

# Technology

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Gendered questions about technology depend on that word's definition. "Technology" often signifies machinery, images of race cars, robots, or military weapons that play to a macho love of power and speed. But once we broaden the concept of technology to include baby bottles, contraceptive devices, sewing patterns, and cell phones, gender connotations change. Furthermore, historians define technology not just as hardware but, equally important, as knowledge about making or doing things. This understanding opens discussion about technology to include skills such as cooking, weaving, and nursing (Lerman, Oldenziel, and Mohun 2003).

Technological assumptions often follow a dichotomy that men build machines while women use them, gendering engineering (active) as male and consumerism (passive) as female. But in reality, women maintain complex relationships to technology, not just as consumers but also as inventors, producers, and workers (Horowitz and Mohun 1998).

Technology itself carries gendered meanings, both deliberate and unintended (Wosk 2001). If asked to assign gender to inanimate objects, most Americans will color a typewriter pink and a jet engine blue. But the relationship is not static; women have actively chosen to accept, reject, or reshape technologies to fit their needs and desires.

## Automobiles

"Women's technology" is seen as less valuable, as illustrated in the early 1900s, when buyers could choose between electric, steam, and gasoline-powered automobiles. Experts presumed women were too high-strung to handle noisy, dirty gasoline cars and too weak to manage the difficult, exhausting ignition cranking. Manufacturers of electric cars marketed their easy push-button start as naturally suited to female drivers. Heavy batteries limited electrics' range to 50 miles, but women who roamed too far were controversial anyway; when

Theodore Roosevelt's daughter's long solo drives drew criticism, the president allegedly commented that he could run the country or control Alice, not both. Even Henry Ford bought an electric car for his wife to make calls around town. But once quiet, clean, electric cars became associated with female drivers, men scorned them for sportier gasoline models (Scharff 1991).

While assuming men to be natural drivers, skeptics disparaged women as easily distracted, nervous, and unable to react rapidly in emergencies. Early racer Joan Cuneo suggested that cautiousness and responsibility actually made women better drivers. But when a female driver had an accident, critics held her mistakes against her entire sex.

Ironically, female drivers' presumed inferiority opened one opportunity. To convince potential customers that automobiles weren't just fads, promoters staged long-distance trips to demonstrate their machines' practicality. In 1909, manufacturers sponsored Alice Ramsey's cross-country 41-day drive across primitive roads. The publicity stunt signaled to men, "What are you worried about? Even a woman can handle this!"

Despite criticism, hundreds of women soon adopted automobiles. Suffragists made driving tours to promote women's voting rights; cars drew attention, covered ground rapidly, and made an important statement. In breaking from old notions of ideal womanhood, the suffragists' comfort with technology fostered an alternate vision of gender roles, the independent "New Woman." During World War I, dozens of British, French, and American women (including Gertrude Stein and Alice B. Toklas) volunteered to transport wounded soldiers, bring supplies to battlefield hospitals, and evacuate refugees. Ambulance driving took women into areas under fire and across destroyed roads where women had to repair breakdowns themselves.

## Aviation

In aviation, many flying instructors initially refused to teach women, calling them emotionally unreliable and incapable of mastering mechanical details. America's first licensed female pilot, Harriet Quimby, flew the English Channel in 1912, and subsequently, female pilots beat male competitors in high-profile air races. The 1929 Women's Air Derby required female aviators to carry male navigators, outraging Amelia Earhart. Earhart promoted her flying records (including the first Atlantic Ocean solo since Charles Lindbergh) as proving women's ability to succeed in all areas of life. In the 1930s, at least 700 women held American pilot's licenses, but "ladybirds" and "sweethearts of the air" were expected to look pretty even following exhausting flights. Photographs of Earhart in both flying helmet and pearl necklace underlined expectations of femininity.



*Elizabeth L. Gardner, a WASP (Women's Airforce Service Pilot), of Rockford, Illinois, prepares for takeoff. The WASPs flew noncombat missions during World War II. (National Archives)*

Airplane manufacturers hired female pilots as public representatives, as their demonstrations made aviation look glamorous and easy enough for a woman. But airlines refused to hire women as commercial pilots, figuring that 1920s passengers already felt nervous about flying without the additional worry of having a female pilot. In 1934, Helen Richey beat seven men in tests for air mail employment, but male pilots forced her to resign by pressuring the Commerce Department into forbidding Richey from flying in bad weather (and possibly grounding her during menstruation). While airlines excluded female pilots until the 1970s, they welcomed all-American girls as stewardesses to pamper passengers.

Just as World War I made female drivers valuable, so the manpower shortage of World War II temporarily opened flying opportunity to women. Women's Airforce Service Pilots (WASPs) delivered military planes, tested planes after repairs, and towed gunnery targets for artillery crew training (with live ammunition). But the government refused to grant WASPs official status, and the program was canceled once the military found male pilots to replace the women. Russia's female pilots actually flew in combat, conducting night bombing raids on German positions and airlifting supplies to stranded troops.

WASP performance indicated that women had high endurance for isolation, pain, and temperature extremes, supporting the National Aeronautics and Space Administration's (NASA) 1960 move to consider female pilots as astronauts. Despite women's excellence in physical and psychological testing, the program was abruptly canceled after critics (including John Glenn) warned

that the sideshow of training female astronauts might cost the United States the space race. Women didn't fit the "right stuff" test-pilot model, and the government feared the political ramifications if female astronauts got killed. NASA did not name female astronauts until 1978, under pressure to offer equal opportunity to women.

## **Bicycles**

While female aviators offered curiosity value, women's more common relationship to technology, as consumers, also threatened to disrupt "separate spheres" ideology. Although women (and many men) hesitated to tackle tricky high-wheeled bicycles, the safety bicycle developed in the 1890s appealed particularly to women. Appearance presented issues; for practicality, many female riders adopted divided skirts or knickers. Pointed humor caricatured female bicyclists as either revoltingly muscular or helplessly fragile. Experts encouraged female riders to acquire technical competence, learning to maintain and fix their own machines. Medical experts warned about physical consequences of overexertion, while moralists worried about women cycling alone or worse, with men. Jokes about women riding off, leaving husbands with chores and child care, masked real concerns about women abandoning demure domesticity.

## **Consumers and Home Economics**

Even as women were bicycling, entering college, and agitating to vote, early 20th-century experts hoped new technologies could reinforce traditional roles. The discipline of home economics aimed to lure women back to their "natural" domestic role by teaching them to become more scientific, more efficient, and thus happier homemakers. High school and college home ec instructors, women's magazines, and extension workers emphasized the advantages of modern kitchen equipment, following corporations in promoting a vision where electrified homes meant big business.

Some industries reshaped technologies to court female consumers. Early 20th-century men and boys tinkered with homemade radios in garages, but when commercial broadcasting began in the 1920s, radio moved into living rooms. Manufacturers designed sets resembling elegant furniture, and networks created soap operas and cooking shows to attract female audiences. But other businesses overlooked or devalued the women's market. Early telephone systems promoted business communication and condemned wasteful female chatting before belatedly recognizing the financial potential of leisure calling.

Homemakers were not passive recipients of technology. To make women technically informed purchasers, home economists taught students to inspect appliances down to the seams. Defying helpless housewife stereotypes, classes studied the construction of refrigerators by literally taking them apart. Nor did women automatically obey messages about technology reinforcing traditional roles. Farm life experts praised rural electrification as enabling women to leave fieldwork to men and return to their "natural" domestic place. Yet farmwomen resisted this urban gender ideal and continued driving tractors and running milking machines, which felt more interesting and important than full-time homemaking.

Machine Age toys both reflected and reinforced traditional roles. Model airplanes were intended to inspire the next Orville Wright, while Erector Sets taught civil engineering. Girls' toys also scaled down new adult technology: their mothers' kitchen appliances. Given this indoctrination, 25 percent of American boys in the 1920s planned to become engineers versus 3 percent of girls.

### **Technologies in the Workforce**

Gendered assumptions also dictated how workplaces incorporated technology. Establishing his 1820s textile mills, Boston merchant Francis Cabot Lowell avoided Britain's horrors of child labor by recruiting New England farmers' daughters eager to earn money before marriage. While men repaired machines and supervised, women tended looms for long hours under exhausting, unhealthy conditions. Female employees lived in company-run boardinghouses under paternalistic rules aimed at protecting femininity and maintaining order. But women proved less than compliant; when factories cut wages, female workers walked out on strike and owners turned to children and immigrants for cheap labor.

Similarly, when boys initially hired as telephone operators proved rowdy and rude to callers, companies replaced them with girls socialized to be polite. The Bell System became America's largest employer of women; generations of "telephone girls" soothed frustrated customers and provided personalized convenience (including prearranged wake-up calls). While advertisements idealized this feminine "Voice with a Smile," the Bell System began installing automatic dialing in the 1930s, pushing operators into technological unemployment.

Workplace machinery itself, particularly office equipment, became gendered. Most 1870s clerical workers were male, and men were first to use the new typewriters. But soon observers portrayed women as naturally superior typists, with smaller hands and manual dexterity developed through sewing and

piano-playing. By 1930, women made up 95 percent of all typists, and adding machines also became associated with female operators. Critics warned that the rough, immoral business world might destroy femininity, and they complained about secretaries giggling, crying, and being incapacitated by monthly periods. But employers could hire women at half men's salaries, and secretaries presented a pleasant face in the office, offering bosses sympathetic (almost wifely) support.

Technology became devalued when assigned to women. Early 20th-century nurses assumed responsibility for using clinical thermometers and ensuring their accuracy. Though taught to recognize abnormal temperature variations, nurses were chided not to diagnose patients, which remained physicians' specialty. As thermometers became symbols of nurses' work, the prestige formerly attached to that instrument disappeared. Doctors reserved stethoscopes for themselves, convinced that their use required special perceptual skills and training beyond nurses' ability.

Stereotypes questioned women's ability to handle equipment bigger than typewriters, but wartime manpower shortages proved women able to operate nontraditional machines. World War I metal-working factories that hired women reported their productivity equaled or exceeded men's; one munitions plant found women 50 percent more productive than men working drill presses and milling machines. Unions feared female labor would lower male status and wages; men refused to work alongside women, calling this inappropriate, and regulations subsequently barred women from heavy labor. World War II, however, brought millions of women into shipyards and airplane manufacturing. Government praised "Rosie the Riveter" as essential to victory, and media images portrayed Rosie as strong (yet still feminine), willing to learn new skills, but always at a technical disadvantage.

## Engineering

Assumptions linking men with technical mastery long kept women out of engineering (Oldenziel 1999). Most pre-1900 engineers were trained in the military, the field, or the machine shop, routes closed to most women. Among the few exceptions, Lillian Gilbreth (1878–1972) conducted time-and-motion studies with her efficiency-expert husband while raising a huge family (immortalized in *Cheaper by the Dozen*). After Frank's early death, Lillian had trouble, as a woman, securing engineering consulting jobs. After remarketing herself as a household efficiency specialist, she won employment, numerous honorary degrees, and the nickname "the First Lady of Engineering."

But leading American technical schools, including Georgia Tech and Caltech, refused to enroll women until after World War II. Male students, faculty,

and alumni ridiculed the notion of female engineers, drawing cartoons of women getting their hair tangled in equipment or using machinery to crack nuts. Women who insisted on entering engineering were oddities; by definition, a female engineer was not a typical engineer and not a typical woman. This defiance of norms created social and sexual tensions, with cracks about women in engineering just looking for husbands. Administrators considered teaching women a waste of time, as they inevitably dropped careers to marry. Psychologists labeled female engineers abnormal, unhealthily competing with men and rejecting identification with their mothers. The Society of Women Engineers blamed such attitudes for scaring away girls and campaigned to show that female engineers were both professionally capable and wholesomely feminine. Yet many late 20th-century female engineers continued to encounter negative comments, sexual harassment, or job discrimination.

The default "engineer" remained male; female engineers complained about office visitors mistaking them for secretaries. Similarly, the image of "inventor" remained male. Although women historically held few patents (in part due to expensive, time-consuming legalities), women created countless innovations over the centuries, in both household devices and more unexpected directions. Women devised better butter churns and dishwashers, baby carriages, sewing machine accessories, surgical instruments, fire escapes, shoemaking and metalworking equipment, elevator improvements, railroad couplings, computer languages, even military technology (actress Hedy Lamarr helped develop a World War II anti-jamming torpedo system). California farmer Harriet Strong created a working model for water storage dams, but analysts later misclassified her patent as culinary equipment, undoubtedly reflecting assumptions about women's narrow interests (Stanley 1993).

The 21st century still equates high-tech with male despite the prevalence of computers and other technologies in women's workplaces and private life. Men are considered and position themselves as computer experts, ready to tinker, and as "early adopters" in love with the latest gadgets. "Geek" or "hacker culture" remains intensely male. Boys in computer classes boast about how easy they find programming; when they imply that computing comes naturally to men, less-confident girls may switch majors. Video game makers have drawn criticism for depicting highly eroticized women and passive damsels in distress. Research suggests that degrading female representations, along with extreme violence, discourage some women from gaming. Attempts to design games appealing to girls often also play to stereotypes, as with "Barbie Fashion Designer."

In many ways, critics suggest, the technological world remains less than female friendly. Car airbags initially were engineered to protect bodies of typical male height and weight, posing dangers to women, children, and smaller men. Yet women have proven ingenious in adapting technologies such as

the Internet to their own purposes, leaving much scope for discussion about gender and technology. (See *also* Computer Science; Early 20th Century)

### References and Further Reading

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