SCIENCE & HUMANITIES

SUCCESSFUL SCIENTIFIC WRITING

A step-by-step guide for the biological and medical sciences

Janice R.Matthews Robert W.Matthews

剑桥科学素养读本

成功的科研写作

修志龙 注译

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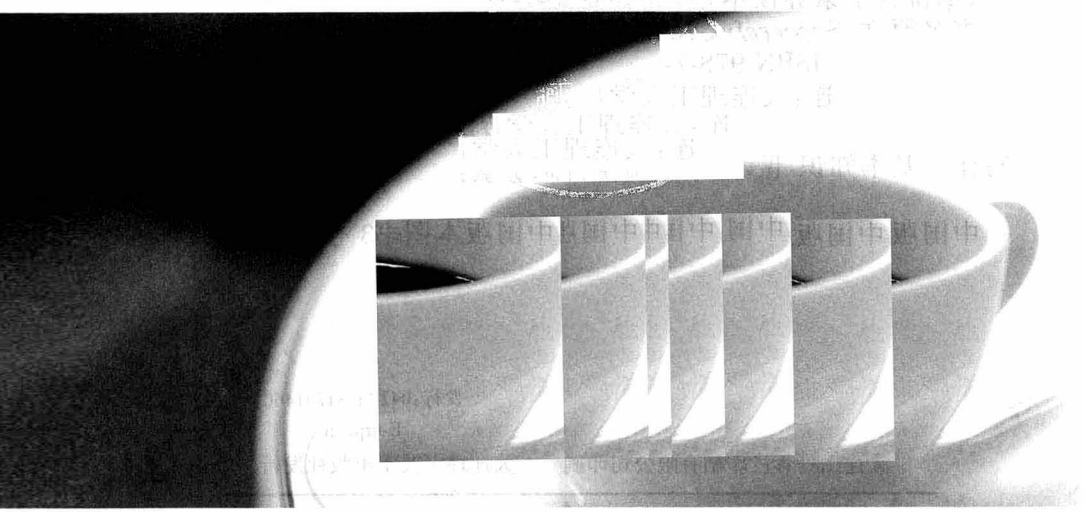

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Successful Scientific Writing

The detailed, practical, step-by-step advice in this user-friendly guide will help students and researchers to communicate their work more effectively through the written word. Covering all aspects of the writing process, this concise, accessible resource is critically acclaimed, well-structured, comprehensive, and entertaining. Self-help exercises and abundant examples from actual typescripts draw on the authors' extensive experience working both as researchers and with them.

Whilst retaining the accessible and pragmatic style of earlier editions, this third edition has been updated and broadened to incorporate such timely topics as guidelines for successful international publication, ethical and legal issues including plagiarism and falsified data, electronic publication, and text-based talks and poster presentations.

With advice applicable to many writing contexts in the majority of scientific disciplines, this book is a powerful tool for improving individual skills and an eminently suitable text for classroom courses or seminars.

JANICE R. MATTHEWS is a writer and educator with a broad background in the biological sciences. She has edited books, technical manuals and hundreds of scientific research papers in the veterinary and biological sciences, both in university settings and for private industry.

ROBERT W. MATTHEWS is a Josiah Meigs Distinguished Teaching Professor at the University of Georgia and a member of the UGA Teaching Academy. An insect behaviour specialist, his scientific publications number over 165 research articles.

成功的科研写作

本书条理清晰，详尽实用，可帮助科研工作者有效提高写作能力，进行科研工作的顺畅交流。本书包括科研写作过程的各个方面，内容精炼，容易上手，结构完整，通俗易懂并引人入胜，是一本无可挑剔的科研写作宝典。来自于实践的用于自修的练习和丰富的实例彰显作者丰富的科研和写作经验。

本版保留了上一版容易学习、可操作性强的风格，而且与时俱进，更新并拓展了诸如成功的国际出版、剽窃、伪造数据等学术道德和法律问题，增加了电子出版、书面交谈及海报演讲等内容。

本书涉及科技写作各个方面，是增强科研工作者写作技巧不可多得的工具。尤其适合于作为写作课程或讨论班的教材。

Janice R. Matthews 是一位资深作家和教育家，有很宽的生物科学研究背景。她编辑出版了大量书籍、技术手册、科研论文。

Robert W. Matthews 是乔治亚大学杰出的教学教授（Teaching Professor），乔治亚大学教学研究院成员，昆虫行为专家。

编者的话

科学研究的目的是发现新事物并将之应用于改善人类及动物的生活状态。但是，现在的科学研究本身则很费力气，不仅仅需要对科学的热爱。如果你正在考虑将科学研究作为自己一生的职业，或者已经踏上自己的职业之路，或者想有所成就但尚不确定未来的路线，急需一些从事科研工作的建议、训练和指导，《剑桥科学素养读本》丛书将给你提供满意的答案。

《剑桥科学素养读本》丛书全部从英国剑桥大学出版社引进。特邀大连理工大学几位有留学经历、具有丰富相关教学及科研从业经验的教授，对本套丛书逐一进行点评式注译。本系列丛书相辅相成，互为补充，涉及如何规划及实践科研职业，如何写作和发表科研论文，乃至如何作科学报告。我们认为，这套丛书将成为中国读者案头一套必备的科研实战指南。对于有志于从事科研事业的读者来说，实为甘醇雨露，春风化雨。

本套丛书具有以下特色：

• **题材广泛，内容丰富，表达地道** 本套丛书直接选自国外原版，内容广泛。读者可细细品味欣赏，也可随手借鉴，均有开拓视野、提升能力之功效。

• **作者学识渊博，有丰富的教学科研经验** 作者均是在各自学科领域颇有建树的专家学者，他们绝不单纯是知识技能的传授者，更是引导人生道路的前辈。读者在书中可随时感觉到其爱心和耐心，也感受到科学研究作为职业乃至事业的独具魅力的意境。他们的写作风格不尽相同，但能够洞悉母语为非英语的学生学习和使用英语的心态，均使用浅显易懂的语言对各种问题及对策加以解说、诠释，像和朋友在聊天，更像导师在引导你一步步上路。对这套丛书，读者们完全可以用一种轻松的心情去品读。

• **英语原文与中文点评相得益彰，易学易用** 为了让读者品读原文的韵味，丛书采用了点评的注译模式，特别有助于读者在潜移默化中掌握地道的英语、培养英语语感，减少许多不必要的摸索时间。

• **装帧精美，常读常新** 丛书的装帧设计精美大方，品质高雅，以国际水准的精美版面呈现于读者的面前，令读者赏心悦目。加之内容实用可读，在科研的不同阶段，均能从本套丛书中得到不同的收获，颇具收藏价值。不但收藏起图书，更是收藏起你科研道路的足迹。

从作者的“闲言絮语”中，读者尽可体会个中的激情与周到：

> “我喜欢作为一名科学家的我。这是一个让我为之陶醉、为之痴迷的职业。科学领域中像我这样的人比比皆是，他们都专注于在常人看来很抽象的目标。他们很忙碌，甚至全神贯注。这使得通常的交往远非容易。一下子投入到科研领域……职业道路很不稳定……对于一个新加入者来说，看起来前途是如此暗淡。但是，如果你能坚持下来，回报将是巨大的……当你发现了前人没有发现的规律时，这种兴奋会使你义无反顾，这就是一切。”

> “当人们决定要成为一名科研工作者时，通常是因为他们喜欢科学，而不是因为想成为作家。然而，一旦人们开始职业生涯，很快就会发现，一个管道工可以不会写关于管道的文章，也可以生活得很好，而科学工作者的成功则依赖于其写作能力。”

建议读者通读本套丛书，若时间有限，也可以根据自己的需要，以按图索骥的模式选择性地阅读其中的一本或其中的有关章节。相信读者通过本套丛书的帮助，能够增强自己进行科学研究的兴趣和信心，驾驭未来的能力会有质的飞跃，会更自信地应对未来的各种挑战，满怀信心地踏上科研之路。

我们期待着本套丛书能够为读者的事业之鹰插上腾飞的翅膀，能够帮助读者达成理想，从此走向成功。

To Chinese Readers

We are pleased and honored to offer this third edition of Successful Scientific Writing to our colleagues in China, and hope that you will find it to be both useful and interesting.

When people decide to become scientists, it is usually because they like science, not because they want to become a writer. However, once one's working life begins, it is quickly apparent that while a plumber can make a comfortable living without writing about pipes, a scientist's career depends upon his or her ability to write. However, scientific writing is not literary writing. Literary writing is an art ··· an art in which style often means ornamentation, ungrammatical constructions are often deliberately used for effect, and multiple meanings are both accepted and encouraged.

Scientific writing is quite different. Compared to literary writing, science writing differs most not in its subject matter, but in the fact that precision is of paramount importance. In scientific writing, style centers not on ornamentation, but on the smooth transfer of ideas. The best scientific grammar is the simplest. More than one interpretation is unacceptable, so precise attention must be paid both to the choice of words and to their arrangement.

At the same time, it is important to realize that scientific writing is less an art than a craft ··· not always an easy craft to learn, but one well within the capabilities of almost any scientific researcher. While good writing seems to involve a lot of revising, rereading, and polishing, effective output is not as difficult to accomplish as many people try to make it. In this book, we point out techniques that can be applied almost routinely to make good scientific writing less mysterious and more repeatable. We will outline efficient approaches

that can be applied to save you both time and effort. To illustrate this framework and make the guidelines more concrete, we have provided examples and exercises based upon actual manuscripts scheduled for publication in scientific journals in the biological and medical sciences. We also point out pitfalls and potential problems, hoping to save you from being ensnared by them.

Whether you use this book as an alternative to a formal course in science communication or to complement such a course, we hope that you will find that studying and applying this material increases your awareness of scientific writing style. Our goal is to help ease your approach to the writing that your chosen profession will invariably call upon you to do.

J. R. M.
R. W. M.
25 March 2008

致中国读者

我们很荣幸能有机会将《Successful Scientific Writing》的第3版提供给中国同行，并真诚希望本书不仅仅能给您提供帮助，更重要的是您能对本书感兴趣。

当人们决定要成为一名科研工作者时，通常是因为他们喜欢科学，而不是因为想成为作家。然而，一旦人们开始职业生涯，很快就会发现，一个管道工可以不会写关于管道的文章，也可以生活得很好，而科学工作者的成功则依赖于其写作能力。不过，科学写作不同于文学创作。文学创作是一种艺术——艺术创作常常意味着经常故意使用修饰、不合语法的结构以达到所期望的效果，歧义不但是可接受的，而且是鼓励使用的。

科研写作则与此截然相反。与文学写作相比，最主要的不是主题不同，而是准确性对于科研写作至关重要。在科研写作中，文风的重点不是修饰，而是思想的流畅表达。科研写作最好的规则是尽量简单。文章表达的意思应是唯一的，因此，必须不但关注用什么词，而且也要注意词的顺序。

同时，也要认识到，科研写作更少艺术性，且是一种技能——并不是一项容易学的技能，但几乎是每一位科研工作者都要具备的能力。尽管好的写作似乎都涉及大量的修改、反复阅读、润色，但做起来并不是那么困难。本书中，我们给出了一些可以仿照应用的技巧，使科技写作易于成功，而不是不可捉摸。为此我们大致描述了能节省时间和精力的有效途径。为了说明框架并使指南更具体，我们基于实际写作提供了一些例子和练习，这些手稿是准备发表在生物和医学科学杂志

上的。我们同时也指出了一些缺陷和潜在的问题，希望你远离它们的诱惑。

本书可作为科技交流课程的教科书或参考书，我们真诚期望本书能帮助你进行科研写作的学习和应用。我们的目的是，使科研写作变得更加容易，使你始终坚持自己的职业选择，不断向前！

J. R. M.
R. W. M.
25 March 2008

Preface to the Third Edition

Times change. Today the need to communicate science information effectively is perhaps more important than it has ever been, but the past decade has witnessed a significant revolution in the manner in which we gather, process, and communicate information. The twin technologies of the Internet and personal computers have changed the way nearly everyone works (and plays).

In keeping with the spirit of change, we have extensively revised, updated, and reorganized this third edition. Whether you are a first time author/speaker or a seasoned professional in the biological or medical sciences, we hope you find this step-by-step manual useful.

Because our preface message to you in the second edition still rings true for us, we are including it here as well. Enjoy.

JRM

RWM

2007

第三版前言

时代已经变化。今天，我们比以往任何时候更需要科学信息的有效交流，但是，过去的十余年中，我们已经感受到信息收集、处理和交流过程发生的天翻地覆的变化。互联网和个人电脑几乎改变了每个人的工作（和娱乐）方式。

为跟上时代的变化，我们对本书进行了大幅度的修订、更新以及重新组织，推出了第3版。我们真诚期望本书能给您的工作提供有效帮助。

祝您快乐！

JRM

RWM

2007

Preface to the Second Edition

Mend your speech a little, lest it mar your fortune.

— *Shakespeare*

The catch phrase "Publish or Perish" —or its more upbeat variant, "Publish and Flourish" —seems to have as much validity as ever in the minds of scientists everywhere. The scientific community has long emphasized quantity and quality of scholarly publications as a way to judge the eminence of scientists. Granting agencies appear to do the same. Scores received by renewal applications for National Institutes of Health funding for research in universities and hospitals have been shown to correlate very strongly with the number of publications resulting from NIH grants. Perhaps it is not surprising that the publication rate of scientific information doubles about every 12 years (Stix, 1994), although few of us will be likely to match the output of a Russian chemist whose scientific productivity over 10 years totaled 948 papers, or about one publication every four days!

All this writing ... Does it really make any difference whether it is good, bad, or ugly? We believe it does, and that it matters a great deal, for words are tools of science no less than numbers are. Research is not complete until it is communicated, and publication in a refereed journal is the fundamental unit of scientific communication. The decision not only to write, but to make the effort to write well, lies at the heart of scientific literacy. To most minds, sloppy scientific writing indicates sloppy thinking, and both are disastrous to research and research reporting.

The published word has remarkable persistence. A sloppily written or prematurely published paper can haunt a scientist to the end of his or her days. Over 30 years ago, an examination of the reasons why research grant applications were turned down showed that

12% of the rejected proposals were not approved because the investigators' previously published work did not inspire confidence. Despite vast technological advances, there is no reason to expect that scientific writing is any less important today.

Still, we never set out to be writers. Few scientists do. During our graduate training, we learned about statistics, research, experimentation; we were taught to use instruments and techniques we have seldom encountered again. There was never a word of guidance on writing a scientific paper, nor did we notice that this instruction was missing... at first. Once our working lives began we quickly learned that while a plumber can make a comfortable living without writing about his pipes, a scientist's career is inextricably enmeshed with (some would say enslaved by) the need to write. So, like most scientists, we have stumbled along, learning writing skills by trial and error—now and then helped along by a benevolent senior faculty member or a friendly colleague.

Now, as a new millennium begins, we find we have become that senior faculty member and, hopefully, those friendly colleagues as well. This guidebook is one outcome. Its goals are to help you to write effectively and efficiently, just as we would if we could meet with you in person. Because it forms such a major part of almost every scientist's written communication, the research article in a biological, medical, or veterinary medical journal is the book's main focus. However, the tips, techniques, and guidelines presented here apply to a variety of other writing contexts, from review articles to the popular press.

The first edition of *Successful Scientific Writing* began as a brief manual requested by graduate students and new researchers affiliated with the University of Georgia's College of Veterinary Medicine, and their colleagues in human medicine and the biological sciences. This edition has been reorganized and expanded to offer increased guidance, additional examples, and more hands-on exercises.

When you picked up this book, did you fear that it would center on split infinitives, case and tense, and other matters that sound only too much like English composition class? They will be covered-but we promise this won't be grammar class revisited. We do not aspire to present you with a comprehensive reference work or stylebook, chock-full of detailed grammatical and stylistic rules and ob-

scure exceptions to them. Where such specialized information might be desirable, we try instead to point you toward relevant resources.

Efficiency and effectiveness include far more than wordsmithing. While good writing seems synonymous with a great deal of revising, rereading, and polishing, we believe that effective scientific writing is not as difficult to accomplish as many people try to make it. We hope to show you how to develop a strong organizational framework for both the task and the document, how to access the literature more effectively, and how to tailor your approach to your individual style. We have shared a potpourri of techniques which have been useful in our own writing—covering aspects as varied as overcoming writer's block, using word processors, and constructing tables and graphs. To illustrate the guidelines and suggestions, we have provided abundant examples and exercises, many of which are based upon actual manuscripts slated for publication in scientific journals in the biological and medical sciences.

Our scientific community is rapidly becoming an international one, and English is becoming a truly global language. New sections in this edition cover using the Internet and email, and special tips when writers and readers have different first languages. Because we are most accustomed to American spelling, grammar, abbreviations, and punctuation, we have usually followed American conventions in these matters. However, we have tried to point out British equivalents or alternatives whenever possible.

Any book can only do so much, especially in as personal an area as writing. Learning to write skillfully is, always has been, and must continue to be a hands-on experience. However, it needn't be the random, slow, haphazard process that typically occurs in academic circles. Whether you use this book as an alternative to a formal course in science communication or to complement such a course, we hope that you will find that studying and applying this material increases your awareness of scientific writing style. Our goal is to help ease your approach to the writing that your chosen profession in the sciences will invariably call upon you to do.

J. R. M.
J. M. B.
R. W. M.

第 2 版前言

“出版，还是出局”——更积极一些的说法，“出版，然后兴旺”—— 似乎在世界各地的科学家心中都有着不可更改的地位。科学团体一直强调学术出版的数量和质量，以此来判断科学工作者的地位。基金委员会也是如此。据国家健康基金会统计，各大学和医院提交给基金会申请书的得分也与发表论文的数量密切相关。也许并不令人吃惊，科研论文的发表数量每 12 年就增加一倍（Stix，1994），尽管我们中的极少数人会愿意跟上这名俄罗斯化学家的出产速度，他在 10 年中发表了 948 篇论文，几乎每 4 天就发表一篇。

这就是写作——难道写好，写坏，甚至写得极糟，真的还有区别吗？我们坚信，这种区别依然存在，因为语言，不仅仅是数据，是科学的工具。科学研究只有进行交流才算完成，在相关杂志上发表是科研交流的重要组成。不只是写作，而且要努力写好，是科学写作的精神。对大多数人来说，草率的科研写作只能表达出草率的思想，这对于研究和报告都是灾难。

言语一旦发表，就永远留存在那里。草率的写作或过早发表的论文将伴随一位科学家的一生。30 多年前，一项研究表明，12% 的基金申请不获批准的原因是申请者先前发表的论文没有吸引人之处。尽管技术已经发生巨大进步，但今天科研写作的重要性却没有衰减。

尽管如此，我们却从没有计划要成为一名作家。几乎没有科学家可成为真正的作家。在研究生阶段，我们学习了统计、研究、实验；我们学会使用仪器，尽管我们以后很难再碰到它们。但我们却从没有得到关于如何写作科技论文的指导，更可悲的是，我们一开始也没有意识到缺少了这一环节。一旦我们开始工作，我们会立即意识到，一名管道工不必写关于管子的论文，照样可以生活得很好，但科学研究这一职业却难以摆脱写作的需要（有些人甚至说被写作所奴役）。这样，像大多数科研工作者一样，我们跌跌撞撞，在无数的失败中习得写作的技能，有时也可得到好心的年长的同伴或同事的帮助。

新世纪已经开始，我们发现我们已经成为了“年长的同伴”，并希望成为“好心的同事”。本书就是我们的答卷。本书的目的就是帮助