A Brief History of Technical Communication

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Civilization is a cumulative enterprise, and communication has always been a vital component of that cumulation process. From the fourteenth century on, the social system of science has depended on technical communication to describe, disseminate, criticize, use, and improve innovations and advances in science, medicine, and technology. Rapid change in technical communication has been obvious during the past few decades with the advent of computers, laser printers, the Internet, and other developments. Viewed from a historical perspective, those changes can be seen as but a portion of the evolution that technical communication has undergone. It has undergone vast changes in the means and methods that it employs and in the audience to which it is addressed, the purposes to which it is put, the roles it fulfills, and the social forces that drive and support it.

Scientific observations and technological developments were recorded in early writings and transmitted orally and through example, such as by apprenticeships. Astronomical observations were numerous among these scientific records and were preserved in the writings and artifacts of many cultures, including the Aztecs, Chinese, Egyptians, and Babylonians.

A case can be made that the first software documentation writer was Muhammad ibn Musa Al'Khowarizmi, a twelfth-century Tashkent cleric who developed the concept of writing a detailed process to be followed to achieve some goal, a technique employed in virtually all computer-programming languages today. He published a book about his approach and named his process the algorithm, a name that even today is used to refer to the mathematical application of this method.

In the 14th to 17th centuries, western societies experienced an explosion of inquiry and inventiveness in the fields of medicine, science, religion, mechanical arts, graphic arts, and literature that has since been dubbed the Renaissance. What emerged was a social system that not only matched but even surpassed the advances in language, travel, trade, social infrastructure (e.g., roads, public buildings, and water supplies), and organization of the earlier civilizations at their zeniths. A major diversion of the Renaissance from previous history was to include science in the activities deemed worthwhile to spread through the social organization via communication. With the beginning of the Renaissance, scientific inquiry was underwritten through patronage, and the payback for the patron's investment was the association of his (and sometimes her) name with the advance gained by the philosopher or artisan who was being sponsored. Although travel was slow and copies of written tracts and books were difficult to produce, a commerce of ideas was established, and communication about science and technology flourished along with that about government, trade, military affairs, and religion. Interest in scientific ideas was fostered by the establishment of a series of universities.

Midway in the fifteenth century, technology made the first of a series of major impacts on technical communication with the commercial application of movable type or artificial script, as it was called then. Johannes Gensfleisch of Gutenberg almost became the first publisher of printed books, but went bankrupt trying to do so. His equipment was sold off to pay his debts, and others quickly opened shops to mass-produce books, mostly religious but many scientific. At this point, five new trades were established almost simultaneously: typefounding, printing, publishing, editing, and bookselling. Prominent among the new entrepreneurs was Aldus Manutius, who operated a publishing house in Venice from 1490 to his death in 1515. From a technical-communication point of view, most notable of his operation was the employment of Desiderius Erasmus of Rotterdam. Literally and truly a renaissance man, Erasmus had an encompassing knowledge of science, medicine, religion, and polity. At Manutius's sign of the dolphin and at several other publishing houses around Europe, Erasmus was employed to edit all manner of texts before they were printed, reviewing them predominantly for content but also for expression. As such, he can legitimately be considered the first technical editor.

In the eighteenth century, a major impact was produced not by technology but by a major introduction into the social system of science, the beginning of the scientific journal. The first of these is frequently identified as the *Journal des Sçavans*, although another contender for the title is the *Philosophical Transactions of the Royal Society*. These periodicals were established by the emerging scientific societies and institutes not so much to publish original research but to digest and comment on the now vast amount of letters and tracts put into circulation among the members of the scientific community. From the beginning of journal publishing in 1665, the number of such publications has increased exponentially almost unabated, doubling every 15 years. Technology and the underlying scientific research were provided an impetus during the eighteenth century by the introduction of the patent system. The resulting increase in inventive activity was reflected by the continued growth of the technical literature. The fairly regular and reliable delivery of mail through first private and then public postal systems also aided the distribution and utility of technical publications.

Early in the American adventure, the presidents Adams and Jefferson made science and technology a significant segment of government through the provision of standards for weights and measures, the mapping of the country, the surveying of its natural resources, and the advancement of agriculture. But the sponsorship of scientific research and technical development took a major step with the granting of the nation's first research contract in 1830 to the Franklin Institute of Philadelphia to study the causes of steamboat boilers' explosions. The amount of this first research contract let by the federal government was $1500. Since then, huge amounts have been spent on the sponsorship of research and development and the documentation and dissemination of the results of that effort. Indeed, contracting for R&D has become highly ingrained in federal agencies, and the U.S. government has become history's largest investor in science and technology and the world's largest producer of technical communication.

About 1830, with the number of scientific journals exceeding 500 worldwide, another genre was seen necessary to manage and delve into the literature, and several abstract journals started publication. They were later termed the secondary literature, to be followed by the tertiary literature, which consisted of indexes to the journal articles (the primary literature) based on subject, author, chemical formula, and a number of other indicators. The first systematic index was the *International Catalog of Scientific Literature*, started in 1901 by the Royal Society, although there was an early predecessor published by Reuss in Gottingen in 1801 entitled *Repertorium Commentationum Societatibus Literatiis Editarum Secundum Disciplinarum Ordinem Digessit*. In the nineteenth century, industrialization spurred on science and technology, not only by demanding advances for commercial and military purposes but also by providing new capabilities (such as steam-driven printing presses and trains) for producing and transporting printed publications.

Also at this time, a technology was being developed that would revolutionize technical communication a century later: the electrification of communication by such researcher/inventors as Helmholtz, Bell, and Edison.

The conduct of research, and therefore of the reporting of research, was standardized by the adoption of the scientific method, which basically requires the researcher to

1. State the problem
2. Form a possible explanation or hypothesis
3. Observe, experiment, and record data
4. Interpret the data
5. Draw conclusions

During the late nineteenth century and early twentieth century, a standard outline was adopted for reporting research:

1. State the problem
2. Describe the method
3. Display the results
4. Draw the conclusions

This outline reflects the process of the scientific method. That method did not suddenly appear full-blown in the scientific community. Rather, it was based on the logic of Aristotle, established in the empiricism of Francis Bacon, formalized by a coterie of philosophers in the mid-nineteenth century, and overtly stated by John Dewey in his book *How We Think* in 1910.

In the first half of the twentieth century, war was the most important driver of scientific and technological advance. The U.S. Army Medical Corps battled malaria in the jungles of Panama, the Chemical Corps pushed chemical advances in explosives and poisonous gases (and defenses against them), the Manhattan District of the Corps of Engineers literally made quantum leaps in the understanding of physics, and the Air Corps pioneered aviation design. Progress in other developed and some developing countries was spurred on in a similar manner. The British inventing radar and the Germans developing rocketry are among a large number of possible examples. Sad to say, but many of the benefits of science that we enjoy today (e.g., air travel, antibiotics, high-performance materials, computers, and telecommunications) would be in a primitive state of development, if extant at all, if it were not for the exigencies of war.

The practice of technical communication is among the beneficiaries of belligerence. Technical writing became recognized as a job title, if not a profession, during World War II as the technology and logistics of battle became complicated and required standardized procedures, definitions, descriptions, instructions, and training. World War II also fundamentally changed the nature of universities and their relationship with government, particularly the military sector. In the United States, universities, as the major repositories of scientific knowledge, were called upon to direct large portions of the war effort, especially in the attempt to develop the atomic bomb. The University of Chicago managed facilities in Chicago and Oak Ridge; Columbia University conducted research in New York; and the University of California oversaw operations at Los Alamos, Berkeley, and Livermore.

After the war, military (now termed "defense") support for science and technology continued to be strong and undergirded new connections and interdependencies among the government, industries, and universities. This phenomenon occurred in most of the "victorious" countries; the "conquered" powers turned their attention largely to rebuilding their shattered economies and displaced populations. In the United States, a fear of the eastern-bloc countries fueled a military expansion, both in the territory protected and in the weaponry deployed. To ensure that the burgeoning government procurements got what was needed, specifications and standards for purchased goods and services were written, mostly by the military, and several new types of writers appeared in the marketplace, notably proposal writers and writers that could "write to mil specs."

At about the same time, a postwar boom ensued in many economies. It promoted new classes of consumer goods and significantly raised the standard of living in the developed countries, victors and victims alike. The effect was much more pronounced in the market-economy countries than the planned-economy countries. This postwar boom was evidenced in the United States not only by the government underwriting of infrastructures [e.g., the interstate highway system, libraries, hospitals, defense early warning systems, ICBMs, schools and universities (through scholarships, building monies, and research funds), mass-transit systems, and air-traffic control systems] but also by a robust private sector providing goods and services to the consuming public.

Many of those goods were electronic and were based on the 1947 discovery by William Shockley, John Bardeen, and Walter Brattain of the transfer-resistance device, which has come to be called the transistor. Today, almost no aspect of life in the United States is unaffected by transistors, and their manufacture and use fuels the economies of many developing nations whose labor forces manufacture electronic goods. The most ubiquitous application of the transistor and its companion advance, the printed circuit, has been the computer.

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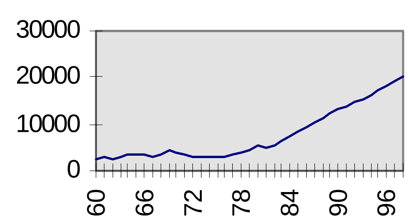
Along with those goods, both commercial- and consumer-oriented, came the need for documentation on their use, installation, maintenance., and integration. This need opened up several new genres of technical communication: user manuals, quick reference guides, hardware installation manuals, and cheat sheets, to name a few. It also created jobs for the creators of those publications. Recently, the Bureau of Labor Statistics, tabulated the current number of writers and editors (including technical writers) employed and calculated a projected number for 2005:

Year	Thousands Employed	Increase
1994	272	
2005	332	22%

Membership statistics for the Society for Technical Communication are another indicator of the growth of career opportunities in this field (see Fig. 1).

More important for technical communicators, however, has been the effect on work practices that the electronic revolution has had. Successively more powerful computers and more sophisticated software have increased the possibilities in the production of technical communications. Computers lent a correctibility to text, word-processing packages allowed facile manipulation of text, graphics packages prepared and altered illustrations, page-layout software produced camera-ready copy, laser printers provided variations in typefonts and clean printed text and graphics, and scanners presented an alternative means of entering text or graphics into electronic representation. Now

Fig. 1. STC Membership by Year



the trade is making the transition from paper-based publications to electronic presentations through CD-ROMs, the World Wide Web, networks of computers, and magnetic media. In addition, software capabilities are increasing and becoming more comprehensive; what used to be word-processing packages now perform at least some page layout, and layout packages are incorporating more word-processing functions. On top of that, the software is becoming easier to use, allowing nonprofessionals to use if not master them. As a result, some specialized jobs are being eliminated. Government statistics on projected civilian employment are sobering; among the fastest-declining job categories between 1994 and 2005 are (the percentages represent the decline in employment during the ten-year period):

Paste-up workers	−25.7%
Typists and word processors	−30.0%
Lithography-machine operators	−30.5%
Large-computer operators	−35.3%
Typesetting and composing-machine operators	−70.2%
Letterpress operators	−70.5%

The changes in technology have placed increased demands on the skill levels of technical communicators. They have not made obsolete the core competencies of writers, editors, and illustrators, but they have required new knowledge and capabilities as new job categories have been created, such as desktop publisher, electronic graphic artist, and webmaster.

The profession of technical communication has changed radically since its beginning, and there is no reason to think that it will remain unchanged in the future. On the contrary, the historical record would indicate that the rate of change will increase even faster.

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