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7 *Gender, Technology, and the History of Technical Communication*

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Relying on the groundbreaking work of historians of technology Ruth Schwartz Cowan, Autumn Stanley, and Judy Wajcman, Durack highlights the reasons that women have been "largely absent from our recorded disciplinary past" (p. 99 in this volume). Pointing toward cultural biases that have not valued the household, and by extension, women's tools, she points out the "cultural blinders" that have made it difficult to see women's contributions in the past. More important, she points out that, with the gradual disappearance of the "workplace," it is quite possible that the home and workshop, what Zuboff calls "principal centers of production as late as 1850" (p. 106), will again become such centers of production in the near future. Equally important is an recognition of the problems attached to definition and her willingness to offer an attempt at a flexible definition that both accommodates the past and takes future changes into consideration.

Women are largely absent from our recorded disciplinary past, whether as technical writers, as scientists, or as inventors or users of technology. There are a few notable exceptions from a handful of scholars: Elizabeth Tebeaux's work on Renaissance technical writing (see "Technical Writing" and sections of "Visual Language"), Tebeaux and Mary Lay's "Images of Women in Technical Books from the English Renaissance," Kathryn Neeley's "Women as Mediatrix: Women as Writers on Science and Technology in the Eighteenth and Nineteenth Centuries," a chapter on sewing machines in R. John Brockmann's *From Millwrights to Shipwrights*, and my own article on document design innovations in home sewing patterns ("Patterns for Success").

There are several possible explanations for the absence of women in the history of technical communication. One possibility is that women have contributed only very rarely to technical and scientific work (and, consequently, to technical and scientific communication). Indeed, Elizabeth Wayland Barber suggests that women's contributions to technological innovation have been hampered by their own productive (and reproductive) responsibilities: "The

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only people who have the leisure to experiment with how to make new articles, or how to use new tools, are those *not* locked into basic subsistence production—people with time and/or cash to spare" (258). Because there are almost no cultures in which men bear the primary responsibility for child care, this task typically has fallen to women and influenced the variety and type of work they do (Brown 1075). We might agree then, that as scientific inquiry and technological innovation have been primarily the work of men, the contributions of women have consequently been subsumed, lost, or overlooked.

Yet another possible reason why the history of technical communication is so barren of women is that (as feminist scholars have noted about histories of technology) "the absence of a female perspective . . . was a function of the historians who wrote them and not of historical reality" (Cowan, "From Virginia Dare" 248). In our case, the omission arises not from the absence of women historians (after all, nearly one third of the articles named by Rivers in his 1994 bibliographic essay were authored by women), but instead can be attributed to the "peculiar set of cultural blinders" (Cowan, *More* 9) that make it difficult for us to see many of the ways in which women may have contributed to technical communication.

A "Peculiar Set of Cultural Blinders"

How we define our profession quite obviously influences where we look to find our past: definition, by function, tells us what is and what is not technical writing. While it is true that we have yet to agree upon what constitutes modern technical writing, popular definitions often exhibit either or both of two key characteristics: first, a close relationship (in subject matter or function) to *technology*; and second, an understanding that technical writing is associated with *work* and the *workplace*. An example of the former is David Dobrin's definition of technical writing as "writing that accommodates technology to the user" ("What's Technical" 242); an example of the latter is the premise proposed by Tebeaux and M. Jimmie Killingsworth to guide historical research, that "technical writing exists to help its readers to achieve work-related goals—to perform work; to solve problems in a work context" (7). It follows then, that "what counts" as technical writing is derived from what is considered *technology*, what we consider *work*, and where we understand the *workplace* to be.

The problem with regard to adding women to our disciplinary history lies in the assumption that *technology*, *work*, and *workplace* are gender-neutral terms, and that addressing gender and the history of technical communication is a simple matter of searching the annals of science and industry and tacking on articles about a few women who have distinguished themselves in scientific, medical, and technical fields. But as the work of feminist historians and scholars demonstrate, such terms represent contested ground, and such a simplistic view may be inadequate to fully address the elusive—and, as I suspect, frequently unintentional—biases that both define our past and govern our future.

History and Women's Work

Women's work has long escaped the notice of historians, leading feminist critics to assert that *his-story* itself is "deeply gendered" and "presented as a universal human story exemplified by the lives of men" (Scott 18; see Barber, Cowan, and Stanley as well). Most histories, including the history of technical communication thus far, focus primarily on the works of *great men*—Aristotle, Leonardo da Vinci, Galileo, Albert Einstein—and the *great works* of men—space travel, nuclear power, medical miracles, and the computer revolution. With the former, the focus is on *agency*—having identified persons who have contributed significantly to technical, scientific, or medical fields, we then seek samples of their writing to study. In contrast, the latter focuses on *products*—having identified artifacts of significant scientific, technical, or medical value, we seek to study ancillary texts associated with those artifacts and then the authors (when they can be identified). In both cases, there is a need to establish *significance*, which usually involves prerequisite location within the public sphere (allocated to men) rather than the private sphere (the realm of women). As Joan Wallach Scott (*Gender*) and Autumn Stanley (*Mothers* and "Women") each point out, history in general, and the history of technology in particular have tended to omit the activities of women in part by locating significance primarily in public and political activities and innovations, the very "realm[s] of social, political, and economic interaction" of such great interest today to researchers in technical communication (Cooper x). (See Kerber for an insightful discussion of the rhetoric of "separate spheres.")

Including women and women's work in a history of technical writing requires that we contest two assumptions that lead to their exclusion from our disciplinary story: First, (the assumption of agency) that women are not significant originators of technical, scientific, or medical achievement; and second, (the assumption of technological significance) that women's tools are not sufficiently technical, nor their work sufficiently important, to warrant study of their supporting texts.

Women as Significant Contributors to Science and Technology

Overcoming the assumption of agency first involves identifying women who have contributed significantly to science, technology, and medicine, then fitting their written works into our history: "gather[ing] evidence about women to demonstrate their essential likeness as historical subjects to men . . . [and] attempt[ing] to fit a new subject—women—into received historical categories" (Scott 18–19). The main difficulty facing the historian is the apparent lack of women's contribution to these fields. From the dawn of humanity, women, like men, have undoubtedly sought means for improving their work processes, yet we rarely conceive of women as technological innovators. Why is this the case?

In her search for women's technological achievements, Stanley determined that many women's inventive accomplishments are obscured by having been

misclassified, trivialized, or attributed to men. Examples of these sometimes glaring obfuscations include:

- Harriet R. Strong's storage dam and reservoir system, which was "nearly built on the Colorado river during World War I [but in the patent record] is classified as a container for kitchen debris" (Stanley, *Mothers* xxx)
- Madeleine Vionnet's invention of the bias cut in dressmaking, which according to J.E. Gordon, "exploits the low shear modulus and high Poisson's ratio of certain square-weave fabrics in the 45-degree direction" (qtd. in Stanley, *Mothers* xxxii)
- The persistent debates over women's contributions to key inventions of the U.S. Industrial Revolution (Catherine Greene and the cotton gin, Elizabeth Howe and the sewing machine), plus documented instances where partial or total credit is given to men for women's inventions (such as the "Maltron" keyboard conceived by Lillian Malt, but known in England as "Stephen Hobday's keyboard") (Stanley, *Mothers* xxix)

Stanley contends that women's technological achievements have been routinely under-reported, at least in part, because "our sex-role stereotypes seek to confine that [feminine] creativity to such 'acceptable' areas as art, music, dance, writing, and cooking, whereas 'real' invention and technology have to do with weapons and machines and chemical compounds created in laboratories" (*Mothers* xx). Even when well-known women patent such "real" inventions of significance, they may not receive credit: screen actress Hedy Lamarr invented a secret communications system during World War II (and patented it, with composer George Antheil) yet "has never received either recompense . . . or due recognition," even though one of its key features—frequency hopping—"is the main anti-jamming technology used in today's billion-dollar defense systems" (Stanley, *Mothers* 383). Lamarr is far from the only woman to demonstrate that beauty and brains are not antithetical, but despite the fact that women have been receiving U.S. patents since 1809, as late as the 1970s librarians "did not even use *Women inventors* as a category for filing information" (Stanley, *Mothers* xviii).

Women's general absence from the patent record (and consequently, from histories of technology) is attributed by Stanley (*Mothers* xxviii–xxix) to several factors:

- Patents require disposable income and time, both resources of which women historically have had less than men
- Married women in the United States and Britain could not own their inventions or patents until after the Married Women's Property Acts passed (first in New York in 1848 and 1860; in Britain in 1870 and 1882)
- The technical and mathematical training necessary to build models of inventions and patent them was not available to women because of gender-segregated education
- Cultural stereotypes discourage women from claiming credit for their achievements
- These same stereotypes also encourage women to be generous and giving, resulting in sharing ideas rather protecting and profiting from them.

Judy Wajcman, like Stanley, observes that "we tend to think about technology in terms of industrial machinery and cars . . . ignoring other technologies that affect most aspects of everyday life" (137). Ruth Schwartz Cowan notes in *More Work for Mother*, her history of household technology, that we "do not ordinarily associate 'tools' with 'women's work'—but household tools there nonetheless are and always have been" (9). Stoves and spinning wheels are two such examples; the sewing machine is one such tool used in the household and in industry.

Furthermore, technologies that pertain specifically to women's biological functions and social roles have been essentially ignored by historians of technology. "The indices to the standard histories of technology . . . do not contain a single reference . . . to such a significant cultural artifact as the baby bottle," a technology that Cowan asserts has "revolutionized a basic biological process, transformed a fundamental human experience for vast numbers of infants and mothers, and been one of the more controversial exports of Western technology to underdeveloped countries" ("From Virginia Dare" 248). Such omission by categorization presents obvious problems for the researcher, who would find few women's technologies (such as horticulture, cooking, and childcare) in the standard indices of technology.

Women as Significant Users of Technology

With the first notion dispelled, that women do not contribute significantly to science and technology, we turn to the second assumption, that men's and women's experiences of technology are identical, thus relegating women to inferior technological roles. Addressing this second assumption—that women's traditional work is not technological—involves a different strategy: departing from conventional history to challenge existing definition, seeking "a new narrative" that focuses "on the causal role played by women in their history and on the qualities of women's experience that sharply distinguish it from men's experience (Scott 20). Men's and women's experiences of technology are quite different.

The industrial revolution brought with it not only great technological innovation, but increasing differentiation between appropriate work roles for men and for women (see Kerber; Oakley). "One of the most profound effects of industrialization was, and is, the separation of 'work places' from 'home places'—and the attendant designation of the former as the 'place' for men and the latter as the 'domain' of women," asserts Cowan (*More* 18). During the rise of industrial society and capitalism, "the modern concept of work, as the expenditure of energy for financial gain" (Oakley 4) came to further distinguish the stereotyped expectations of productive activity done by men and women.

In fact, Cynthia Cockburn points out that "Technological knowledge at the professional level, and technological know-how at the practical level, are sharp differentiators of men and women" (17–18). In her study of the sexual division of labor and technologies of production, Cockburn found that "a sexual

division of labor in and around technology persists and survives" despite inroads women have made into many professions (8). "The consistent theme unfolding here is this: women are to be found in great numbers operating machinery . . . [b]ut women continue to be rarities in those occupations that involve knowing what goes on inside the machine" (Cockburn 11). As Cockburn puts it, "[w]omen may push the buttons but they may not meddle with the works" (12). The popular image of Rosie the Riveter and the fact of women's successes in all facets of industry during World War II testifies to women's technological competence; their immediate dismissal at the conclusion of the war punctuates the persistence of the view that a woman's place is in the home.

Both Cockburn and Wajcman observe technological competence is involved in establishing masculine and feminine difference. According to Wajcman, "skilled status has . . . been traditionally identified with masculinity and as work that women don't do, while women's skills have been defined as non-technical and undervalued" (38). She illustrates her point with the example of sewing: "It is not possible for anybody to sit down at sewing machine and sew a garment without previous experience. . . . Although this is one area where women are at ease with machines, this is seen as women's supposed natural aptitude for sewing and thus this technical skill is devalued and underpaid" (49). Women are accepted as users of machines, particularly those that are used for housework, but such knowledge is not considered as competence with *technology*.

Despite some changes in recent years, jobs remain sex-typed and the outcomes of technological activities—the production of goods and services—are typically associated with economic gain and the "workplace" rather than the household, where work is often unrecognized and generally unpaid or underpaid. Historical studies find women are excluded from *technology* as a consequence of the gender division of labor (see Rothschild, Cockburn, and Wajcman). Men remain predominantly the makers, repairers, designers, and users of what we typically consider technology. Wajcman observes that "technical competence is central to the dominant cultural ideal of masculinity and its absence a key feature of stereotyped femininity" (159) and that "the work of women is often deemed inferior simply because it is women who do it" (37). Hence the remarks of anthropologist George Murdock:

> The statistics reveal no technological activities which are strictly feminine. One can, of course, name activities that are strictly feminine, e.g., nursing and infant care, but they fall outside the range of technological pursuits. (qtd. in Stanley, "Women" 5)

Feminist critics of technology contend that women are excluded from that which we consider technological by definition: As Stanley puts it, technology is "what men do" rather than "what people do" ("Women" 5). The basis of this assertion lies in cultural views that:

- Deny women's identities as inventors and women's work aids as "tools"
- Deny women access to knowledge necessary for inventing and protecting tools and ideas

- Diminish the significance of women's technological skills in areas they are expected to have expertise
- Define women's unpaid labor as "not work"
- Define traditional women's work as not "technological"

The periodic submittal (and rejection) of texts such as cookbooks to the Society for Technical Communication's annual publications competition demonstrates the difficulty we have with considering as "work" a productive activity that is typically assigned to women and accomplished within individual households without benefit of financial compensation (see McKay for her response to the "Cookbook Caper"). John Harris' comments reveal the same subtle distinctions based on place and type of activity. Harris attributes his own success with teaching and practicing technical writing to his interest in mechanical devices of all sorts, including his mother's treadle sewing machine and the process of making root beer at home out of Hires Extract, sugar, and Fleischman's yeast. Yet, what Harris found remarkable about making root beer was not the productive activity itself, but rather the fact that it took place at home: "I suppose what impressed me was that we were doing at home what I would have considered industrial production," he comments (241). He reveals most explicitly a view of technology that excludes women near the end of the article as he laments the reduced stature of today's inventors:

> A few bodies of diehard inventors and tinkerers hang on. . . . We see them at the annual hot rod speed trials at Bonneville Salt Flats and at some power boat races and at bench-rest shooting matches and so on. (245)

Such gendered scenarios as hot rod speed trials and boat races encourage readers to conceive of significant inventions as the product—and playthings—of men and discount the many instances where (for example) kitchens double as chemistry labs for female entrepreneurs such as Bette Graham (who experimented with her formula for Liquid Paper® in her kitchen before enlisting the aid of a chemist to standardize the formula) (Stanley xviii).

The Household as a Setting of Consequence

Perhaps the greatest force working against the inclusion of women in the history of technical writing is the current focus on workplace writing. Defining technical writing as a type of writing geographically situated in the workplace fails to recognize the household as either a workplace or a "setting of consequence" at all (Cooper x, suggested by Ackerman and Oates). Certainly writers in organizations are more easily studied than writers within individual households: the researcher can identify more or less unified groups of individuals who face similar types of tasks to be accomplished through texts. Such practices (and groups) can also be identified (and therefore compared) among different organizations: most companies develop and publish policies and procedures, most write letters and send memos, many develop contracts,

publish reports, and quite a few write software documentation for their own use or the use of their customers. Such comparisons are more difficult to make among individual households for various reasons, but ease of access for study should not be a reason to exclude from significance technical writing in and from the private sphere.

I believe there are significant instances of technical writing and the use of technical documentation that occur within the household. Many of the technologies produced by industry are targeted for home use; the associated documentation is used primarily within the household (by women *and* by men). Examples include instructions for computer hardware and software, but also those for vacuum cleaners, lawn mowers, blenders, and even coffee mills (note that Dobrin finds instructions for the coffee mill worthy of analysis; see "Do Not Grind"). Further examples of other types of technical communication that enter and are "consumed" within the household include credit card agreements, billing statements, and tax and insurance forms and documents. Daily life is not devoid of instances in which individuals might produce artifacts we would find worthy of study if they had originated within the "workplace": there are any number of situations in which private individuals must interact by text with organizations. Surely correspondence challenging billing errors or notifying insurance carriers of changes to personal information are as "significant" as intercompany correspondence and job postings.

An irony of our focus on workplace writing is that it comes at a time when the "workplace" itself is disappearing. To define technical writing by placing it strictly within the workplace denies the historical contributions of women, but in doing so it also denies a larger past—and future—where the household is a primary location for the economically productive activities of women and men. According to Shoshana Zuboff, "home and workshop continued to be the principal centers of production as late as 1850" (227); with the increase in computer technologies, the prevalence of two-income households, and the rise of an information economy, the separation of home space and work space blurs, and as Joan Greenbaum asserts, "the office of the future may be the home" (117). Many people (myself included) spend many of their productive hours working in a *home office*, connected to clients and coworkers by computer networks, fax, and phone. Barber welcomes these changes, and the increased flexibility they offer child-rearing members of our society: "We are looking forward into a new age, when women [and men?] who so desire can rear their children quietly at home while they pursue a career on their child-safe, relatively interruptible-and-resumable home computers, linked to the world not by muleback or the steam locomotive, or even a car, but by the telephone and the modem" (33).

Toward Inclusive Definitions

If we are to include the accomplishments of women in the history of technical communication, I believe we must challenge the dualisitic thinking that severs public and private, household and industry, and masculine and feminine labor. I do not know if it is possible to construct a single definition

for *technical communication* that can flexibly accommodate past and future changes in the meaning and significance of *work*, *workplace*, and *technology*, but toward this end I offer the following observations.

- **Technical writing exists within government and industry, as well as in the intersection between private and public spheres.** Technical writing exists to accomplish something: as Cooper points out, it is a form of social action (x). This action can originate in a variety of settings and for many purposes; such action may occur as part of one's work for hire or arise from personal interaction with organizations. Although many forms of technical writing exist and are employed strictly within and among organizations, there are also significant instances of its use within and origination from individual households in their interactions with government and industry.
- **Technical writing has a close relationship to technology.** *Technical* writing *per se*, must have some logical relationship to *technology*. We have tended to employ a very narrow view of *technology*, and to conflate the term with *computer technology*. But as Wajcman points out, technology is more than just the latest computer hardware or software on the market. Technology refers equally to *knowledge*, *actions*, and *tools*: it is (for example) a network of constructed waterways, the knowledge of when and how to irrigate fields, and the entire set of human actions that comprise this method for farming. *Inventions*, as Stanley argues, therefore include innovations such as the prepaid health care plan (Jeanne Mance), social services in hospitals (Dr. Marie Zakrzewska), and flextime (Christel Kammerer) (*Mothers* xxxiii).
- **Technical writing often seeks to make tacit knowledge explicit.** When its purpose is to instruct persons in a new technology (whether using a tool or performing a process), technical writing seeks to make tacit knowledge explicit, bridging by way of text and graphics gaps in different ways of learning. Zuboff, Dorothy Winsor, and Wajcman all emphasize that knowledge is not just cognitive, but often tactile and visual as well, relying on cues from context on when to act and what to do. Such "action-centered skills" (to use Zuboff's term) are a hallmark of oral culture and transmission of knowledge. Both Renaissance patterns for laces (Tebeaux, "Technical Writing") and early instructions for home dressmaking (Durack) include scanty explanation and rely on the user to provide most of the relevant information necessary to complete the work. Transition to literate cultures, along with the rationalization of work processes, involves analysis of action-centered skills and their codification and standardization. This results in an increase in the need for a text to provide contextual cues and information for the user, hence increases in the level of detail in text and graphics as shown in the evolution of home sewing pattern design (Durack).

As Allen has pointed out, a hazard of definition is that we may "succumb to a simplistic or exclusionary [definition] that separate[s] us from one another" (76). The cultural link between science, technology, and masculinity combined with a bias that fails to find significance in productive activities that occur within the household and lack associated cash value has, I believe, resulted in an interpretation of "technical writing" that works to exclude the significant contributions of women. Articles, such as those in this issue, test our disciplinary boundaries—and blinders—to argue for the relevance and

significance of texts that might otherwise be omitted from our history. As we construct this history, a major challenge will be to examine why we deem certain artifacts *technology*, their attendant activities *work*, their place of conduct *the workplace*, and therefore find reason to include associated writings within the corpus *history of technical writing*.

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