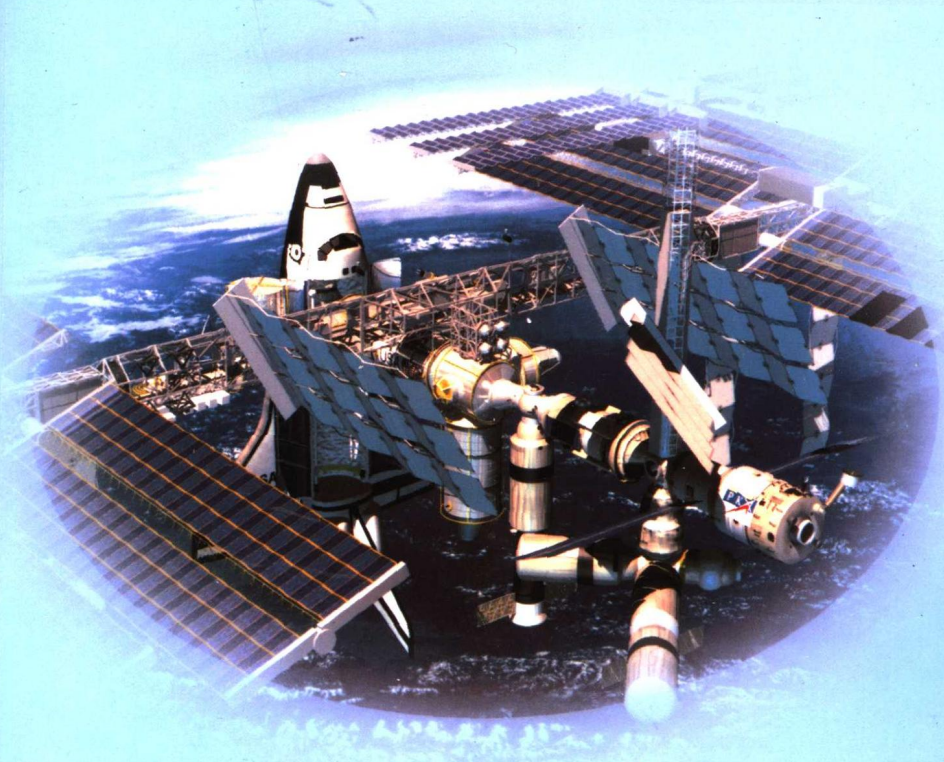
科技应用文写作

刘世铸



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前 言

十年前我在外资公司做翻译的时候，不少中国的雇员——其中有英语专业的毕业生——经常向我请教科技文书写作的一些问题，我发现他们中有些人甚至连基础的科技应用文也不会写。由此我深感掌握科技文书写作知识在全球经济一体化形势下的必要，于是我把日常碰到的相关资料积累起来，这本教材的大部分素材是那个时候搜集的。

时隔十多年，国际间的交往更加频繁，用英语写作的机会越来越多，而我们的大学课程却没有多少变化。普通高校一般都开设普通应用文写作，而科技应用文写作却只在少数几所理工院校里开设。不少学生抱怨，学了十几年的英语，四、六级的考试成绩也不错，可就是不会用。特别是一些研究生，连实验报告、开题报告也不会写。于是我补充了一些有关的资料，编成此书。

本书分四部分。第一部分是常用信函写作，包括备忘、个人简历、求职信、电子邮件等的写作；第二部分是正式科技报告的写作，主要涉及到实验报告、研究报告、可行性研究报告、进度报告和建议书的写作；第三部分是其

他一些常用的科技文书，如操作指南、广告、产品手册和说明书等的写作；最后一部分是科技文书的写作理论，常见的有定义、描写、分类、分析等写作方法。各章的结构基本一致，除了介绍写作背景外，每章均有针对性强的写作策略和为写作完成后而准备的核对清单。另外每章还有一至两篇范文和数量不等的练习，供读者参考练习用。

本书的初稿曾在理工科博士生和科技英语专业学生中试用，边秀房教授和他的博士生以及使用该教材的其他师生提出了许多有益的建议，在此向他们表示感谢。美国的著名教授 Dave Smith 对本书的初稿内容提出了建设性的意见并慷慨提供原版资料。本书得到了山东大学出版基金的资助和山东大学研究生院、大学外语部研究生教研室的大力协助，在此向他们表示衷心的感谢。

由于本人掌握资料有限，科技知识不足，书中错误在所难免，恳请读者批评指正。

刘世铸

2003 年 10 月

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Introduction

Before you commit words to paper in an engineering or scientific document, you should understand the subject matter that you are trying to communicate. In other words, you should not begin filling pages with sentences unless you have a general idea where those sentences are headed. Even after you have a general understanding of your subject matter, you still should not begin writing until you analyze your writing constraints, which are those aspects of the writing that you do not control. Constraints include your audience for the document and the format of the document—both of these constraints are discussed in this section. Another constraint, not discussed here, is mechanics, which comprises grammar, punctuation, and usage. Besides discussing the constraints of audience and format, this section also discusses the term style, which is that aspect of the writing that you do control.

Assessing the Audience

In assessing your writing situation, audience is your most important constraint. To understand this constraint, you must first decide who your readers are. Are they professors, manag-

ers, engineers, scientists, or technicians? You also assess what your audience knows about the subject. What terms will you have to define? What background information will you have to include? Another consideration for audience is why your audience is reading the document. This consideration is often referred to as the purpose of the document. Is the document supposed to inform or to convince? Finally, in assessing the audience, you assess how your audience will read your document. Will they read it straight through like a story or will they turn to specific sections?

Selecting the Format

Besides audience, another important constraint is format, which is the arrangement of type upon the page. The choice of typeface, the placement of headings, the method of citing references—these are aspects of format. For longer documents such as reports, format also encompasses the arrangement of information into sections. In engineering and science, there is no universal format. Rather, companies, journals, and courses select formats to serve their particular audiences, purposes, and occasions.

When your teachers asked you to write something, the format was often simple: double spaced and front side of the paper only. However, in engineering and science, the formats are much more detailed. Why is that so? One reason is to make the reading process efficient. For instance, in a laboratory report, having all the information follow a specific sequence makes it easier for readers to locate specific information such as the results.

In another instance, having all information in proposals placed under specified headings helps reviewers compare information fairly.

In your laboratory design, or communication course, your instructor will select a format that helps emphasize the important information, that allows readers to find key information, and that allows evaluators to assess your work. These guidelines are designed to help your instructor communicate those formats efficiently and accurately to you. As stated earlier, no universal formats exist in engineering and science. For that reason, these guidelines present a number of common formats that your instructor can choose from or modify to serve the documents of your course.

In these guidelines, you will find formats for correspondence (letters and memos), formal reports (laboratory reports, research reports, and progress reports), and other documents (proposals, instructions). Although the format guidelines presented are common in engineering and science, they are not universal. In fact, if you were to pick up a dozen scientific journals and look at the way headings were done or references were handled, you might very well find twelve different formats. Why are formats in engineering and science so varied? One reason is identity. A journal such as *Scientific American* formats its articles in the same way to distinguish the look of its journal from other scientific journals. The Palatino typeface, the descriptive summary in italics on the article's first page, the four columns for the article's text—those aspects give *Scientific American* a signature that helps readers identify the magazine even when they

don't see the masthead. To a lesser extent, companies and laboratories often want their own "look" as well.

Table I-1 presents some common differences found in just two format issues: the hierarchy of headings and the listings of references in the text. One reason that a format specifies a hierarchy for headings is so that readers can understand what information in the document is primary and what information is subordinate. The actual ways to represent these hierarchies vary considerably. Common ways are different type sizes for the headings, different amounts of white space surrounding the headings, different typestyles for the headings, and numbering schemes for different order headings. In still other cases, such as the default option of your word processor (header 1, header 2, header 3), the formats call for combinations of these variables. Likewise, the formats for assigning credit to sources vary a great deal. Some formats call for an author-year listing in the text, others call for a numbered listing, and still others call for an abbreviated listing. Each of these listing systems refers to a section, often named "References", where readers can find a full citation for the source. Note that the ways those full citations are written vary widely as well.

Table I-1 Choices in Format for Heading Hierarchy and Reference Listings

Format Issue	Purpose	Options
Heading Hierarchy	to help rank information	Hierarchy by type size (18 points, 14 points, 12 points) Hierarchy by white space (3 spaces, 2 spaces, 1 space) Hierarchy by type style (boldface, boldface italics, italics) Hierarchy by number (2.0, 2.0.1, 2.0.1.1)
Reference Listings	to give credit to sources	[Author, Year]: [Jones, 1998], [Smith, 1976] [Numbered]: [1], [2] [Abbreviated author, abbreviated year]: [JON, 98], [SMI, 76]

Given the wide variety of format issues and the even wider variety of options for those issues, these format guidelines cannot possibly present every format option that you will encounter in engineering and science. Such a collection would be cumbersome and, in the end, not particularly helpful. What's important is not that you learn every format which exists, but that you realize a specified format will often exist and that you follow that format. For those situations in which no specified format exists, you should choose a professional format to follow that is appropriate for your situation.

Crafting the Style

An important, but sometimes hazy, distinction in scientific

writing is between format (the way you place the type upon the page) and style (the way that you express a thought in words and images). Style comprises structure, language, and illustration. These guidelines do not attempt to discuss the many questions of style; rather, these guidelines focus on stylistic points particular to writing a few technical documents, such as laboratory reports, that you are likely to encounter.

Writing is an essential skill for the successful engineer and scientist. As an engineer or scientist, you cannot treat your writing in the same way that you treat fluid mechanics or organic chemistry. Scientific writing is not a science; rather, it is a craft. The game of golf provides a good analogy to the way you should view your writing. Think of your technical problems as your drives and iron shots. In your drives and iron shots, you want loft, accuracy, and distance. Now, think of your writing problems the same as you would take a putt. Notice that the clubs, swings, and mental approach of driving differ dramatically from those of putting. The same is true for the differences between the solution or technical problems and the communication of those solutions.

Part One
Correspondence

Correspondence consists of memos, letters, and electronic mails. In engineering and science, correspondence is an effective way to make requests, submit changes to a job, and deliver specific information. Unlike telephone conversations, correspondence presents the audience with a legal contract that is dated and can support a claim in court. This part presents formats for memos and letters. Because electronic mail usually has a built-in format, no format is assigned here for it.

In your correspondence, you should concentrate on being clear and precise. Because audiences tend to read letters and memos quickly, opt for shorter sentences and paragraphs than you would use in a formal report or journal article. Also, in correspondence, you should consider carefully the tone. Tone is difficult to control in correspondence. For instance, in a job application letter, how do you talk about your accomplishments without sounding boastful? Or in a letter complaining about faulty workmanship, how do you motivate the reader to repair the damage without alienating the reader? The answers are not simple.

Often, engineers and scientists lose control of tone by avoiding simple straightforward wording. When some people sit down to write a business letter or memo, they change their entire personality. Instead of using plain English, they use convoluted phrases such as "per your request" or "enclosed please find." Because these phrases are not natural or straightforward, they inject an undesired attitude, usually arrogance, into the writing.

Unit 1
Memo

Memos (correspondence written and read only within a company) are the primary means by which employees communicate with each other. More memos are written than other type of technical correspondence. Memos are the workhorses of the workplace. A memo is important not only because of its frequency of use and the wide range of subject matter presented in memo form, but also because memos represent a major component of your interpersonal communication skills within your work environment.

The reports to be discussed in the following chapters can be long or short, however, the memo is a report of one to four pages. It may note the existence of a problem, propose some course of action, describe a procedure, or report the results of a test or investigation. Proposals, feasibility reports, progress reports and lab reports, etc, may be in the form of a memo.

As shown in Figure 1-1, the standard memo has a heading that names the organization and identifies the sender, recipient, subject (often in caps or underlined for emphasis), and date. (As with company letterheads, placement of these items differs slightly among firms.) A memo report includes topic headings

for easier reading and better organization.

When your memo report is longer than one page, on following pages list the recipient's name, the date, and the page number (Mr. Roberts, 4/13/84, page 2). Place these information three spaces from the top of the page. Begin your text three spaces below.

Direct-plan memos simply end after the final point; no closing remarks or summary are necessary. Memos don't require a complimentary close and signature. If authentication is needed, initial the "FROM" line after, or close to, your name. When you're distributing the memo to a number of people, place a distribution notation at the end of the memo-listing recipients (e.g., Copies: C. Black, J. Capilona, G. Hopkins, P. Maxwell).

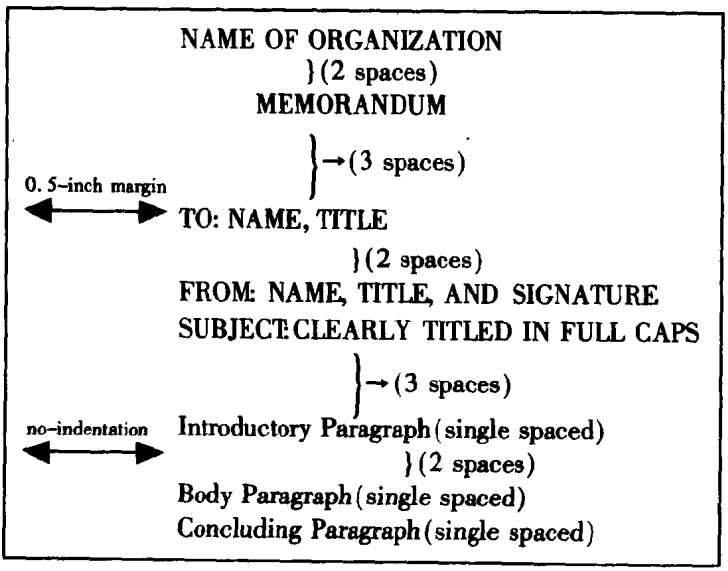

Figure 1-1 Standard memo format