In addition to the normal features of good writing (e.g., correct grammar, good style, punctuation, spelling, etc.), scholarly writing imposes an additional obligation on the author: citing relevant published literature. To educated people who engage in critical thinking, an unsupported assertion is worthless, no matter how authoritative the author or speaker is. References provide support for statements and add credibility to writing.

The rules for what needs a citation are an academic tradition, but are rarely stated explicitly:

1. All direct quotations from another author must be cited. The writer has no discretion in this matter: the rule is absolute. Failure to cite quotations is known as plagiarism, a serious academic offense that is equivalent to fraudulent representation of someone else's property as the writer's. It is highly recommended that authors always include the indicia of a quotation [i.e., both (1) a citation to the original source and (2) enclose all quoted material within quotation marks or set it in a block of indented, single-spaced text] immediately after typing or inserting the quoted text into the author's document. It is not an acceptable defense to plagiarism to claim that the author forgot to include the indicia of a quotation.

2. All substantial information taken from another source should be cited. There are four reasons for this:
   a. to give credit to the person who supplied the information or first made the discovery (i.e., to avoid misrepresenting an idea as the original work of the author),
   b. to relieve the writer from the responsibility for the accuracy or truth of the information,
   c. to lead the reader to a source of more detailed or complete information, or
   d. to give the reader a sense of the historical evolution of ideas in the field.

The meaning of "substantial information" in (2) is deduced on a case-by-case basis by considering the four reasons. If one of the reasons is appropriate or desirable, then a reference should be used.

However, one does not give a reference for well-known facts (e.g., Newton's Three Laws of Motion, Maxwell's Equations for Electromagnetism), except in history papers. The appropriate test is whether any person with an undergraduate education in the appropriate specialty would immediately recognize the fact: if yes, then no reference is needed.

Let us take a moment to expand on item 2b above. If the writer doubts the truth of the information, then the writer should indicate to the reader the basis for those doubts. This can be accomplished diplomatically by making a "on the one hand...on the other hand" argument by citing two different authorities who disagree. Doubts can also be raised and at least partly resolved by discussing alternative interpretations. The point is that the writer can not just serve the
reader some cited material and then walk away from the mess: the writer has a responsibility to guide the reader to an informed decision in a coherent way. If a complete resolution of the facts is not possible, then the writer has an obligation to say so.

Some types of statements beg for a citation. For example,

It is commonly believed that....

It is widely known that....

The conventional wisdom is that

These assertions need a citation of at least one (I prefer three) references that support the assertion. These references may be to textbooks, which are rarely cited in professional literature in other contexts. There are two reasons for requiring a reference to this type of statement: (1) the reader may disagree with the assertion and need to be convinced that it is a commonly held belief, or (2) the reader may not be an expert in the area and may need a source of more information in order to understand what is being discussed.

What kind of literature should be referenced?

It is preferred that all references be archival material: books, scholarly journals, and certain other publications. There is one test for "archival": Is it retained permanently by many major technical libraries? In general, any paper that is listed in standard databases (e.g., INSPEC's Physics and Electrical Engineering Abstracts) certainly qualifies as archival. In addition, patents and government reports qualify as archival materials, although they are often not considered scholarly materials.

Engineering standards, although they are important, are not archival: most university libraries have few standards, and libraries that do have standards typically only keep the current edition of the standard. It is almost impossible to locate a copy of an obsolete or withdrawn standard, unless one knows an old engineer who has a copy in the filing cabinet! For these reasons, standards are not archival documents. However, if one needs to cite to conventional good engineering practice or to cite to a performance specification, then one can cite engineering standards.

In general, one should avoid citing proprietary literature (manufacturer's application notes, specification sheets for products, etc.) or trade magazines. These materials are of an ephemeral nature and definitely not archival: most libraries have few of these publications and what they do have is nearly always discarded when a new edition becomes available. A trade magazine is a periodical that is characterized by an abundance of (1) advertisements and (2) articles written by a employee of manufacturer X about a specific product of manufacturer X. Such material is commonly not objective, and is often blatantly self-serving. Trade magazines are often distributed free to readers who are engaged in purchasing and specifying the products that are described in the magazine. Trade magazines are distinguished from a journal that is published by a professional society. Journals usually have two or three recognized experts
review each prospective article for accuracy (a process called "peer review") before the article is published, while trade magazines publish anything that the editor wishes. Journals are supported by fees paid by the readers, while trade magazines are supported by advertising revenue. This suggests that journals are responsible to their professional readers, while magazines are responsible to their advertisers.

The Internet is not an archival source. One of the nice things about the Internet is that authors may make frequent revisions and additions to their works, which is one source of instability. Another source of instability is that people remove their web site from a local Internet Service Provider or university when they move. Webmasters sometimes rearrange directories or rename files, so only the domain name in the URL remains stable. In addition to these problems of instability, information on the Internet is only as trustworthy as its source: unlike books and scholarly journals, there is no peer review of material on the Internet.

**format of citations and references**

There are many different styles of references. The "proper" style is determined by each technical journal and is specified in its style manual. A writer should obtain a copy of the appropriate style manual before beginning writing. In the absence of specific advice in a style manual, here is the style that I prefer. To distinguish from conventional style, I call it *preferred style*.

Put a citation in the text that contains a citation to the author's name, date of publication, and perhaps the specific page number of work cited. For example:

A general survey of overvoltage protection techniques has been published (Standler, 1989).

Standler (1989) wrote a general survey of overvoltage protection techniques.

One should avoid using a neon indicator lamp as a surge-protective device (Standler, 1989, p. 130).

Then at the end of the document, one lists a bibliography in alphabetical order by the name of the author and – when more than one item by an author is cited – chronologically by time of publication for that one author:


If an author publishes two or more items in one year (for example: 1989) that are cited, then, the earliest one is identified as 1989a, the second as 1989b, the third is 1989c, .... The same letters are used after the year of publication in the bibliography.

The reference list at the end of the scholarly article has the following format:

* for a book written by John Doe:

Doe, J., *Title of Book*, publisher, total number of pages, year of publication.

If the book is a second – or later – edition, then the edition number (e.g.,
"2nd ed." or "3rd ed." must also appear in the reference list.

- **for an article in a scholarly journal by John Doe:**

  Doe, J., "Title of Paper", *Title of Journal*, volume number: first page-last page, month and year of publication.

- **for a document by John Doe that is posted on the Internet:**

  Doe, J., *Title of Document*, URL, date of last revision.

  The URL should include "http://", "ftp://", or "telnet://".

  The **MLA** style requires the URL to be inside angular brackets (e.g., <http://www.rbs0.com/tw.htm>) which seems unnecessary to me, as the prefix "http://" clearly identifies the URL. Further, angular brackets are used to enclose commands in HTML, which could cause problems if the reference list is written in HTML and either posted on the Internet or sent via e-mail. If one wants to distinguish the URL from text, the URL could be set in a monospaced font.

  The reference list has similar formats for other items. The author’s name, title of item, and year of publication should always be given. Other information (e.g., catalogue number) that is useful in locating the item in a library, or in purchasing a copy, should also be included.

  Titles are set in either italics or underlined. The modern form is to use italics. When I was a student in 1960s and 1970s, underlining was common, because one could underline (but not italicize) on a typewriter.

  In the case of both books and journal articles, a specific page can be cited in the text, for example: (Doe, 1978, p. 132), but not in the reference list at the end of the scholarly article.

**justification for this style**

The preferred style of references suggested above is used in the following scholarly journals, among others:

- Journal of Geophysical Research,
- Quarterly Journal of the Royal Meteorological Society,
- all journals that are published by the Institute of Physics in Great Britain (e.g., Journal of Physics),
- American Scientist (journal of Sigma Xi),
- Radio Science, and
- The Journal of Comparative Neurology.

The preferred style is also recommended by the Modern Language Association (MLA). At my urging, the IEEE Editorial Office accepted this style of references in the revision of ANSI/IEEE Standard C62.41-1991. I also persuaded Wiley-Interscience Press to allow me to use this style in my book that was published in 1989.
This preferred style has several major advantages over the conventional use of reference numbers (e.g., a citation to [6]):

1. The conventional style demands that the reader turn to the end of the paper to decode the reference numbers, so the reader needs to be looking at two pages simultaneously. Moreover, a reader who is familiar with the literature can recognize some of the classic papers by author and date of publication, whereas a citation to item 6 in the bibliography is meaningless until the reader looks at the bibliography.

2. This style makes it easier for the author to prepare the paper because the citation is independent of its location in the paper. If paragraphs are rearranged or material is inserted in a draft, conventional reference numbers may need to be revised from the location of the change to the end of the paper, but references in this style do not need to be changed. I favor making it easy to rearrange, insert, or otherwise modify a draft without having to simultaneously revise the order of references.

3. This style makes it easy for the author of the article, who is familiar with the references to the literature, to verify that the citations are accurate. An editor may not care about making life easier for authors, but the real benefit of making life easier for authors is that there will be fewer errors in citations. Errors make citations worthless. Furthermore, it is commonly known that extensive revisions produce a better final product. We should encourage writers to revise their writing, and not punish them by making them also revise their reference numbers with each revision.

One of the leading organizations of scientists in the USA, the American Association for the Advancement of Science, uses the day-month-year format in its journal, Science. The journals of the American Institute of Physics also use the day-month-year format. Aside from harmonizing with international practice, there is a consistent order from small units (days) to large units (years), unlike the conventional American practice. Note that a date written 8-3-1999 is ambiguous to an international audience: is it the eighth day of the third month (German form) or the third day of the eighth month (American form)? Therefore, I recommend using a three-letter abbreviation for the month, instead of a number, to avoid this ambiguity.

The accepted rule in American English when using quotation marks is always to put a final comma or period inside the closing quotation mark. For example:

Arnold said "No," but I did not believe him.

Logically, this makes little sense. The comma is not part of Arnold’s statement; the comma indicates a pause before the “but” in my sentence. Historically, this silly rule comes from antique typesetting practices, where small elements like a comma or period, were vulnerable to mechanical damage and were protected by
including them inside the ending quotation mark. Large punctuation marks (e.g., colon and semicolon), are conventionally placed outside quotation marks. Question marks and exclamation points are conventionally placed logically, i.e., whether they are part of the quoted material or not. I like the statement in the 1979 edition of Mathematics Into Type, a style manual from the American Mathematical Society, which says "In general, mathematicians are probably hastening the process toward placing quotation marks logically." This example is just one of many that I could cite of a rule of style that was reasonable in the distant past, which rule is now continued, even though the reason has vanished. Rules should not be arbitrary, they should have a clear justification! The conventional rule for punctuation can mislead the reader, as in the following example:

The URL of my web site is "www.rbs2.com."

The final period indicates the end of the sentence and is not part of my URL, yet the conventional rule for punctuation invites the reader to type the final period as part of my URL. I would write this sentence as

The URL of my web site is "www.rbs2.com".

A better way to write this sentence is to avoid quotation marks and adopt the style used in software manuals. Set commands, URLs, and other material to be entered by the reader in a monospaced typeface and write the sentence to avoid punctuation at the end of the URL.