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SPECIAL EDITORIAL
CANONS FOR WRITING AND EDITING MANUSCRIPTS

HENRI D. GRISSINO-MAYER
Associate Editor

Laboratory of Tree-Ring Science
Department of Geography
University of Tennessee
Knoxville, Tennessee 37996, USA

ABSTRACT

Writing is much like any other activity—the more you read and write, the more proficient you become as a scientist. Here, I provide canons for writing and editing scientific papers that should help novice writers avoid common hazards that could render a manuscript unpublishable. Abstracts should be well-written and concise and contain all the major results and conclusions. The manuscript should be well organized. Sentences in all paragraphs should stick to the central theme of the paragraph. Writers should provide Latin names for species analyzed, and should use SI units in all cases. The use of bulleted lists, active voice, and commas after introductory phrases will improve the clarity of the manuscript. Tables and figures should be clear, well-organized, stand-alone accessories to the text, and usually convey data and results that are numerous or complex. Writers should avoid both plagiarism and self-plagiarism, and should have their manuscript proofread before submitting to a journal. Finally, authors should consult primary references (such as *Scientific Style and Format,* published by the Council of Biology Editors in 1994) to become familiar with troublesome words and phrases.

Keywords: abstracts, manuscript organization, proofreading, active voice, plagiarism.

INTRODUCTION

When I was first thrust into the scientific writing pool, I was given several articles and books about writing manuscripts, many of which serve me to this day. I realized I had much to learn (*e.g.* why does it matter if I use "which" instead of "that"?), and I was continually frustrated by what appeared to be a lack of acceptance by my peers for my writing. I later realized that writing like a scientist is like any other activity—the more you engage in the activity, the more proficient you become. As I steadily gained confidence, I saw a major improvement in my writing and my manuscripts were increasingly accepted. One activity that most improved my own scientific writing was the reading of hundreds of manuscripts, proposals, and student term papers. As one editor recently informed me, the best writers are also the most prolific readers (Brian C. McCarthy, personal communication). Today, I provide a set of canons to my students for writing scientific papers in the hope that they will avoid the mistakes to which I (too often) fell prey. Writers should keep in mind, however, that different journals will have different formats and styles, and that the guidelines for the targeted journal should be read carefully when preparing a manuscript.

THE THREE C's

Be concise. Nothing is more tedious than reading a paper bloated with unnecessary text and filler sentences. Many novice writers believe lengthy manuscripts equate to more scientific manuscripts, and this simply is not true. In fact, the articles cited most often by other scientists are usually short articles. Some journals (such as *Science* and *Nature*) have strict guidelines that require submitted manuscripts be as short as possible while still communicating the major findings of the study. Learn

how to maximize the amount of information presented in as short a space as possible.

Be clear. Avoid wordiness. Why say "master tree-ring index chronology" when "master chronology" will suffice? As scientists, we must necessarily be technical, but writing like a scientist requires a balance between being technical and being clear. Remember that many reading your article may not be experts in your particular field. Simple, non-technical phrases and sentences are easier to read and understand. Always read over each sentence and look for those hallmark expressions that indicate wordiness (some examples are listed at the end of this article).

Be correct. Never ever fabricate data, invent results, embellish your findings, steal words or ideas from others, or purposely mislead the reader. Nothing is more heinous than a scientist who intentionally commits fraud. In a well-publicized case, two cancer researchers fabricated data that were reported in more than 40 peer-reviewed publications (Abbott 1997, 1998). Report only what your results show and be prepared to back up your interpretations with graphs, tables, and hard data.

THE ABSTRACT IS CRITICAL

The abstract is the single most important section of the manuscript because scientists read abstracts to gauge whether to read the entire paper (Landes 1951; Hart 1976; Council of Biology Editors (CBE) 1994). Writers must therefore convey in the abstract as much vital information about the study as possible (Weil 1970). Abstracts should be short and concise, no longer than 250–300 words (but check the journal's guidelines). Abstracts should consist of only one paragraph, although two paragraphs are allowable for more extensive studies. The abstract should contain all the elements of the paper itself:

1) 1–3 sentences that introduce and justify the study
2) 1–3 sentences about the study area and species used
3) 2–3 sentences on the methods employed
4) all significant results, which should comprise the majority of the abstract
5) 2–3 sentences that encapsulate the major conclusions

Never use vague phrases such as "is described," "is reported," "is discussed," and "is presented" (Landes 1951; Hart 1976). Avoid verbose, space-wasting phrases such as "In this study, we investigated . . .". State simply "We investigated . . .".

ORGANIZATION IS KEY

A manuscript must be well organized with all the sections required by the journal, typically: Abstract, Introduction, Site Description, Methods (*not* "Methodology"), Results, Discussion, Conclusions, and References Cited. Begin all manuscripts by creating a detailed outline of the content to be included (justification, objectives, site information, tests to be conducted, *etc.*). In fact, the sections in your outline should easily turn into the headings used in the sections of the paper. While writing, ask yourself to which section your sentences (and the ideas they convey) belong. Be sure to place background material, objectives, and the study justification in the Introduction. Any sentences that describe field and laboratory techniques and statistical and graphical analyses must go in the Methods section. The Results section (sometimes the shortest) should contain tables and figures that clearly and concisely present the main findings of the study. Reserve any interpretations of the results for the Discussion section. Do not repeat sentences from previous sections to "remind" the reader why particular techniques were used. Do not introduce new methods in the Results section, as these are often viewed by readers as "afterthoughts," possibly introduced once the primary methods did not produce the desired results. Ensure that your paragraphs "flow" from one to the next, using transitional sentences when necessary.

MAINTAIN GOOD PARAGRAPH STRUCTURE

Each paragraph should have a topic sentence (CBE 1994; Sorenson 1995). All other sentences in the paragraph must support the central topic of paragraph. When writing, ask yourself, "Does this sentence support the major topic of this paragraph?

Does it instead belong in the previous (or following) paragraph?" Furthermore, all sentences should flow, with each subsequent sentence relating in some way to the previous statements. Use transition words and phrases when necessary (but sparingly), such as "Furthermore," "In contrast," "In addition," "Subsequently," and "Consequently" (Sorenson 1995).

USE BULLETED AND NUMBERED LISTS

Bulleted and numbered lists add clarity to complex statements that involve listing more than one item. For example, fire history studies make use of several intra-annual positions for fire scars to help designate the season of fire occurrence:

- Dormant: a scar between the latewood and earlywood.
- Early earlywood: a scar in the first one-third portion of the earlywood.
- Middle earlywood: a scar in the second one-third portion of the earlywood.
- Late earlywood: a scar in the last one-third portion of the earlywood.
- Latewood: a scar in the latewood.

Supplying this information in one or more sentences would have created an awkwardly worded paragraph. The list is preceded by a colon and each entry in the list is capitalized (Vorfeld 2002), although lowercase can be used if each entry is syntactically part of the sentence (Chicago Editorial Staff 1993). The use of periods after each list entry depends on whether the list entry completes the introductory sentence, although consistent use of periods is recommended (Vorfeld 2002). Use numbered lists *only* when the items must be performed, analyzed, or discussed sequentially; otherwise, use non-numbered lists.

ALWAYS PROVIDE LATIN NAMES

"Identification of organisms is the first step in communicating an investigator's results in any report involving any biological entities" (Lee *et al.* 1982). Because replication of experiments is a hallmark of good science, always mention the plant species investigated (Tippo 1989). Include the full Latin binomial name, as well as the author, in parentheses after the common name. For example, "We analyzed the growth response of shortleaf pine (*Pinus echinata* Mill.) to changing climate conditions." Italicize or underline the Latin binomial names. Use accepted abbreviations for the authors (*e.g.* "L.", not "Linnaeus"). Avoid using outdated or unacceptable synonyms for the binomial name (*e.g. Pseudotsuga taxifolia* $\neq$ *Pseudotsuga menziesii*). Once mentioned, the genus name can be abbreviated (*e.g.* "*P. echinata*").

ALWAYS USE SI UNITS

Use SI units in all manuscripts (Orvis and Grissino-Mayer 2002). "SI" refers to "*Système International*" units, the modern version of the metric system and the standard for scientific writing, adopted in 1960. In the physical sciences, the most common base units are meters (for length or distance), kilograms (for mass), and seconds (for time) (CBE 1994). Standard prefixes and their symbols (if the journal permits) should be used (*e.g.* kilo = k; micro = μ) in the text of the manuscript. More information on SI base units and conversions can be found at the web site for the *Bureau International des Poids et Mesures* at http://www.bipm.fr/enus/3_SI/si.html.

USE COMMAS WHEN NECESSARY

The use of a comma after introductory phrases at the beginning of a sentence may make the sentence more understandable (Shertzer 1986). I abhor reading a sentence that does not make sense as punctuated, only to discover that a comma placed after the introductory phrase would have made the sentence much more clear. For example, "After analyzing the program output using the standardization options we selected we chose to use a 100-yr smoothing spline." In this sentence, one does not know whether to pause the reading after the words "output," "options," or "selected" without somehow reading ahead. Commas are necessary after such long introductory prepositional phrases, and should always be used when punctuation is needed for clarity (Shertzer 1986; Gibaldi 1999). When in doubt, opt for clarity and

Table 1. Nominalizations found in the dendrochronological literature.

Nominalization	Alternative
. . . allowed the development of	. . . developed
. . . climate was a significant influence on	. . . climate significantly influenced
. . . these analyses were performed on	. . . we analyzed
. . . the chronology provided estimates of	. . . the chronology estimated
. . . helped the creation of	. . . helped create
. . . facilitated an interpretation of	. . . helped interpret
. . . an expression of past climate for	. . . expressed as past climate for

insert a comma after introductory phrases in sentences.

USE ACTIVE VOICE

Manuals on writing style and many scientific journals explicitly direct writers to use the active rather than the passive voice (Strunk and White 1979; Sublett 1993). The subject conducts the action in active voice, whereas the subject receives the action in the passive voice. For example, the passively-voiced sentence "The tree rings were found to be too complacent for accurate dating" becomes "We found the tree rings too complacent for accurate dating" in active voice. The active voice is considered more direct, concise, and effective (McMillan 1988; Sublett 1993). The use of active voice often requires the use of personal pronouns (Hart 1976), which is advantageous because scientists should assume personal responsibility for their research (McMillan 1988). The overuse of active voice, however, can render a manuscript *too* personal, and the writer should occasionally use passive constructions. Writers should peruse recent issues of the targeted journal to gauge the acceptance of first/third person usage.

AVOID NOMINALIZATIONS

Nominalizations are usually verbs converted to nouns (Lanciani 1998; Table 1). For example, the phrase "led to the generation of indices" could easily be shortened to the much clearer phrase "generated indices. Many novice writers believe that liberal use of nominalizations creates a study that sounds more scientific, but this is rarely the case. Sentences should describe the actions of scientists concisely and clearly, which requires generous use of action verbs rather than nominalizations. Nominalizations are verbose, but are commonly found in dendrochronology as in many other sciences.

AVOID NOUN CLUSTERS AND STACKED MODIFIERS

A noun adjunct is any noun used to modify another noun (Wilson 1993), and is very common in scientific writing, e.g. "tree ring" and "computer program." The overuse of noun adjuncts creates noun clusters (CBE 1994) and clumsy sentence structure. Similarly, adjectives that are clustered are known as stacked modifiers (CBE 1994). A common mistake by beginning writers is the overuse of noun adjuncts and stacked modifiers in the false belief that their writing will appear more "scientific." For example, in the sentence "The 1926 juniper growth ring index was below 1.0," the subject word "index" is preceded by four nouns used as adjectives. Instead, use prepositional phrases to clarify the sentence: "The tree-ring index for the year 1926 from our junipers was below 1.0." While brevity will be sacrificed, clarity will be gained (CBE 1994).

AVOID PLAGIARISM

Plagiarism occurs when "one presents substantial portions or elements of another's work or data as their own" (American Psychological Association (APA) 1994). Plagiarism not only applies to written statements, but also extends to ideas and hypotheses expressed previously by someone else (APA 1994). To ensure written plagiarism is

avoided, writers should learn how to paraphrase, whereby sentences and passages are placed in one's own words (McMillan 1988; APA 1994; Sorenson 1995). Paraphrased passages, however, must be properly credited in the text. If exact text is used, it should be enclosed in quotation marks and again properly cited, although quoted passages are not very common in the natural and physical sciences.

Another contentious issue is *self-plagiarism.* Self-plagiarism occurs when an author lifts complete sentences or paragraphs from previous publications and inserts them in a new manuscript (Binder 1990; Samuelson 1994), which infringes on the copyright secured by the first journal. Especially egregious, self-plagiarism occurs when authors submit a manuscript as original when it has already been published in another journal, or when one attempts to re-publish a manuscript in a slightly altered form (Binder 1990). Submitting the same study in another language also constitutes self-plagiarism (unless editors specifically ask for a translation of the previous study, or appropriate accommodations are made to republish copyrighted material). Self-plagiarized publications are easy to spot—they often have a similar title to a previously published article. Avoid self-plagiarism because it "is sometimes both unlawful and unethical" (Samuelson 1994).

USE EASY-TO-READ TABLES AND FIGURES

Tables and figures are often required accessories to the text in a manuscript, but unfortunately are also the most difficult parts to design and edit (CBE 1994). Both should contain enough information to be stand-alone items. Tables are used mostly to display large amounts of numeric data or text information in a concise, organized space in a logical column/row format. If the information can be tabulated, or if the information would create text that is difficult to read, consider placing this material in a table. All tables should have (1) a number and title, (2) column headings, (3) row headings (or the "stub"), (4) the data fields (also called "cells"), and (5) footnotes (if required).

Figures are visual aids that should clearly, concisely, and immediately convey information to the reader without the reader having to resort to the text. If trends (both temporal and spatial) are apparent in your data or results, consider using a chart or map rather than attempting to convey this information in the text. Keep charts (*e.g.* X-Y graphs, line charts, bar charts) simple, using accepted symbols and abbreviations that are clear. Label all axes (including the secondary y-axis if used) and keep the text size uniform throughout the figure and sufficiently large that it will still be readable when reduced to fit into the allotted journal page space. Flow charts can be used to convey complex schemes and concepts (*e.g.* Fritts 1976: 232). Photographs should always contain some indicator of the scale of the object (*e.g.* a coin, camera lens cap, handle from an increment borer, or even a size scale printed onto the photo). Ensure that all figures are absolutely necessary—ask yourself, "Does this figure add a significant amount of *valuable* information not presented in the text?"

PROOFREAD AND READ PROOFS

Never submit a manuscript for publication unless is has gone through an internal (and sometimes external) review process (CBE 1994). Nothing is more frustrating than reviewing a manuscript that has multiple grammatical and spelling errors, odd given that most word processors have grammar and spell checkers. You should always have one or more of your colleagues read over your paper for accuracy and clarity. If your colleague has difficulty understanding a sentence or paragraph, then some journal readers surely will. If English is not your native language, consider asking an English-speaking colleague to read over your manuscript for correctness and clarity and for help in some of the translations.

Once accepted for publication, the senior author (usually) is responsible for ensuring accuracy and completeness, and should carefully read the proof pages (called "galley proofs") sent to them by the journal prior to publication. I read each page at least twice. During the first reading, I concentrate solely on the details: spelling, punctuation, and grammar. During the second and subsequent readings, I concentrate on the clarity of the text, tables,

and graphics. Remember, though, that journals may charge a fee if you suggest that extensive changes be made to the proofs.

TROUBLESOME WORDS AND PHRASES

Certain words and phrases are repeatedly misused by beginning writers and seasoned professionals alike, despite many being clearly explained in such standard references as Strunk and White (1979) and CBE (1994). These are some of the more common.

time period, period of time: These are redundant, wordy expressions because *period* already refers to time. Simply use *period,* as in "We examined the period before suppression began."

in order: This wordy phrase is never necessary. For example, rather than saying "In order to examine the growth rates of trees . . . ," simply say "To examine the growth rates of trees . . .".

There are, There is, There were: Never begin sentences with these phrases because they indicate a wordy sentence that can be restructured for clarity (Hart 1976). *There* should never be the subject. Rather than saying "There were many micro-rings found in this section of the wood," say "We found many micro-rings in this section of the wood."

Figure 1 shows, Table 2 proves: References to tables and figures should always be parenthetical in the sentence and never occupy positions in the subject (Hart 1976; CBE 1994). For example, "We found statistically significant correlation coefficients between the two variables (Table 1)."

This indicates, It can be seen, It is: Sometimes *this* or *it* may not be obvious to the reader. Such sentences can always be re-worded (Hart 1976). For example, rather than saying "It can be seen that climate changed over time," say simply "Climate changed over time."

through the use of: Attribution is the correct intention of this phrase, but the phrase always indicates a sentence that can be restructured for clarity. For example, rather than saying "Through the use of dendrochronology, we. . . ," say "We used dendrochronological techniques to . . .".

As previously stated, As mentioned previously: Such phrases always suggest a paper that can be more clearly written and perhaps re-organized (Hart 1976). One should never have to restate a fact already stated. This situation often occurs when sentences in the Methods section are restated in the Results section.

A.D. 1861, 1127 B.C.: In dates, "A.D." precedes the year, while "B.C." follows the year (Gibaldi 1999). Repeatedly mentioning "A.D." is redundant if all dates reported in your manuscript are A.D., but follow the journal's guidelines. "AD" and "BC" (without periods) are also acceptable, but again should follow the journal guidelines.

1700s and *1800s* (with no apostrophes) are preferred over *1700's* and *1800's:* Although the plural form of years can take an apostrophe, the *primary* intent of an apostrophe is to indicate the possessive case. The apostrophe can be omitted when no possibility exists in mistaking the plural meaning (Shertzer 1986; Gibaldi 1999).

$P < 0.05$ is preferred over $P = 0.05$: In classical hypothesis testing, significance levels for statistical tests are chosen beforehand (Burt and Barber 1996). A test result is statistically significant when the probability level associated with the test statistic falls *below* the chosen significance level. In addition, never report "$P < 0.0000$." Instead, simply state "$P < 0.0001$." The "P" should be capitalized (CBE 1994). (Again, check journal.)

since ≠ *because*: The primary definitions for the word *since* are related to elapsed time (CBE 1994; Agnes 1995). If causality is implied, use instead the word *because.* Rather than saying "Since growth rates have changed. . ." say "Because growth rates have changed since AD 1950. . .".

due to ≠ *because of*: Although common, *due to* is not a satisfactory substitute for *because of.* The primary meanings of the word *due* refer to something owed (Agnes 1995). Again, if causality is implied, use *because.* Rather than saying "Tree growth was exceptional due to this enhanced rainfall," say "Tree growth was exceptional because of this enhanced rainfall."

because ≠ *whereas* ≠ *while*: These conjunctions

are not interchangeable. Use *because* if causality is suggested by the second conjoined sentence. Use *whereas* and *while* if the second conjoined sentence contrasts the meaning of the first sentence or phrase. *While* also carries the element of time.

that ≠ *which*: These troublesome words are *not* interchangeable. The pronoun *that* is restrictive, referring to one specific object, whereas *which* is nonrestrictive (Hart 1976; Strunk and White 1979; CBE 1994). In most cases, *that* can be substituted for *which,* thereby improving the clarity of the sentence. For example, "The tree that had the most sensitive rings was located on a ridge" is different from "This tree, which was located on a ridge, had the most sensitive rings."

instance ≠ *example*: *Instance* refers to a "person, thing, or event that proves or supports a general statement" (Agnes 1995). *Example* is applied to anything "cited as typical of members of the group" (Agnes 1995). In most scientific studies, we provide examples rather than instances. When appropriate, use "For example" rather than "For instance."

effect ≠ *affect*: The most common use of *effect* is as a noun indicating the result of an action, *e.g.* "Summer precipitation had the greatest effect." The most common use of *affect* is as a verb meaning to influence, *e.g.* "Summer precipitation adversely affected tree growth."

effect ≠ *impact*: Often used synonymously, these words have different primary meanings. *Impact* should be used only when describing the action of one object striking another. For example, rather than saying "Summer precipitation had the greatest impact on tree growth," say "Summer precipitation had the greatest effect on tree growth" (CBE 1994).

accuracy ≠ *precision*: In dendrochronology, we (too often) throw these words around indiscriminately. *Accuracy* is the degree of *correctness* of a measure or statement, whereas *precision* is the degree of *refinement* of a measure or statement (CBE 1994). Tree-ring scientists provide dates that are accurate to one year, *e.g.* "A.D. 1685." We rarely can provide dates that are more precise, *e.g.* "A.D. 1685.125."

use ≠ *utilize* ≠ *employ*: These are not interchangeable (CBE 1994). *Employ* (meaning "to put to work") should never be used in the natural sciences. *Utilize* is simply too wordy, while *use* is more straight-forward: "We used monthly climate data," not "We utilized monthly climate data."

data and *criteria*: These words are the *plural* form for the singular *datum* (itself rarely used in scientific writing) and *criterion.* Sentence structures must reflect that these are plural nouns.

methods, not *methodology*: The word *methodology* refers primarily to the "science of method or orderly arrangement" (Agnes 1995) and the collective body of principles, techniques, and analyses employed in a discipline. Dendrochronology as a science indeed has a *methodology.* In a particular study, however, scientists design, use, and report specific *methods* that answer a hypothesis.

firstly, secondly, and related words: Avoid these words altogether when enumerating sequential phrases. Instead, simply say "First" and "Second."

highly, extremely, strongly, very: Avoid qualifiers as much as possible because these words are often unnecessary and indicate opinion. For example, "The coefficients were highly significant ($p < 0.05$)." Instead, say simply "The coefficients were statistically significant ($p < 0.05$)."

crossdating, not *cross-dating*: *Crossdating* is one word, not two, and it is not hyphenated (Kaennel and Schweingruber 1995).

tree rings, but *tree-ring dating*; *ring widths,* but *ring-width series*: Adjectival noun phrases may need to be hyphenated to improve clarity (APA 1994). If a group of adjectival nouns precedes what it modifies, consider hyphenating the adjectives. If the group of words follows it, then it should not need hyphenating (APA 1994). For example, "*Tree-ring* dating was successful," but "Dating of the *tree rings* was successful." The compound noun "treering" should never be used.

dendrochronology: This is the science, not a time series. Avoid referring to tree-ring chronologies as "dendrochronologies."

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REFERENCES CITED

Abbott, A.
1997 Fraud claims shake German complacency. *Nature* 387:750.

Abbott, A.
1998 German scientists may escape fraud trial. *Nature* 395: 532–533.

Agnes, M. E., editor
1995 *Webster's New World Dictionary and Thesaurus.* John Wiley & Sons, Inc., New York.

American Psychological Association (APA)
1994 *Publication Manual of the American Psychological Association.* American Psychological Association, Washington, DC.

Binder, C.
1990 Self-plagiarism and multiple publications—negligence or epidemic disease. *Acta Endocrinologica* 122:7.

Burt, J. E., and G. M. Barber
1996 *Elementary Statistics for Geographers.* Guilford Press, New York.

Chicago Editorial Staff
1993 *Chicago Manual of Style.* University of Chicago Press, Chicago.

Council of Biology Editors (CBE)
1994 *Scientific Style and Format: The CBE Manual for Authors, Editors, and Publishers.* Cambridge University Press, New York.

Fritts, H. C.
1976 *Tree Rings and Climate.* Academic Press, New York.

Gibaldi, J.
1999 *MLA Handbook for Writers of Research Papers.* The Modern Language Association of America, New York.

Hart, J. T.
1976 Ruminations of a dyspeptic ex-editor. *The Professional Geographer* 28:225–232.

Kaennel, M., and F. H. Schweingruber
1995 *Multilingual Glossary of Dendrochronology.* Paul Haupt Verlag, Birmensdorf.

Lanciani, C. A.
1998 Reader-friendly writing in science. *Bulletin of the Ecological Society of America* 79:171–172.

Landes, K. K.
1951 A scrutiny of the abstract. *Bulletin of the American Association of Petroleum Geologists* 35:1660.

Lee, W. L., B. M. Bell, and J. F. Sutton, eds.
1982 *Guidelines for Acquisition and Management of Biological Specimens.* Association of Systematics Collections, Lawrence, Kansas.

McMillan, V. E.
1988 *Writing Papers in the Biological Sciences.* St. Martin's Press, New York.

Orvis, K. H., and H. D. Grissino-Mayer
2002 Standardizing the reporting of abrasive papers used to surface tree-ring samples. *Tree-Ring Research* 58: 47–50.

Samuelson, P.
1994 Self-plagiarism or fair use? *Communications of the ACM* 37:21–25

Shertzer, M.
1986 *The Elements of Grammar.* Macmillan Publishing Company, New York.

Sorenson, S.
1995 *How to Write Research Papers.* Macmillan Publishing Company, New York.

Strunk, Jr., W., and E. B. White
1979 *The Elements of Style.* Macmillan Publishing Company, New York.

Sublett, M. D.
1993 The active voice: one key to more effective geographic writing. *The Geographical Bulletin* 35:23–32.

Tippo, O.
1989 Confessions of a botanical editor. *Economic Botany* 43:4–16.

Vorfeld, J.
2002 Bulleted lists: capitalization and punctuation. Office of Support Services, Peoria, Illinois. http://www.ossweb.com/article-bullets.html.

Weil, B. H.
1970 Standards for writing abstracts. *Journal of the American Society for Information Science* 21:351–358.

Wilson, K. G.
1993 *The Columbia Guide to Standard American English.* Columbia University Press, New York.

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