuscript. The following steps are recommended: (1) Read the title and the abstract, (2) test whether the illustrations and tables are intelligible on their own by considering them just after the abstract, (3) read the text critically for content and presentation, making appropriate marginal notes and numbered comments keyed to places in the text, and suggesting possible improvements in the organization and writing, (4) point out any specialized topics that need expert review, (5) do whatever library research may be needed on uncertain points, (6) judge whether all essential points have been covered by rereading the manuscript, editing the comments, and deciding which ones are most important, (7) finally, write a summary explaining what the manuscript contributes to science—or, if it falls short, why it fails.

ELEMENTS THAT AFFECT THE SIGNIFICANCE OF THE REPORT

PRIOR PUBLICATION

Scientific results are sometimes anticipated by previous workers. Authors whose work is not new are sometimes unaware of the fact; as a reviewer, you should point out the duplication and call attention to any references that may have been missed. If a new finding is described, consider whether the background information is sufficient without repeating already published work. Formal reports may repeat, in perhaps more polished form, information from theses, abstracts, technical comments, and conference reports that have not been formally published. Publishing information that is not wholly new may be worthwhile if so doing is important to the times, if republishing it confirms or refines known results, or if it calls attention to obscure or forgotten findings.

Sending a manuscript to more than one publisher at a time is unethical, and reviewers who learn of it should caution the author or inform the appropriate editors.

NEW FACTS; USEFUL REVIEWS

Reviewers should judge whether the author's discovery has been adequately verified. The usual test is whether arguments in favor of the discovery are convincing.

Review papers generally summarize results and comment on areas of agreement, contradictions, and controversies. The most useful review papers also take stock, pare down reported results, put the useful pieces into perspective, define what has been achieved, and suggest starting points for future research.

INTENDED READERSHIP

Consider whether the manuscript is appropriate for the intended readership, and if it is, consider its suitability in terms of relevance to ongoing studies, stimulus given for new ideas, and the probable size of the readership. The manuscript may have greater interest if the author's objective is to develop a new principle, solve a nagging scientific problem, or establish criteria to cope with an unsolved problem—not just to describe field relationships or laboratory results. Timeliness also enhances interest.

TIMELINESS

Editors of journals that try to publish new results quickly, such as "Science," tell reviewers that "a paper should have news value for the scientific community." Such a manuscript might pertain to a current topic, raise a new subject, question an established theory, or respond to a point of controversy.

ADEQUACY OF DETAIL

Scientists judge the worth of new facts or concepts by considering how such information adds to previous knowledge. For the facts or concepts to be potentially useful, a contribution to an established field should be either fairly detailed or based on a closely reasoned argument. In contrast, when little is previously known in a field of study, any relevant finding or idea may be worthwhile. All data needed to understand a paper should be published, but a reviewer should judge whether or not voluminous supporting data such as modal analyses, chemical data, stratigraphic descriptions, and repetitive measurements might be better placed in an appendix or in a data depository.



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ADEQUACY OF APPROACH

Consider whether or not the author has used all the tools that are available and whether or not the research approach is adequately explained. Stratigraphic evaluations may need supplemental measured sections, petrographic studies may need supporting chemical analyses, geomorphologic analyses may need terrain measurements, and so on. Point out any oversights to the author. The manuscript should explain what was studied and the procedures used—not just the results. Data for an age determination, for example, should describe the sample: its precise locality, a brief description of its distinguishing features, its relations to other rock units, and pertinent factors about the analytical method. The methods used should be properly explained. Familiar, published techniques can simply be cited, but possible differences from previous methods should be clarified. Judge whether the methods are reliable and adequate, citing other methods when appropriate.

RESULTS AND THEIR RELATIVE IMPORTANCE

Geological results are commonly given as tables, maps, cross sections, well logs, photographs, graphs, and diagrams. Such results should reinforce ideas presented in the text, but should not duplicate each other. A concise text, moreover, is not littered with undigested results or with unrelated facts or ideas. If the lack of a certain result under the described conditions could be important, point it out.

SOUNDNESS AND RELEVANCE OF CONCLUSIONS

The conclusions should discuss the relationships between the observed facts, should interpret their significance, and should tie evidence to inference. A mere summation of the results is superfluous. The author should explain gaps and limits in the results, if any, and show how the results support or contradict the findings of others. Speculation should be limited to reasonable, testable hypotheses. Be sure that the author does not make too much from too little and does not ignore obvious alternative hypotheses. Some authors fail to see a useful principle in clouds of detail. Some digress on irrelevant matters or reach illogical conclusions. The most significant conclusions should also be mentioned in the abstract and the introduction.

PRESENTATION

TITLE

After reviewing the content of the report, reaffirm that the title is appropriate. If it is not, suggest possible alternatives. Key words make a title more precise. Some authors even forget to include an identifying geographic name. Delete needless words (“Investigations on”). The use of nouns as adjectives should be discouraged (“Ocean Disposal Symposium”). Abbreviations, jargon, and unusual terms should not be used either. Cleverly worded titles are unsuitable for scientific papers but may be provocative for essays and other expressions of individual views. Titles in the form of a question or a statement can be forceful (“Is the Suffolk Scarp a Shoreline?” and “Densities of Brines Should be Measured at 4°C”).

ABSTRACT

A plainly written abstract invites the reader to study the paper that follows. It should not be treated as an introduction. It gives the essence of the paper but stands on its own; it outlines the purpose of the work, methods used, and important results, and it gives only the information that is in the paper. Authors sometimes forget to include needed facts, such as important localities, but they more commonly give extraneous details. The reviewer should point out unneeded words and ideas. Abbreviations, symbols, or acronyms are rarely needed, but if they must be used for brevity, the author should define them. References are best left to the body of the report; if an abstract must cite a reference, sufficient information must be given in parentheses for the reader to find the reference because the abstract must stand alone. The order of topics in an abstract must be logical but need not be the same as in the body of the paper. Giving the conclusions first and then the background and supporting facts can be effective.

INTRODUCTION

A good introduction can be organized in many ways but should include the following elements: (1) A description of the research objective and the purpose of the paper, (2) a summary of previous work, (3) a description of the methods used and the responsibilities of the coauthors, (4) a mention of the principal results and their importance, and (5) an outline of how the rest of the report is organized. The reviewer should check that the rest of the report is consistent

with the introduction. The introduction should be written as if it appeared without the title and abstract.

ILLUSTRATIONS AND TABLES

Check to be sure that illustrations and tables (1) are consistent with interpretations in the text, (2) show what the author intends to show, (3) do not unnecessarily repeat information given in the text, (4) are readily understandable on their own, and (5) are in proper form. Be sure that the report contains neither too many nor too few illustrations or tables. Also ask yourself if details in the text could be expressed more clearly or concisely as illustrations or tables.

REFERENCES

Inform the author if relevant work has been missed or, conversely, if irrelevant work has been cited. References not directly related to the work are superfluous, although published work of historical interest can be pertinent. Reviewers are expected to check citations in the text against the list of references, noting omissions or discrepancies in names, dates, or pagination.

ACKNOWLEDGMENTS

Acknowledgments are the author's prerogative but preferably should be given for noteworthy contributions and financial support (p. 12). In Government reports, cooperation with another agency is noted on the title page. Credits for supporting information should be placed in the text where the information is used. Contributors who share importantly in the work may be listed as coauthors. Some editors require that acknowledgments be approved by those whose help is acknowledged, on the grounds that an acknowledgment may mistakenly imply endorsement of the author's work.

ORGANIZATION

Thoughtful suggestions on organization and clear writing may help the author better express important results and concepts. Scientific papers are easier to understand when the findings and their significance are clearly explained, when extraneous matters are left out, and when elements of the work can be quickly found. Understandable reports proceed from the

statement of a problem to its solution. A classic sequence is: "Introduction, Materials and Methods, Results, and Discussion," but no prescribed form can be universally recommended. The results derive from the approach taken and the methods used. Interpretations are best placed in the closing discussion, where the meaning and significance of the results are explained and evaluated. Carelessly organized papers fail to state the purpose of the work, explain the approach taken, or clearly derive an explanation of the results.

CLARITY

Clarity and conciseness are improved by following simple rules: Favor the active voice and the first person; do not use nouns as verbs; delete needless words; use concrete words, not vague or abstract terms; substitute short words for long ones; say what things are, not what they are not; express parallel thoughts in parallel form; avoid jargon.

ACCURACY AND CONSISTENCY

Reviewers are expected to catch technical errors that might otherwise be missed. Look especially for numerical errors and for mistakes in technical terms and proper names that may be unfamiliar to the editor. If an error is found in a calculated value, ask the author to check all the values. A common error is a misplaced decimal point. Even when the calculated values are correct, check the method of calculation. If in doubt about the mathematics, statistics, chemical formulas, or other technical usage, explain to the editor or supervisor that review by an appropriate expert is needed. If many technical terms are used, the report may need a glossary. Try to check definitions and quotations. Verify that abbreviations or acronyms are defined when first used; would they be better spelled out? Check scales on maps and photographs. Geographic names in the text must agree with those on the maps and preferably with names on published topographic maps. All names used in the text should be shown on a map in the report or be otherwise adequately located.