



COMMUNICATING SCIENCE: THE SCIENTIFIC ARTICLE FROM THE 17TH CENTURY TO THE PRESENT. ALAN G GROSS, JOSEPH E HARMON, MICHAEL REIDY. OXFORD AND NEW YORK: OXFORD UNIVERSITY PRESS; 2002. X + 267 PAGES. HARDCOVER \$65.00. ISBN 0-19-513454-0.

If you have worked as an editor for 2 or 3 decades or more, you know that the style and structure of scientific papers—the formal reports of research—can change as time goes by. The changes have differed in different disciplines, but there has been change. An example is the shift in the late 1980s and early 1990s among medical journals from the simply paragraphed abstract to the structured abstract. Anyone who has looked back at scientific papers of the 1600s—their birth century—has seen clearly that the scientific paper has radically changed in style and structure and in all disciplines. So the questions for anyone interested in the kinds of changes and in their causes are two: What changes came when? What brought them about? Those are the questions Gross, Harmon, and Reidy have considered in this book.

Their answers do not simply come out of impressions gained from a random scanning of papers published in the 3½ centuries they cover. Nor do they come only from papers in English. Their answers come from systematic and detailed quantitative analyses of large samples of papers in French and German, as well as in English. Their analyses have focused on details in prose style, in presentation (titles, headings, tables, illustrations, citations, and other elements), and in argument. They present their findings in tables organized by language—English, French, German—and periods as percentages of the kinds of details they have considered. Their text discusses the significances of their findings and considers changes that cannot be quantified. Appendix A, “Method for Sampling Scientific Texts”, sets out the details of how they selected texts for analysis. Appendix B, “Method for Analyzing Scientific Texts”, gives the specific questions they considered for each sampled text for data on style, presentation, and argument. Those appendixes show that the conclusions reached are truly based on a rigorously scientific method and not on randomly assembled impressions. Most readers will probably be satisfied by the authors’ description (in the introduction) of their methods of analysis and need not read the appendixes before they move into

the first chapter.

I cannot summarize their findings in detail here, only the main trends in change. In the 17th century, the style was that of personal accounts—often in the form of a letter—of the actions and observations of the author. Style changed gradually through the next centuries to today’s objective impersonal style; the author disappears as a person in the text, and actions are not of authors but of things—molecules, ecologic forces, drugs. Presentation too has changed. In the late 17th century, less than half the papers had figures and tables. As time went by, elements of presentation increased in both kind and number up to what we see today. Changes in argument are more difficult to summarize, and I might unwittingly misrepresent or oversimplify them. My sense is that the shift in argument has been mainly from affirming the legitimacy of reported observations to linking findings to causal mechanisms or to theory. Not all the changes proceeded at the same rate in English, French, and German papers, and the authors suggest the why of national differences. The authors attribute some of the changes in style and presentation in the 20th century to the development between 1909 and 1979 of style manuals prepared by organizations in scientific publishing, among them, specifically, the one first published in 1960 by the Council of Biology Editors, the predecessor of CSE. What changes lie ahead in our century? Gross, Harmon, and Reidy concede that they “own no crystal ball”, but they do make some guesses in the closing four pages of their final chapter, “Epilogue: Past, Present, Future”. The essence of their view is that there will be changes—which they guess at—but that “economic, technical, and institutional hurdles” may be substantial obstacles to our reaching soon all that electronic publishing might bring to enriching scientific communication.

Anyone with any interest in the history and evolution of the scientific literature should read this book. I do not know any other study of the birth, growth, and character of scientific literature that comes close to this one in breadth of disciplines

and languages considered and in depth of analysis. But it is not easy reading; its depth and range of detail can be intimidating. For as diverse a potential readership as CSE members, the question is not so readily answered. Those with little or no interest in the history of scientific literature may see it as having no relevance to their day-to-day tasks. But those among them who would like to sharpen their ability to analyze the characteristics of today's scientific papers with the aim of understanding why they have them today, this could be a valuable book—valuable not only for the history it tells but for the method and details of analysis the authors have used.

I have two minor concerns about how some readers might see some aspects of this book. Some readers may think the authors advance their analysis of the growth in number and complexity of noun phrases in scientific prose to justify this trend. No, the authors do not advocate the trend; they simply analyze it. The second point has to do with how statistically knowledge-

able readers will see the authors' quantitative data. As I mentioned above, some of their conclusions are based on percentages of papers that have particular characteristics of style or format. The tables reporting percentages do not include confidence intervals for the percentages. Hence, we do not know whether their conclusions are drawn only from differences or changes in percentages with "significance". My sense is that the authors have been conservative in drawing conclusions from their percentage data.

I hope Gross, Harmon, and Reidy get the audience that they deserve among CSE members. They have given all of us who work for scientific journals an extraordinarily detailed and rich study of where scientific papers came from, how they have changed, and where they are today.

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