Technological standards are everywhere, they span international borders and permeate our living spaces, but we know shockingly little about where they come from and how they came to be. They are certainly “technical” even if one can make no certain appeal to the laws of nature to set the cycles and voltage of alternating current electricity, the form and gauge of railroad tracks, or the shape of electrical sockets. The recent battle for standards for high-definition television (HDTV) featured corporate titans in Japan, Europe, and the U.S. jostling for commercial advantage. Standards may also reveal key characteristics of technological change, as innovation theorists such as Brian Arthur and Paul David have observed in the QWERTY standard for keyboards, itself a historical fluke of late-nineteenth century typewriter design that is now “locked in” and practically immutable.

Theorists and citizens will be most interested in Coordinating Technology, written by two German social scientists, for its carefully researched account of international standardization in three telecommunications technologies, interactive videotex, facsimile, and computer email. Social scientists may find valuable the authors’ attempt to link their findings to social theory.

This book is focused on the CCITT, the Comité Consultatif International Télégraphique et Téléphonique, a leading international standards-setting body from the 1950s to the 1990s. The authors are chiefly interested in international standards-setting by committee. They explain that standards-setting by markets or governments works when there is a single producer, a single market, or a single country large enough to pull others along. A dominant producer like IBM in computing can often make its proprietary standards into national or international ones (not always: witness IBM’s failed OS/2). Governments, too, sometimes acting at the behest of a national champion, can legislate a certain technological standard. But these three cases are more complex. In each, the collective benefit of standards in a “network technology” (increased certainty, economies of scale, lowered transaction and legal costs) were clear, especially in an era of increasing globalization, yet no single firm or single country could set durable international standards. Enter the CCITT -- an arm of the UN-sanctioned International Telecommunications Union -- with its quadrennial plenary meetings, on-going formal study groups, scores of working committees, legions of sub-committees, and informal coffee breaks. Again and again, the authors point out that the institutional dynamics of the CCITT, with its decided preference for consensus and technical argument, shaped the standards-setting process.

In interactive videotex, standards-setting failed. The CCITT aspires to articulate one international standard, or compatible standards that can be linked through gateway technologies. With interactive videotex the difference between North America’s 525-line TVs and Europe’s 625-line ones was only the beginning. In the 1970s there were also great expectations in England that its national videotex system would set the international standard. (Germany, Canada, Japan, and the U.S. soon jumped into the fray with their own expectations and systems.) But the British system was incapable of displaying the accent marks needed in many European languages. Especially French. Curiously enough, it was
France where videotex turned out to be most widely adopted, in large measure to the French government’s giving away Minitel terminals as part of its rapid modernization of the national telephone system. What emerged from the CCITT was an umbrella “standard” with three incompatible “options.”

Facsimile did not face the inflated promises that buried videotex, nor was it a system that needed to harmonize incompatible technical elements. The standards-setting process for the successive generations --- group 1, group 2, and group 3 facsimile -- went smoothly in large measure because decision making could proceed in parallel on each of the critical characteristics. Transmission speed, scanning density, and compression routines (among others) obviously had systemic consequences. Yet higher scanning speeds could be compatible with slower transmission rates, albeit with lengthier phone calls. With the rise of “handshaking” (those starting seconds where fax machines scream at one another incomprehensibly, at a leisurely 300 baud), manufacturers could add new features to their own line of machines and yet keep them compatible with the installed universe of fax machines. (That 300 baud handshaking must shed light on how ancient modems can still download World Wide Web files.) Fax machines, whose sales boomed in the 1980s, are thus a triumph of international incrementalism. Indeed, the revolution of digital “group 4” facsimile, using OSI, is largely stillborn.

The X.400 protocol for electronic mail is an example of successful standards-setting, the authors maintain. The X.400 effort within CCITT during the 1980s built on pre-existing standards for data transmission (X.25 set up packet switching, OSI set up networks), and setting standards was a smooth, orderly and successful process. There was only the problem of the Internet, shaped by the ARPANET community in league with the U.S. Defense Department. Its own wide-spreading standards for message handling (SMTP) and networks (TCP/IP) were largely ignored by CCITT’s orderly committee process. [[ADD: Readers wishing further information may consult John Rhoton’s X.400 and SMTP: Battle of the E-Mail Protocols (Digital Press 1997)]] Anyone seeking to understand global communication technologies, and the maze of international standards they depend on, must not ignore this book.

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