BOOKS: HISTORY OF SCIENCE

# A Scientific Rhetoric

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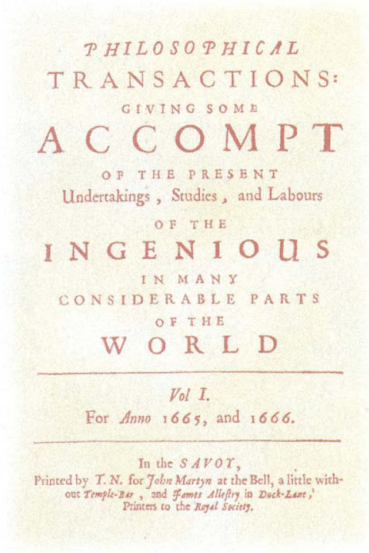
Those familiar with Alan Gross's earlier work may think him a foe of science. In *The Rhetoric of Science* (*1*), he described science "not as the privileged route to certain knowledge but as another intellectual enterprise, an activity that takes its place beside, but not above, philosophy, literary criticism, history, and rhetoric itself." Trained as a scholar of the humanities to analyze rhetoric, the ways that people speak and write to influence others, Gross seemed to be deflating science when he entertained "the possibility that the claims of science are solely the products of persuasion."

Now, rather than foe, Gross appears to have become an advocate for science. His *Communicating Science*, coauthored with science writer Joseph Harmon and historian of science Michael Reidy, attacks what it calls "first generation" rhetorical studies of science for their lack of precision in defining terms, failure to use credible sampling procedures, and refusal to build a well-motivated theory to explain changes in writing practices over time. In short, Gross *et al.* view the rhetorical study of science as not scientific enough, a problem their book is designed to overcome. This move to scientize the humanistic study of science with quantitative social scientific methods is one that recently was taken in another book by a scholar of rhetoric, Celeste Condit (*2*). Insofar as this new kind of study productively brings together the knowledge of the humanities, social sciences, and natural sciences, it reflects an interesting development in the field. One need not condemn scholarship that follows more traditional paths to acknowledge the promise of work that respectfully combines approaches that are usually kept separate.

**Communicating Science**
**The Scientific Article from the 17th Century to the Present**
*by Alan G. Gross, Joseph E. Harmon, and Michael Reidy*
Oxford University Press, New York, 2002. 279 pp. $60, £45. ISBN 0-19-513454-0.

*Communicating Science* adopts a combination of quantitative and humanistic methods to tell the rhetorical history of the scientific article. It is an ambitious project. The authors analyze the style of short passages from 1800 scientific articles, and they closely examine 430 complete papers for organization, use of images, and arguments. Spanning four centuries and three languages, the large sample was randomly selected from the most significant journals of science to cover the written products of average scientists rather than the geniuses and mavericks who most often draw our attention.

The book may suffer from its own flaws as a first-generation scientific study of rhetoric. The absence of definitions for some of the stylistic markers identified by the authors will bother readers who have forgotten their advanced grammar lessons. The authors neglect to report the statistical significance of findings they present in tables throughout the book. And they fail to fully connect their use of selection theory as an explanatory model to their recorded observations. But flaws like these are easily forgiven in a work of such broad scope. Gross, Harmon, and Reidy offer statistics on various stylistic, presentational, and argumentative features of scientific articles in each century. They not only contrast available English, French, and German samples in each time period, they examine trends within and across centuries. In addition, they interpret and explain numerous examples of scientific prose, arrangement schemes, images, and arguments.


PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD
Vol I.
For Anno 1665, and 1666.
In the SAVOY,
Printed by T. N. for John Martyn at the Bell, a little without Temple-Bar, and James Allestry in Duck-Lane,
Printers to the Royal Society.

**In the beginning.** The first scientific journals, *Philosophical Transactions* and *Journal des Sçavans*, were both founded in 1665.

Despite the authors' careful historical claim that the changes they identify do not constitute an improvement in scientific communication, each chapter is devoted to tracing the progress toward the scientific article's modern form—its heightened efficiency, objectivity, cognitive complexity, and explanatory aims. Some of the study's findings neatly fit our expectations; scientific writing has become more impersonal over time, and presentational features such as headings and figure captions are largely absent in 17th-century articles but have now become standard. Other findings are, however, quite remarkable. For example, the authors determine that two of their four principal measures of "objective style" (the use of the dummy subjects "it" and "there," and the use of things or concepts as implied agents) did not increase from the 17th century to the 20th century. This stability suggests that in some ways the modern impersonal style of science is not as radically different from early scientific writing as one might expect. An especially interesting observation is that the modern scientific article has shorter sentences and fewer clauses per sentence than early scientific prose. Like other forms of modern English writing, its syntax has become simpler over time. The finding belies the assumption that scientific writing has become harder to read because modern scientists lack proficiency in English prose. The authors suggest that this simplification of syntax helps to compensate for the increase in lexical complexity caused by the modern article's use of increasingly long and technical noun phrases.

Gross and his coauthors conclude that in its current form the scientific article is "an accurate reflection of the world as science conceives it, an effective means of securing the claims of science, and an efficient medium for communicating the knowledge it creates." The style that has evolved no longer focuses the reader's attention on the scientist but instead features objects of the laboratory and natural world. The presentational structure makes it easier for readers to find specific aspects of an article, thus allowing more economical reading practices. And, now, more arguments are concerned not merely with establishing new facts but also with offering theory-based explanations for them.

In ancient times, scholars of rhetoric were trained to argue both sides of the case, for the truth inevitably lies somewhere in between. One gets the sense that Gross is doing just that. He once advocated the case against the uniqueness of science; now, with his coauthors, he supports the superiority of its methods and primary form of communication. For those who have a passion for science and its modern writing practices, *Communicating Science* is likely to be a welcome argument.

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**References**
1. A. G. Gross, *The Rhetoric of Science* (Harvard Univ. Press, Cambridge, MA, 1990).
2. C. M. Condit, *The Meanings of the Gene: Public Debates about Human Heredity* (Wisconsin Univ. Press, Madison, WI, 1999).