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Engendered by Technologies

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Although “technology” usually refers to the application of scientific knowledge, some writers also invoke the word to discuss the methods that powerful persons and institutions use to set ideologies in motion. Interpreted in both of these ways, the concept of a technology illuminates and brings together numerous practices that have kept women from achieving equality with men in the United States—particularly in the workplace—notwithstanding the force of comprehensive antidiscrimination laws. Associating maleness with science and its instruments is a veiled yet pointed weapon. It can make exclusion or subordination of women seem natural, even “progressive,” and therefore beyond the reach of legal remedies.

This Article coins the term “technocentric expansionism” to describe the deployment of science-related devices (which can be intellectual or pedagogical as well as mechanical) to slur, denigrate, exclude, or dislodge women at work or in their training for work. In detailing some of the exploits of technocentric expansionism, the Article refutes familiar interpretations of these harmful effects: that displacements of women are politically neutral; that women are by their nature either unfit to work with a new technology or unfit to work away from it; and that losses to women attributable to technocentric expansionism are simply a collateral harm. Having demonstrated that technocentric expansionism is a method—or a technology—of gender-segregation, the Article outlines a preliminary extrajudicial strategy for law and lawyers to work against it.
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INTRODUCTION

Picture this: it’s visual. A laboring mother lies supine in a delivery room, with instruments behind and around her. The time is the present. Machines have cast the figure before us as an object of inspection to be studied, plumbed, and mastered by an observer.

The laboring mother is on her back and her feet are in stirrups that hold her legs apart.\(^1\) Her posture, convenient for the application of other technologies—the speculum, episiotomies—prolongs labor and tends to increase the mother’s pain, without offsetting clinical benefit.\(^2\) It may have been invented by that eighteenth-century obstetrical innovator (and undistinguished monarch) Louis XVI, who used to enjoy crouching behind a curtain to watch his mistresses give birth; the King decreed his preference when he observed that other laboring positions got in the way of his purpose, to see the baby

\(^1\) See Robbie E. Davis-Floyd, *Ritual in the Hospital: Giving Birth the American Way*, SPECIAL DELIVERY, Mar. 22, 1995, at 2, 4 (“Despite years of effort on the part of childbirth activists, including many obstetricians, the majority of American women still give birth lying flat on their backs.”).

\(^2\) For summaries of medical findings that the lithotomy, or supine, position for childbirth is more dangerous and painful than alternatives such as sitting or squatting, see F.W. Kelley et al., *A Review of Alternative Birthing Positions*, 99 J. AM. OSTEOPATHIC ASSOC. 470, 473 (1999); Davis-Floyd, *supra* note 1, at 4. See also AMANDA C. BANKS, BIRTH CHAIRS, MIDWIVES, AND MEDICINE 111 (1999) (quoting the 1978 edition of THE TEXTBOOK OF OBSTETRICS AND GYNECOLOGY: “Use of the lithotomy position has two purposes: it makes maintenance of asepsis easier and it contributes greatly to the convenience of the obstetrician. These advantages more than compensate for the somewhat unphysiologic posture and the discomfort of the posture itself.”).
emerge. But that was then; this is now. Today's electronic fetal monitoring machinery (a technology that in routine use has failed tests for safety and efficacy; it nevertheless persists) lays the woman out naturally, inevitably, at the receiving end of an authoritative gaze.

Months before delivery, ultrasound technology will have declared repeatedly throughout a pregnancy that both the fetus and the pregnant woman are entities to be seen. Pregnant women in the United States typically undergo these sonograms, not always for good reason: for all anyone knows they might be ineffective or therapeutically unnecessary; no controlled studies defend them. Visual images of ultrasound technology call for expertise, a reader qualified to identify shapes, shadows, and outlines of mute matter.

Feminists have long found these machines and methods provocative. It is now commonplace, for example, for theorists to assert that obstetrical technology leads to "political discourses insisting on the autonomy and subjectivity of the fetus," "the objectification of the pregnant woman and the exclusion of her subjectivity," and "the reduction of pregnant women to technomaternal environments for fetal patients." Less explored, however—particularly in the context of law—is the broader notion of technologies as a source of gender-oppression. Katherine Franke's

3. See ROBERT MENDELSOHN, MALE PRACTICE: HOW DOCTORS MANIPULATE WOMEN 152–53 (1982); see also BANKS, supra note 2, at 62 (providing a slightly different version of the Louis XVI "narrative").

4. Randomized clinical studies have demonstrated that for high-risk laboring women, electronic fetal monitoring doubles or triples the rate of Cesarean births and postpartum infections without improving the condition of the neonate. See Judith R. Kunisch, Electronic Fetal Monitors: Marketing Forces and the Resulting Controversy, in HEALING TECHNOLOGY: FEMINIST PERSPECTIVES 41, 56–57 (Kathryn S. Ratcliff et al. eds., 1989) [hereinafter HEALING TECHNOLOGY].

5. See Susan Duerksen, Baby-to-Be, in 3-D, SAN DIEGO UNION-TRIB., Jan. 20, 1999, at E1 (noting that about eighty percent of known pregnancies are examined by sonograms).

6. See Kathryn S. Ratcliff, Health Technologies for Women: Whose Technology?, in HEALING TECHNOLOGY, supra note 4, at 173, 187–90 (arguing that sonograms are wrongly presumed both harmless and therapeutically effective). See generally H.D. Banta, The Diffusion of the Computed Tomography (CT) Scanner in the United States, 10 INT'L J. HEALTH SERVICES 251, 263 (1980) (noting that tomographic scanning was introduced, and then maintained in use, without evidence of its safety or effectiveness).

Marvelous phrase, "a technology of sexism," provides a starting point.

Marvelous in what way? For openers, only that famous slogan "the personal is political" expresses more pithily the feminist insight that oppression of women extends beyond private, individual predilection. Gender-oppression, a force that is distinct from misogynous persons, is at work: sexism uses technologies—or applications of ideas, oriented around feasibility—to advance its agenda. The word "technology" implies economies of scale. It also connotes a capacity to execute designs that is separate from motive, suggesting that although the personal can be political, the political need not always be personal. And so women may be subordinated by means of an apparatus that can keep running even when ill-will is absent. With or without animus, sexism can reach for one of several tools for gender-oppression, in the way that an engineer might reach for software or robotics or the square-root key on a calculator.

Executing its high-stakes scheme, the sexism of "a technology of sexism" can thus be regarded as one of the political "isms," with its own blueprints and battles and plans, like Marxism and socialism and capitalism. Like other belligerent and assertive ideologies, sexism seeks to expand its fronts. It fights battles. It stretches to take hold.

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8. Katherine M. Franke, What's Wrong with Sexual Harassment?, 49 STAN. L. REV. 691, 693 (1997). Franke's phrase is distinct from its more famous Foucauldian predecessor, a "‘technology’ of sex." MICHEL FOUCAULT, THE HISTORY OF SEXUALITY—VOLUME I: AN INTRODUCTION 90 (Robert Hurley trans., 1978). To Foucault, sex itself is the technology, whereas Franke portrays sexism as an agent, the deployer of technologies.

9. CATHERINE A. MACKINNON, Privacy v. Equality: Beyond Roe v. Wade, in FEMINISM UNMODIFIED: DISCOURSES ON LIFE AND LAW 93, 100 (1987) ("The private is the public for those whom the personal is the political.").

10. Definitions of "technology" are generally opaque and unhelpful. The best one might be Corlann G. Bush, Women and the Assessment of Technology: to Think, to Be; to Unthink, to Free, in MACHINA EX DEA 151, 155 (Joan Rothschild ed., 1983) ("Technology refers to the organized systems of interactions that utilize tools and involve techniques for the performance of tasks and the accomplishment of objectives.") [hereinafter MACHINA EX DEA].

of new weapons. Conscientiously if not consciously, sexist individuals and institutions can choose from the instruments at hand.

With the help of these instruments, continues the metaphor, sexism becomes regularized, operational, mechanical, and wired to institutions. Few question or even think about the machinery that undergirds and buttresses gender-relations. Like fiber optics and radio frequencies and many other technologies, the instruments of sexism work unseen. Unless your attention is drawn to them, you're unlikely to think about their existence and their functions—and you wouldn't notice that somebody or something is getting its interests served.

But what is most marvelous, I think, about this phrase is its mot juste: literal technologies indeed. Franke has chosen exactly the right synonym for “tool” or “instrument” or “application”—a word that adds yet more to her description of sexism as political agent, exploiter, and warrior. For hundreds of years, technology has been closely associated with science. “A technology of sexism” thus contains a double reference to the misogyny inherent in postulates of science that have, since the seventeenth century, laid before masculine reason a mute, mysterious, and immanent Nature—a recumbent female awaiting the penetration of inquiry. This

12. I modify a phrase coined by psychiatrist Hugh Drummond. See HUGH DRUMMOND, DOCTOR DRUMMOND’S SPIRITED GUIDE TO HEALTH CARE IN A DYING EMPIRE 77 (1980) (“unconsciously but conscientiously”).

13. For instance, we take for granted kitchen counters that are too low for men to feel at ease, microphones that are too high for women to use at a podium, work gloves that run only in large sizes, and tools that are just heavy and bulky enough to frustrate women workers; these conditions “encas[e] dominant power relation[s], sometimes quite literally, in concrete.” JAN ZIMMERMAN, ONCE UPON THE FUTURE: A WOMAN’S GUIDE TO TOMORROW’S TECHNOLOGY 96 (1986).

14. See William Kilbourne & Susan Weeks, A Socio-Economic Perspective on Gender Bias in Technology, 26 J. SOC.-ECON. 243, 244 (1997) (“[W]e have become so used to technology in our daily lives that we fail to see its implications.”).

15. Whereas many scholars stress the distinction between “science” and “technology,” see JUDY WAJCZMAN, FEMINISM CONFRONTS TECHNOLOGY 12-15 (1991); LANGDON WINNER, AUTONOMOUS TECHNOLOGY 75 (1977), I am inclined to agree that modern science is “locked together” with technology, “each seen as nourishing the other’s growth.” Hilary Rose, Good-bye Truth, Hello Trust: Prospects for Feminist Science and Technology Studies at the Millennium?, in SCIENCE AND THE CONSTRUCTION OF WOMEN 15, 17 (Mary Maynard ed., 1997) [hereinafter SCIENCE AND CONSTRUCTION]. Science gave technology a prestige it did not previously enjoy: although technology was once the province of female workers, “activities long associated with women and slaves—production and manufacturing—are now evocative of a new masculine ethos.” DAVID F. NOBLE, A WORLD WITHOUT WOMEN: THE CHRISTIAN CLERICAL CULTURE OF WESTERN SCIENCE 242 (1992) [hereinafter NOBLE, A WORLD WITHOUT WOMEN].

gendered divide assigns to Man the role of agent in science: women receive the technologies that men deploy.\textsuperscript{17}

One context that reveals the gendered division of technology is the contemporary workplace. Questions related to technology and gender emerge when one looks at almost any American job setting. Why do nurse-anesthetists wear greens in the operating room, whereas most nurses never wear them?\textsuperscript{18} What is a “semi-profession”?\textsuperscript{19} Why do libraries usually seek information about management from outside consultants, rather than develop in-house expertise?\textsuperscript{20} Who controls, and who used to control, spinning, midwifery, and textile production?\textsuperscript{21} These occupational classifications support a belief in female inferiority. Technology-tinged consequences in the workplace are made possible by a preceding ideology of gender-segregation; tropes of science and technology disparage women starting early in their lives.

The phenomenon that unites gendered experiences and images—in the workplace and beyond—may be called technocentric expansionism. In using the word “technocentric,” a neologism that lacks precise meaning,\textsuperscript{22} I refer to the cultivated enthusiasm for distancing, calculating, abstract, or machinelike understandings and...
methods—a fervor that writers have metaphorically called hard and not soft, or rationalist rather than emotional. Technocentric expansionism, accordingly, means an encroachment onto new terrain. Expansionists march upon a subject previously undominated by any preoccupation with science, machinery, or quantification as a preemptive source of knowledge or accomplishment. When they practice technocentric expansionism, revisionists of a subject or occupation or profession decree—usually in the name of progress—that science, machines, technology, or quantitative measurements must now be recognized as fundamental to the field. These encroachments can consist of de-skilling incumbent workers, or upgrading job categories for another class: new technology can define certain work as routine, clerical, machinelike and therefore fit only for disparaged workers, and it can also create privileged space where instruments of prestige are reserved for an elite. The dichotomies are gendered.

Like the female figure on our obstetrical table, women are, in both the “de-skilling” and the “upgrading” types of technocentric expansionism, cast as passive objects rather than active, questing persons. Although not every importation of technocentric thinking into a new area functions as a technology of gender-exclusion, the


24. See SHERRY TURKLE, THE SECOND SELF 104–05 (1984) (contrasting “hard” and “soft”); Paul N. Edwards, The Army and the Microworld: Computers and the Politics of Gender Identity, 16 SIGNS 102, 104 (1990) (exploring sexual and other connotations of these metaphors); see also ZIMMERMAN, supra note 13, at 117 (noting that women hold four percent of “hardware” jobs in the computer industry but almost thirty percent of “software” jobs); cf. Griffiths, supra note 17, at 148–49 (contending that “the rich, personal, sensual, expressive world of emotion and feeling is also associated with technical matters. Indeed, it is intimately associated with them”).

25. See Mary Maynard, Revolutionizing the Subject: Women’s Studies and the Sciences, in SCIENCE AND CONSTRUCTION, supra note 15, at 1, 7 (noting that women, who were pioneers in computing, got pushed out when “the occupation was seen to be creative and important, only to be allowed to return once the work had been reduced to something like ordinary clerical labour”); cf. Karen Scheingold et al., “I’m the Thinkist, You’re the Typist”: The Interaction of Technology and the Social Life of Classrooms, 40 J. SOC. ISSUES 49 (1984) (exploring technology as a source of both degradation and prestige).

26. See, e.g., Bruce Park, Libraries Without Walls; or, Librarians Without a Profession, 23 AM. LIBR. 746, 746 (1992) (noting the role of technology in the erosion of surveyorship and mechanical drafting as professions). Although I am willing to agree that misogyny was not the reason for the change in drafting work, not every feminist writer would agree. See Sally L. Hacker, Mathematization of Engineering: Limits on Women and the Field, in MACHINA EX DEA, supra note 10, at 38, 46 (arguing that “[g]raphics was siphoned off for less highly trained and less well paid people, eventually emerging as a separate field called
expansionist process will typically denigrate both women as individuals and contributions that women as a group made in the past. This denigration casts women as lumpish and inert. In blue-collar settings, new technologies often bring monotony and robotic sameness into women's jobs. When practiced in professional settings (a locus that will occupy Part I of the Article), technocentric expansionism generally proclaims that the colonized field and its prior exponents or practitioners lacked rigor, weren't scientific, didn't keep up with the times, or simply had nothing to do with the current version of the endeavor. Low-tech must now become high-; soft thinking or tendencies must become hard, or move to an ill-favored periphery.

What technocentric expansionism achieves—the excluding, disparaging, discouraging, underpaying, and isolating of women—is often not a collateral harm, nor the byproduct of something more crucial. It is the point. Again, the force is not misogyny as such: gender-segregation is noteworthy for not depending on personal animus. Nobody needs to hate anybody in order for women to end up in conditions of diminished separation, and for men to receive an enlarged share of the spoils of employment and training. With the concept of technocentric expansionism barely identified on the social landscape, gender-segregation not only looks natural and inevitable but even feels normal to many men and women of good faith. Its

drafting, or drawing. Increasingly, women entered this occupation. Much of this work is currently automated, while engineering has retained the abstract skills.

27. A striking example of this conquest was the postwar transformation of regional teachers' colleges into state university campuses. Hundreds of women were pushed out of professorships after the colleges officially adopted a focus on science-related research. See MARGARET W. ROSSITER, WOMEN SCIENTISTS IN AMERICA: BEFORE AFFIRMATIVE ACTION 1940–1972, at 27–49 (1995).

28. See infra Part II.B (detailing the seventeenth-century scientific origins of the notion of femaleness as inert and passive); see also BRIAN EASLEA, SCIENCE AND SEXUAL OPPRESSION: PATRIARCHY'S CONFRONTATION WITH WOMAN AND NATURE 72–76 (1981) (summarizing a transition “from the ‘earth mother’ to barren, inert matter”). Entomologist Mary Barbercheck reviewed advertisements in Science magazine and found that whenever a piece of equipment was marketed as “easy to use” or simple, men were not depicted. Advertisements that pictured men using equipment contained the adjectives “fast, accurate, or reliable in large text.” Mary Barbercheck, Mixed Messages: Men and Women in Advertisements in Science, in WOMEN, SCIENCE, AND TECHNOLOGY 117, 125 (Mary Wyer et al. eds., 2001) [hereinafter WOMEN, SCIENCE, AND TECHNOLOGY]. The message is that simplicity or ease for the male user frees up his time to do something more important, whereas simplicity for a female user accommodates her limitations. Thus women can be depicted using machines “without devaluing the achievements of men.” Id.

appearance of neutrality—especially when juxtaposed against the contrasting image of segregation as violent and hateful—causes individuals to perceive their gendered social status as a function of their own choice.

Observers continue to confuse causes with effects. "Technology continues to move ahead at a rapid pace," runs a standard line. "What a pity that women [or people of color] may feel left out of the information revolution. The solution is to provide disadvantaged groups with equal access to technology, so that they won't be left behind."31 Exactly backward, I contend.32 Technocentric expansionism is distinct from technology per se,33 and it does not "move ahead" in some value-free vacuum.34 It is put to use, sometimes unconsciously and sometimes deliberately.

30. Positions of the argument in this Article apply to men of color, as well as women of every ethnicity and color. I have had occasion previously to comment on this shared circumstance. See Anita Bernstein, Treating Sexual Harassment with Respect, 111 HARV. L. REV. 446, 458–60 (1997) (noting parallels between racist and sexist stereotypes about inferior cognitive powers). Part IV, infra, is especially indebted to race-discrimination precedents.


32. Cf. DRUMMOND, supra note 12, at 50 ("The history of technology is the history of the invention of hammers and the subsequent search for heads to bang with them.").

33. For example, consider the simplistic notion that mechanization is labor-saving. A new machine or process can reduce the physical effort needed to execute a task but also be the catalyst for increased workloads. See RUTH SCHWARTZ COWAN, MORE WORK FOR MOTHER passim (1983) (arguing that technology imposed heavy new burdens on housewives); see also Cecilia Ng Choon Sim & Rohini Hensman, Science and Technology: Friends or Enemies of Women?, in SCIENCE AND CONSTRUCTION, supra note 15, at 93, 94 (distinguishing between technologies and their uses). On the truism that strategies involving instruments are different from the instruments themselves, see Leo Marx & Merritt Roe Smith, Introduction, in DOES TECHNOLOGY DRIVE HISTORY?: THE DILEMMA OF TECHNOLOGICAL DETERMINISM, at xi (Merritt Roe Smith & Leo Marx eds., 1994) (exploring the relationship between history and technological change); Monroe E. Price, Public Broadcasting and the Crisis of Corporate Governance, 17 CARDOZO ARTS & ENT. L.J. 417, 445 (1999) ("New technologies are, in a sense, like new playing cards dealt in a high-stakes game.").

34. See generally HARRY BRAVERMAN, LABOR AND MONOPOLY CAPITAL: THE DEGRADATION OF WORK IN THE TWENTIETH CENTURY 6 (1974) (positing "the theory of a societas ex machina," which emanates "directly from smokestacks, machine tools, and computers").
Identifying technocentric expansionism amounts to an assertion about history and the future. This phenomenon, as I will detail presently, has entrenched occupational segregation, causing detriment to women. Having found no neutral cause for women to lose their status, respect, income, and prerogatives in the workplace and in the contemporary educational settings that prepare them for work, I attribute the rise of technocentric expansionism to segregationist tendencies. And now, unless either segregationist

35. On the connection between history and feminist progress, historian Gerda Lerner also writes about forces of sexism that use technologies:

The system of patriarchy can function only with the cooperation of women. This cooperation is secured by a variety of means: gender indoctrination; educational deprivation; the denial to women of knowledge of their history; the dividing of women, one from the other, by defining “respectability” and “deviance” according to women's sexual activities; by restraints and outright coercion; by discrimination in access to economic resources and political power; and by awarding class privileges to conforming women.


36. My premise that occupational segregation hurts women is not universally shared. See, e.g., Kingsley R. Browne, Sex and Temperament in Modern Society: A Darwinian View of the Glass Ceiling and the Gender Gap, 37 ARIZ. L. REV. 971, 1104-05 (1995) (arguing that whereas feminists maintain that women are disadvantaged and discontented at work, public opinion polls indicate “that men and women are generally equally satisfied with their jobs”); Michael Levin, The Feminist Mystique, COMMENTARY, Dec. 1980, at 25 (contending that status gaps between women and men derive from objective female inferiority, not social segregation).

More recently, Judge Posner and a colleague have found it untroubling that a woman derives her social rank from the activities of a man, typically her husband, rather than through her own work. After all, they write, individuals tend to pair themselves with individuals who are equal to them (that is, about equally intelligent, nearly the same age, and of comparable physical attractiveness), and so a husband's status serves as a good "proxy for the wife's unobservable performance." Gertrud M. Fremling & Richard A. Posner, Status Signaling and the Law, With Particular Application to Sexual Harassment, 147 U. PA. L. REV. 1069, 1076 (1999). Fremling and Posner do not tell us how they know that people choose mates who are equal to them—putting aside the question of what "equal" means, in a gender-stratified society, when used to describe relations between a woman and a man—nor for which onlookers, or on what basis, a wife's performance is "unobservable": for millennia women have participated in communal life away from their husbands, parents, and children, often for pay; the separate-spheres conceit that a woman should not appear outside her home flourished only briefly over history, and within a small fraction of the population. See Ruth Bleier, Sociobiology, Biological Determinism, and Human Behavior, in WOMEN, SCIENCE, AND TECHNOLOGY, supra note 28, at 175, 179 (noting that from hunter-gatherer days through the present, most women in most places have worked away from their homes).

37. See infra Part III (considering reasons for the existence of technocentric expansionism).

38. Here I need to stress a caveat: Just as not every technological change in employment configurations bespeaks sexism, see supra note 26 and accompanying text, not every change in an occupation that is detrimental to women requires technocentric expansionism. Other antecedents can have the same effect. See BARBARA F. RESKIN & PATRICIA A. ROOS, JOB QUEUES, GENDER QUEUES: EXPLAINING WOMEN'S INROADS
impulses or this particular technology of gender-segregation has been overcome or superseded—an unlikely possibility—one may expect technocentric expansionism to grow bigger in the future, doing more harm to women.

Hoping to work against this possibility, in this Article I endeavor to build both theory and strategies that oppose technocentric expansionism. This effort combines description and prescription. My first task in the Article is to elaborate on the notion of technocentric expansionism, arguing that it is a technology of gender-segregation. I support this claim in the first third of the Article with a factual narrative. Then, after casting this narrative in a philosophical and sociological light, I outline what law and lawyers can offer in opposition to this technology.

Part I, “Technocentrism and Gender in the Workplace,” examines technocentric expansionism as a historical force in the professions—a locale that raises obvious concerns about race- and class-based exclusion, but one for which the necessary historical

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39. At the risk of provoking a familiar label, to which journalist Paulina Borsook has written a strong rejoinder:

I am a Luddite—in the true sense of the word. The followers of Ned Ludd were rightfully concerned that rapid industrialization was ruining their traditional artisanal workways and villages, creating nineteenth-century local environmental disasters and horror-show factory working (and living) conditions for family members of all ages. For decades, the displacements of the Industrial Revolution sent hundreds of thousands of people to lives of penury, starvation, disease, and despair in the slums of big cities. The Luddites were early labor and ecology activists, upset not so much with technology per se but with technology’s destructive effects to their bodies, to their children, to the places where they lived, to their ability to make a sane living.


40. Philosopher Elizabeth Spelman deems the problem of “white solipsism” in feminist theory and philosophy so large as to render unpersuasive the writings of every feminist writer who ever attempted to describe the subordination of women. See ELIZABETH V. SPELMAN, INESSENTIAL WOMAN: PROBLEMS OF EXCLUSION IN FEMINIST THOUGHT 117–18, 126–28, 157–58 and passim (1988) (faulting Elizabeth Cady Stanton, Kate Millett, Shulamith Firestone, Betty Friedan, Nancy Chodorow and especially Simone de Beauvoir). It may indeed be futile to write “about women,” id. at 3, although I believe that this assertion overstates the level of incoherence within feminism. I do acknowledge the difficulty of white solipsism, however. By way of response to Spelman’s indictment of feminist theory, I would say that this Article is less “about
record is helpfully clear—using case studies from medicine, librarianship, sociology, and education. These studies focus mainly on the United States, and take a particular interest in about the last hundred years. I describe recurring practices and their baleful consequences to women in all of the occupations examined. As a reader might perhaps expect, technocentric expansionists of the past were more candid than their contemporary heirs, and spoke bluntly against women and feminine tendencies in the professions they sought to control. The written record they left behind expresses the motives that have lain behind this technology of gender-segregation.

The history of technocentric expansionism raises fundamental questions, taken up first in Part II, which considers its origins as an idea, and next in Part III, which addresses the continuing utility of this technology of gender-segregation. How do science and technology serve to subordinate women? Although the question is too large for full treatment in this Article, Part II broaches it by locating origins of technocentric expansionism in the Western rationalist tradition—in particular, the posited connection between maleness and reason, and the canonical tenets of science that began to take hold in the seventeenth century, coupled with the Industrial Revolution’s separation of workplace and home. These sources of origin are far from monolithic. The Enlightenment inquiry that helped to form science as we now know it also invited a humanistic view of women, an ideal of liberal equality that endures: If women are persons, then it is wrong to exclude them without cause from pursuit of their own plans and the occupations they choose. Those who would perpetuate this exclusion need devices—technologies—to make the exclusion appear grounded in good reason.

Technocentric expansionism thus arrogates the ideal of progress, which could otherwise have decreed that women must be regarded as human beings in full citizenship, to keep women subordinated to and

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41. Cf. WILLIAMS, supra note 21, passim (studying nursing, librarianship, elementary education, and social work).
42. See infra notes 84, 99, 110, 130–31 and accompanying text (quoting authorities in the professions).
43. See generally Kilbourne & Weeks, supra note 14 (noting these origins). For a different yet not inconsistent thesis, see NOBLE, THE RELIGION OF TECHNOLOGY, supra note 17, at 12–13 (contending that a religion of technology, associated with clerics and very unwelcoming to women, took root within Christianity in the late Middle Ages).
separated from men.\textsuperscript{44} Whereas one interpretation of Enlightenment humanism, associated with thinkers like Mary Wollstonecraft and John Stuart Mill, insists that a woman is inherently as valuable and autonomous as a man—as much of a person\textsuperscript{45}—the technocentric-expansionist version of the Enlightenment disparages Woman as contrary to reason, freedom, and full human possibility.\textsuperscript{46} It thus continues the efforts of an earlier patriarchy, associated with clerics and feudalism, to deny women their personhood. Unlike these conservative traditions, however, technocentric expansionism makes a credible claim to the future and progress. Feminists would deem the claim false. No vision of the future that subordinates women deserves to be called progressive. But the association between progress and the advancement of science is so strong that whenever technology moves into a new venue, observers tend to see improvement.

As Part III elaborates, this claim about improvement gives technocentric expansionism a respectability that other reactionary endeavors do not have. Moreover, technocentric expansionism augments the power of individuals who embrace it: associations with science and technology provide natural alliances with government officials and private concentrations of wealth. Another utility of the device is its ambiguity.\textsuperscript{47} If, as I suggest, the impulse toward workplace segregation will often be unconscious and riven with internal contradictions, then ambivalent persons would enjoy the freedom to shuttle between conciliation and a hard line. Vagueness helps. "Science" and "technology" elude consistent definition,\textsuperscript{48} even

\textsuperscript{44} Cf. DAVID F. NOBLE, FORCES OF PRODUCTION: A SOCIAL HISTORY OF INDUSTRIAL AUTOMATION, at xii (1984) (calling "technological determinism" an "impoverished version of the Enlightenment notion of progress").


\textsuperscript{46} See generally GENEVIEVE LLOYD, THE MAN OF REASON: "MALE" AND "FEMALE" IN WESTERN PHILOSOPHY 104 (1984) (detailing the traditional use of "reason" to denigrate women).


\textsuperscript{48} On definitional issues surrounding these terms, see supra note 15 and accompanying text (noting the uncertain meaning of "technology"). The word "scientist" emerged relatively recently, in 1834, in a review of a book by the mathematician and astronomer Mary Somerville. See NOBLE, A WORLD WITHOUT WOMEN, supra note 15, at 279. (Somerville's book, Celestial Mechanism of the Heavens, was the standard text at Cambridge—an institution at which she, and every other woman in the world, could not
though there is nothing elusive about such facts as, say, the percentage of advanced degrees in computer science earned by women (a fraction that has been dropping since the late 1980s);\textsuperscript{49} the male domination of such jobs as president, CEO, chief operating officer, and chief technology officer in the high technology sector;\textsuperscript{50} and the generally solid record of gender-segregation and pay inequity in the workforce.\textsuperscript{51} Because of their false association with improvement, technocentric expansionists can assert with occasional sincerity that they deplore these inequities and hope to ameliorate them.

This combination of ambiguity, artful or semi-sincere remorse, references to a better future, and expedient political relations makes technocentric expansionism hard to combat. Unless one begins with a feminist consciousness, or another minority perspective, progress-rhetoric will distract potential allies on the left.\textsuperscript{52} And if the standard division of American conservatives into two camps—part


\textsuperscript{50} See "Babes in Boyland": You've Got Male, CHI. TRIB., Mar. 20, 2000, § 4, at 1 (summarizing data provided in Internet World magazine); see also Holmes, supra note 31 (noting that women, 51% of the population, are "only 28% of computer programmers, 26% of computer scientists and 9% of engineers"); Marilyn Geewax, If Women Ruled . . . Female Techies Imagine a World, ATLANTA J. CONST., Aug. 27, 2000, at D1 (quoting even lower figures from the Department of Commerce, and also reporting that high school girls have recently become more estranged from computers); Candee Wilde, Women in IT Strive for Equal Job Compensation, INFO. WK., June 12, 2000, at 225 (reviewing an annual pay survey of 17,000 information-technology professionals that found a worse gender pay-gap in 2000 than 1999).

\textsuperscript{51} See infra Part IV.C.1. Pay inequity starts early. See It Pays to Be a Boy, TIME, July 24, 2000, at 79 (reporting a survey of 9,000 persons ages twelve to sixteen that found that on average boys are paid more than girls for the same household chores; the largest disparity is in the average pay for cleaning a bathroom: $1.73 for girls and $9.02 for boys).

\textsuperscript{52} See, e.g., Mike Alvear, Advances in Technology Hotwire the Closet Door, S. VOICE, Jul. 27, 2000, at 15 (contending that technologies such as the Internet and cellular phones give gay men "the tools to flourish: [p]rivacy and access"); Andrew I. Batavia, Prospects for a National Personal Assistance Services Program: Enhancing Choice for People with Disabilities, 24 AM. REHAB. 2, 3 (1998) (linking technological progress with the cause of disability rights); Jennifer Egan, Lonely Gay Teen Seeking Same, N.Y. TIMES, Dec. 10, 2000 (Magazine), at 110, 113 (noting an Internet "revolution" that transforms lives of gay youth).
cheerleaders for capitalism, part family-values traditionalists—is accurate, one would be hard pressed to find any political support from either camp on the right: Capitalists have never had a gender-equality problem with the blandishments of technology (which include military contracts, prerogatives for investors, and a weapon to suppress labor unions and reduce payroll costs), and the traditionalists loathe feminism. Legal doctrines? They seem feeble. In many of its forms, discrimination against women, especially in the workplace, violates American law; and technocentric expansionism within the professions is a manifestation of discrimination in employment on the basis of sex. Yet a brave litigant willing to challenge this technology by invoking the employment statutes and case law faces a prospect of failure. Courts have not yet condemned technocentric expansionism as a violation of the law in itself. Its strategies of concealment, false neutrality, and false progressivism make technocentric expansionism look laudable or at least harmless enough (unless its practitioners are reckless) to fend off an adverse legal judgment.

Furthermore, in some cases technocentric expansionism should be able to fend off an adverse judgment. As an idea, it enjoys basic protection. To be sure, as an idea it has begotten many grim consequences, some of which I document below; and courts have held that some of its mischief constitutes a violation of the law. Even when it escapes legal sanction, technocentric expansionism is often unjust and wasteful. But the United States Constitution affords citizens a perfect right to believe in a creed that disqualifies fellow citizens from income, opportunity, and respect on the basis of sex; it also gives them a measure of freedom to act accordingly.


55. See infra notes 441-46 and accompanying text.

56. For a discussion of this conflict, concluding that "liberties" such as freedom of association are more important than the "welfare" or "positive" right to be free from
Working within this liberal perspective on where the law can reach, then, I argue in Part IV that the law offers weapons—amounting to a kind of countertechnology—against the encroachments of technocentric expansionism. Legal doctrine seldom delivers damages to victims of professional exclusion, nor writes an injunction compelling misogynists to cease and desist; but it does provide the vocabulary for a curative discourse. In order to curb technocentric expansionism as a technology of gender-segregation, activists must publicly identify, understand, expose, and denounce the phenomenon. Because law plays a unique role in public denunciations of injustice, the terms and tactics peculiar to law can offer unique value, even when the injustice at issue would escape formal redress in the courts.

The inspiration behind Part IV is *Miranda v. Arizona*, a judicial decision that occupies a crucial place in the American civic firmament. Most American adults know that the United States Constitution affords them rights in the context of arrest and police questioning. This degree of sophistication is extraordinary. To be
sure, some analysts of *Miranda* have found less here than meets my own eye: they point out that the typical American doesn't know the precise content of these rights, thinks that the Constitution protects only other people (also known as "criminals") rather than him, and foolishly fails to insist on his rights when they could do him good. Even if these pessimists correctly perceive the limits of constitutional rights, however, citizens have shown that they can appreciate the value of law beyond adjudication, legislation, and regulation; they have carried over the idea of a right, such as the idea that the police must warn or that suspects can have counsel, into a wider consciousness about the exercise of power in society. These same citizens are competent to conclude that technocentric expansionism violates principles that the law respects.

In an effort to foster this conclusion, I end the Article by proposing an expansion of pertinent legal terminology. This discussion focuses closely on the concept of shifting the burden of proof—that is, prodding people who have relevant knowledge to explain and justify current conditions that leave women devalued, underpaid, and discouraged. Additional ammunition comes from legal sources beyond employment doctrine, including the law of torts, environmental regulation, evidence, civil procedure, and other areas. This augmented vocabulary would help to assert and prove the wrongfulness of technocentric expansionism as a technology of gender-segregation. Migrating into the vernacular, it can influence American thinking. Just as the law has used judicial and legislative measures to achieve some gains against segregation, the law also offers the concepts needed to bring women toward all of the responsibilities and privileges that technology has begotten.

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results of a questionnaire where 64.5% of parolees answered correctly either eleven or twelve out of twelve questions about the rights of suspects in interrogations).


63. See Neil Duxbury, *When Trying is Failing: Holmes's "Englishness,"* 63 BROOK. L. REV. 145, 146-47 (1997) ("Constitutional issues are the food of talk shows and radio phone-ins.") (footnote omitted).

I. TECHNOCENTRISM AND GENDER IN THE WORKPLACE, OR, FOUR PROFESSIONS AND A CULPRIT

Medicine, librarianship, the social sciences, and education all reveal the force of technocentric expansionism in the professions. Of course, any focus on gender in the professions requires caution: decrying barriers and prejudices that educated people encounter in the workplace appears biased to some observers, a problem of mistaking one fraction of feminist issues for too much of the whole. This Part notes the concern and proceeds nonetheless with its inquiry: the experience of upper-income, educated white women is crucial to feminism because the privileges of caste, skin color, upbringing, and family connections that these women have in common with one another—and also have in common with men, whose experiences turn out different—strongly suggest that gender is a basis of subordination. Furthermore, attention to professional employment refutes the possibility that American jobs are segregated simply because a masculine body is needed for certain work.

65. For sociological studies of the subject, see Penina M. Glazer & Miriam Slater, Unequal Colleagues: The Entry of Women into the Professions 1890–1940 (1987); Anne Witz, Professions and Patriarchy (1992); Celia Davies, The Sociology of Professions and the Profession of Gender, 30 Sociology 661 (1996).

66. Although they do not treat women fairly, the professions are nevertheless more hospitable to women than the skilled trades. See Martha Chamallas, Introduction to Feminist Legal Theory 175 (1999) (citing statistics); cf. Miriam Schneir, Feminism in Our Time: The Essential Writings, World War II to the Present 171 (1994) (noting that for many African-American women, work outside the home has always been "an unpleasant part of life, just something one had to do if one wanted to eat.

67. See supra note 40. Martha Fowlkes defends the academic inclination to heed the plight of professional women:

Although [feminism] encompasses a wide spectrum of issues, one single issue continues to stand out: the insistence of women on breaking through the bastions of male occupational privilege and claiming some of that territory for themselves. Perhaps this goal is elitist, but it is also inevitable when there exists a critical mass of educated women who are excluded, because of sex, from the professions that seem to offer the very self-actualization—in the form of intellectual challenge, command of knowledge, power, status, and rewards—that is already open to their own husbands, brothers, and fathers. Martha R. Fowlkes, Women's Studies: The Emergence of Feminist Scholarship, CHOICE, Mar. 1998, at 1155, 1156–57. Elizabeth Spelman disagrees, believing that this reasoning rests on a false premise that gender can be abstracted as distinct from other socially created conditions like slavery and race. See Spelman, supra note 40, at 52. To me the premise is not false: every known society, no matter how homogenous in ethnicity or wealth, makes gender distinctions. See also Susan Bordo, Feminist Skepticism and the "Maleness" of Philosophy, in Women and Reason 143, 152–53 (Elizabeth D. Harvey & Kathleen Okruhlik eds., 1992) (arguing that if gender is a useless category, then all of "social criticism" is equally useless) [hereinafter Women and Reason].
after all, engage few of the primary or secondary sex characteristics. Technological innovation should indeed have brought more egalitarianism to the workplace, machines having been developed long ago to do the jobs once associated with brute strength.\textsuperscript{69} Aggression, which many observers deem the quintessence of masculinity,\textsuperscript{70} is expected to be relatively muted and unimportant within occupations that profess, as it were, to sacrifice gains to practitioners when honoring ideals of public service. As this Part recounts, however, gender-stratification and technological progress have long coexisted within professional employment.

A. Triumphs of Modern Medicine

Although the contemporary profession of medicine likes to proclaim its continuity with a long past,\textsuperscript{71} today's medical doctors do not resemble their colleagues of yore; the profession has had several occasions to reinvent itself, and a doctor trained in the late twentieth or early twenty-first century could not collaborate on a consultation,

\textsuperscript{68} I recognize that nonfeminist conjectures to explain occupational segregation, such as men's intellectual superiority or women's lack of interest in elite work, remain unfree from the perspective of feminist critique. I turn to these alternative hypotheses below. See \textit{infra} notes 164--87 and accompanying text (summarizing the debate over whether gendered neuroanatomy makes men more successful than women at logic and mathematics). Perhaps men dominate the high-status professions because of some inherent mental or psychological advantage, rather than sexism. But the below-the-neck body of a man—by which I mean to include its ability to lift weight and its tendency to be bulkier than a female body—cannot, in a post-industrial age, explain why men hold the spoils of employment. Even though a feminist critique of technocentric expansionism still has its task of persuasion ahead, that much is worth noting at the start.

\textsuperscript{69} See \textit{Wajcman}, \textit{supra} note 15, at 13. For another comment on a historical event that should have made the workplace more egalitarian, see \textit{Linda M. Blum}, \textit{Between Feminism and Labor: The Significance of the Comparable Worth Movement} 154 (1991) (pointing out that during the Depression, men generally chose to go hungry rather than do "women's work").


or any other aspect of medical practice, with a time-transported Galen or Hippocrates.\textsuperscript{72} History records only one common trait among physicians \textit{qua} members of a profession: their struggle to keep patients away from healers they deem uncredentialed. Although some of the "irregulars" persecuted by the profession have been men, the majority of them—as well as the majority of human healers, throughout history and all over the world—have been women.\textsuperscript{73}

The connection between women and medical care is an ancient one. "Except for contraceptives, abortifacients, preparations to ease labor, and other elements of women's or children's medicine," writes historian Autumn Stanley, "it is difficult to state unequivocally that women invented or discovered any specific remedy or procedure. However, in general, the more ancient any given remedy, the likelier it is to be a woman's invention . . . ."\textsuperscript{74} Deities of healing are depicted as female,\textsuperscript{75} and women have worked for thousands of years as gatherers and cultivators of plants, keepers of the home, and caretakers of children, all relevant sources of insight and experience.\textsuperscript{76} Some of their treatments remain state-of-the-art. Belladonna as an antispasmodic, ergot for prolonged labor, digitalis for heart disease, and mold as an antibacterial agent were known to women healers long before the profession of medicine appropriated these remedies.\textsuperscript{77} Women probably knew much more: many historians believe that

\textsuperscript{72} See ELIOT FREIDSON, PROFESSION OF MEDICINE: A STUDY OF THE SOCIOLOGY OF APPLIED KNOWLEDGE 5 (1970) ("If medicine was a 'profession' in the past, it was a profession of quite different characteristics than today's."); see also id. at 13–16 (describing the varied schools of ancient Greek medicine).

\textsuperscript{73} See generally HELEN FISHER, THE FIRST SEX: THE NATURAL TALENTS OF WOMEN AND HOW THEY ARE CHANGING THE WORLD 113–14 (1999) (noting that in many regions of the world, women "never lost" their function as healers).

\textsuperscript{74} Autumn Stanley, Women Hold Up Two-Thirds of the Sky: Notes for a Revised History of Technology, in MACHINA EX DEA, supra note 10, at 5, 11; see also COCKBURN, supra note 29, at 20 (noting that it is likely that women invented methods of "detoxifying and preserving food").

\textsuperscript{75} See Stanley, supra note 74, at 11; see also LERNER, supra note 35, at 159 (describing the goddesses Mylitta, Artemis, Eleithyia, and Hera, all associated with healing or the protection of women in childbirth). Lerner adds that goddesses such as the Babylonian Istar were regarded as having power in their own right, as healers and also in all other realms, whereas later figures like the Virgin Mary could only mediate or intercede with the principal Judeo-Christian deity. \textit{Id.} at 142–43.

\textsuperscript{76} Stanley, supra note 74, at 11–12.

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persecution of these healers resulted in incalculable losses to medicine.\textsuperscript{78}

It is important not to wax sentimental over the lost profession of "wise women," who were usually illiterate and often simply wrong.\textsuperscript{79} Yet their fidelity to empiricism must be remembered, especially whenever a contemporary physician asserts that his profession is, and has been, a scientific one. While the physician to Edward II, who held Oxford degrees in theology and medicine, was claiming in the early fourteenth century that to cure a toothache one should write "In the name of the Father, the Son, and the Holy Ghost" on the patient's jaw, a female healer "relied on her senses rather than faith or doctrine; she believed in trial and error, cause and effect. Her attitude was not religiously passive, but actively enquiring.... In short, her magic was the science of the time."\textsuperscript{80}

Medical men have, indeed, been linking their profession with experimental science and its intellectual commitments for less than two centuries. The early study of medicine, based in church-controlled universities, was a branch of theology and philosophy.\textsuperscript{81} Only gradually did physicians begin to put their studies into practice. The fourteenth century marked a hardening of the rule that physicians, apothecaries, surgeons and barbers (the latter two being members of the same guild\textsuperscript{82}) had to hold university degrees, and women were thus excluded from all of what is thought of today as medical practice, except midwifery.\textsuperscript{83} Theologians condemned and punished women who would "dare to cure," focusing their

\begin{align*}
78. \text{See John M. Riddle, Eve's Herbs: A History of Contraception and Abortion in the West 204-05 (1997); Stanley, supra note 74, at 12. Over centuries in Europe, thousands of women, many of whom had worked as healers, were put to death after being accused of witchcraft. See Robin Briggs, Witches and Neighbors: The Social and Cultural Context of European Witchcraft 326 (1996) (providing conservative statistics).}
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\begin{align*}
79. \text{See generally Noretta Koertge, How Feminism is Alienating Women From Science, 19 Skeptical Inquirer 42, 42 (1995) (contending that women scientists of the modern age, rather than witches and midwives, make good feminist heroines).}
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80. \text{Ehrenreich & English, supra note 77, at 17.}
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81. \text{See Wendy Faulkner, Medical Technology and the Right to Heal, in Smothered by Invention: Technology in Women's Lives 87, 88 (Wendy Faulkner & Erik Arnold eds., 1985) [hereinafter Smothered by Invention]. For centuries these universities refused to admit women. Id.}
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83. \text{Riddle, supra note 78.}
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84. \text{The fifteenth-century tract Malleus Maleficarum (Hammer of the Witches) declared: "If a woman dare to cure without having studied she is a witch and must die." Quoted in Faulkner, supra note 81, at 90. In principle, both men and women could be}
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prosecutions on educated, upper-class, literate healers who were competing for their well-heeled clientele. During this fight over turf, the Church wielded much power: when male healers failed to cure a patient and a woman succeeded, this result was often taken as proof that the woman healer was in league with the Devil.

A feminist of the late Middle Ages and early Renaissance, if one could imagine such a figure, might have believed that women healers and their patients would be much better off on that future day after the Church would have lost much of its worldly power over healing and curing. A modern profession did arise, faithful to the Reformation legacy as it once had been loyal to Catholic universities and clerics, staunchly committed to Western science or what it called "natural philosophy." Revolutionary in many respects, this transformation in medicine kept patriarchy intact, while embracing science and its instruments.

Postponing for a while discussion of the European origins of this change, let us follow the profession to the newly formed United States, where medicine started out as an occupation of no particular status and no great ability to do patients any good. Technocentric expansionism was to engrave changes here: sociologist Paul Starr identifies the years 1850 to 1930 as marking "the consolidation of authority" within medicine in the United States. Whereas women had enjoyed admission to medical schools in the late nineteenth century, and could practice medicine in the lax and somewhat chaotic

witches, but the target of this venomous tract, *maleficarum*, is a feminine noun: male witches would be *maleficorum.*

85. *Id.* at 89.
86. *Id.* at 89–90. The historian and herbalist Elisabeth Brooke adds a converse: "If the doctor gave medicine which aggravated the illness (by using a poison or wrong diagnosis, for example) then he was not at fault. The patient was bewitched." ELISABETH BROOKE, WOMEN HEALERS THROUGH HISTORY 88 (1993).

Alison Peirsoun of Byrehill had established her reputation as a gifted healer. Consequently, the archbishop of St. Andrews sent for her. Afflicted with several disorders that we might call "psychosomatic," he had been treated by many practitioners without relief. Alison, by whatever means, cured him. Later, he not only refused to pay her bill, he also had her arrested. She was charged and executed for witchcraft.


88. See EHRENREICH & ENGLISH, supra note 77, at 72.
89. See infra Part II.
90. STARR, supra note 82, at 79–144 (chapter title).
state of the profession that then prevailed,\textsuperscript{91} consolidation of authority soon put this liberal era to an end.

The opening of a medical school at Johns Hopkins University in 1893 proclaimed a different type of training, for which medical students had to have bachelor's degrees before beginning a rigorous education in basic science and hospital medicine.\textsuperscript{92} This radical new curriculum, destined to become orthodox within medical education over the next two decades, held severe consequences for women. For seventeen years, the Johns Hopkins experiment stood isolated; in 1910, however, it received a famous boost with the publication of *Medical Education in the United States and Canada* by Abraham Flexner.\textsuperscript{93} Exploring American medical schools, Flexner found a shambles.\textsuperscript{94} His recommendations were brisk: "The first-class schools had to be strengthened on the model of Johns Hopkins, and a few from the middle ranks had to be raised to that high standard; the remainder, the great majority of schools, had to be closed."\textsuperscript{95}

The schools that Flexner condemned as inadequate contained large proportions of female and non-Caucasian students.\textsuperscript{96} Only two out of seven African-American medical colleges survived the report.\textsuperscript{97} Although the women's medical colleges were already in decline by the time Carnegie published Flexner's attack, women found themselves further disadvantaged when schools that had admitted them liberally in the pre-Flexner era began to turn them away.\textsuperscript{98} For

\textsuperscript{91.} *Id.* at 117.

\textsuperscript{92.} *Id.* at 115. There were some women present in that class, although Johns Hopkins did not want them: "Strapped for funds," Starr writes, the school agreed to admit women "in return for half a million dollars in endowment money contributed by wealthy women. In effect, American women were forced to buy their way into elite medical education." *Id.* at 117.

\textsuperscript{93.} ABRAHAM FLEXNER, *MEDICAL EDUCATION IN THE UNITED STATES AND CANADA: A REPORT TO THE CARNEGIE CENTER FOR THE ADVANCEMENT OF TEACHING* (1910). The report stemmed from an American Medical Association initiative: when the AMA suggested to the Carnegie Foundation that a review of the state of medical education was in order, the foundation employed Flexner to visit all of the schools and report on them. STARR, *supra* note 82, at 119.

\textsuperscript{94.} See Michael Sanders, *The Forgotten Curriculum: An Argument for Medical Ethics Education*, 274 J. AM. MED. ASS'N 768, 768 (1995) (arguing that the current medical ethics curriculum is in the same sorry state as the medical education that Flexner observed in 1910).

\textsuperscript{95.} STARR, *supra* note 82, at 120.


\textsuperscript{97.} See Oliver, *supra* note 96, at 208.

\textsuperscript{98.} STARR, *supra* note 82, at 124.
the next half century after 1910, except for the war years, women were subjected to a five percent admissions quota in medical school. The medical education establishment must have interpreted Flexner’s report to say that the pursuit of quality and standards meant that medicine had to become “a more esoteric and more socially exclusive profession.” In the stand they took for standards, the Carnegie foundation and its followers in the elite medical schools implicitly claimed that homogeneity in the profession leads to excellence. The historical record suggests that this belief is false.

Modern medicine and its successful claim to monopoly in healing would not have arisen without what sociologist Eliot Friedson has called “the development of medical technology”; only “individual, personal decisions” to consume the services of medicine could sustain this lucrative monopoly, and these decisions are baseless until medicine has something unique to sell. With the invention of Roentgenography in 1895, for example, the hospital had X-rays to offer, and could transform itself from “a passive receptacle for the sick poor to an active curative institution for all members of society.” Quantified standards about the normal human being—defining intelligence, visual acuity, height-to-weight ratios, and other indicators—established physicians as experts, vested with social authority to prescribe much more than ethical drugs. Their powers could expand accordingly.

And so men of medicine used devices and machines to displace women. Several of their technologies were obstetrical, the

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99. Id. Flexner himself had no problem with these numbers, insisting that either low consumer demand or lack of desire among women to be physicians in the new scientific era explained their declining participation, but did go on record to say that women were entitled to the same educational privileges as men. See Wynn, supra note 96, at 669.

100. See Michael Moran & Elizabeth Alexander, Technology, American Democracy and Health Care, 27 BRIT. J. POL. SCI. 573, 589 (1997).

101. See STARR, supra note 82, at 139–40 (discussing numerous errors and misjudgments of informed medical opinion); see also BANKS, supra note 2, at 82 (noting that the profession ignored a 1912 Johns Hopkins study concluding that laboring mothers did better away from hospitals and without the anesthetics of the time).

102. FREIDSON, supra note 72, at 12.

103. Id. at 16. Friedson went on to attack the profession for having abused its monopoly. See id. at 363–64.


105. See STARR, supra note 82, at 137.

106. Medical technologies were generally successful in dispatching female competitors, but not always. Radiography offers an example. See WITZ, supra note 65, at 168–91 (describing how men tried and failed to use X-ray technology to keep women out of jobs in radiography). But see COCKBURN, supra note 29, at 128 (asserting that in this sex-
childbearing population having been seen as an almost limitless market for doctors to conquer. Forceps, despised as "pernicious innovations" and "weapons of death" by at least one female midwife, gave obstetricians and male midwives a unique claim to be present in the delivery room, beginning in about 1733. Female midwives could insist that forceps were unnecessary—and William Smellie himself, the inventor, tended to agree—but the creation of lying-in hospitals (which followed about a century after the invention of forceps) enforced the notion that male observation and intervention in childbirth were desirable, in the best interests of mother and baby; they also connected the male-midwife to a powerful institution. When men redesigned the centuries-old birthing stool so that the laboring woman would lie flat on her back at about bed-height, they deprived her of the benefit of gravity and the opportunity to brace her feet against the ground—in order to spare the professional onlooker the fatigue and aching back that vexed a midwife. The speculum, another favorite of male practitioners that initially horrified female midwives, put the male subject in an authoritative stance, looking at the object of his superior understanding.

107. Faulkner, supra note 81, at 92. 108. Id. at 93. 109. The etymology of these words bears mention. Although "midwife," literally "with woman," is a gender-neutral title available to both men and women, male practitioners in the nineteenth century wanted a new term to denote themselves as men. Ironically the word they chose to supplant the neuter "midwife" was a feminine one—the Latin obstetrix, meaning female midwife—which they masculinized: "obstetrician" is thus a relative newcomer to the English language. See BANKS, supra note 2, at 1, 68 & n.66. 110. See ROSEMARY PRINGLE, SEX AND MEDICINE: GENDER, POWER AND AUTHORITY IN THE MEDICAL PROFESSION 51 (1998). The irrational nature of forceps-enthusiasm did not escape attention; for example, in 1834 a bemused medical practitioner, James Blundell, noted that some men seemed to have "a sort of instinctive impulse to put the level and forceps into the vagina." Quoted in WAJCMAN, supra note 15, at 65. 111. See Faulkner, supra note 81, at 93 (noting that Smellie had "argued that the use of forceps, a valuable aid during obstructed deliveries, should be necessary only in 10 out of every 10,000 births"). 112. See id. at 92–94. 113. See BANKS, supra note 2, at 38; Davis-Floyd, supra note 1, at 4. 114. See generally Lynn Tatlock, Speculum Feminarium: Gendered Perspectives on Obstetrics and Gynecology in Early Modern Germany, 17 SIGNS 725, 759 (1992) (describing the speculum as a source and an instrument of conflict between men and women). Luce Irigaray explores the gendered significance of this instrument in both literal and metaphoric terms: "[M]an's eye—understood as substitute for the penis—will be able to prospect women's sexual parts, seek there new sources of profit." LUCE IRIGARAY, SPECULUM OF THE OTHER WOMAN 145–46 (Gilliam C. Gill trans., Cornell
The end of the nineteenth century brought new devices into obstetrics and gynecology. Medical men installed the episiotomy and stirrup tables as necessities in the delivery room: the former technology whether it was needed or not, and the latter for their own convenience at the expense of laboring mothers. As a complement to imposing unneeded technology on women, the dislodging of midwives took away from women some of what they needed. Hospital delivery pulled the mother away from her support system at home and deprived her of midwife assistance (such as cooking and caring for her older children); the decline of the midwifery profession in the nineteenth century also cut women off from access to information about contraception, and as a result they bore more children than their grandmothers did.

Electronic fetal monitoring was the major obstetrical innovation of the twentieth century. The physician who led the development of this technology, Roberto Caldeyro-Barcia of Uruguay, ultimately became appalled by its overuse in uncomplicated deliveries, just as his progenitor Smellie had objected two hundred years earlier to the overuse of his forceps. Electronic fetal monitoring is still routinely employed, long after randomized clinical studies have demonstrated its lack of safety and efficacy.

University Press 1985) (1974). To Irigaray, evoking Plato and others, the speculum is a “concave mirror,” concentrating rays of light to explore “the secret of the caves.” Id. at 146; see infra notes 272–73 and accompanying text (discussing feminist connotations of the senses of sight and touch).


116. See ZIMMERMAN, supra note 13, at 17; see also supra notes 1–3 and accompanying text.


118. See WAICMAN, supra note 15, at 70–71.

119. See MENDELSON, supra note 3, at 152–53.

120. See supra note 4 and accompanying text. One writer who has examined this technology as both a researcher and a woman in labor has noted that electronic fetal monitoring “increases the drama in the delivery suite,” allowing obstetrical personnel to see themselves as specialists who deal with urgent medical crises; the “forced immobility” of being wired and tied to a machine may irk the mother, but a row of fast-changing visual images lends hurry and urgency, and perhaps an air of importance, to the work of providers. Kunisch, supra note 4, at 58; see also Barad, supra note 7, at 110 (quoting an unnamed laboring mother: “As soon as I got hooked up to the monitor, all everyone did was stare at it. The nurses didn’t even look at me anymore when they came into the room—they went straight to the monitor. I got the weirdest feeling that it was having the baby, not me.”).
Writing in the *Journal of the American Medical Association*, physician David Grimes has charged that "physicians not only accept new technology without a critical appraisal, but they also seem to worship it."¹²¹ Away from the delivery room, throughout the practice of medicine, machines and mechanics meet the varying emotional, psychological, and dramaturgical needs of physicians.¹²² One public health scholar maintains that a physician today can comprehend symptoms only with reference to the way instruments measure them, not by the patient's complaints, descriptions, or obstacles to daily living.¹²³ Medical technology thrives—and perpetuates itself, colonizing new spaces—because of what it gives to the doctors who use it, more than because of its benefits in healing.¹²⁴ If medicine's machines do not derive from imperatives of healing, then they must come from some other point of origin. Compelling evidence indicates that one important antecedent has been the desire to exclude and subordinate women in the practice of medicine.¹²⁵

**B. Librarianship: "The Erosion of a Woman's Profession"¹²⁶**

Like medicine, the profession of librarianship took a turn for the masculine following an early-twentieth-century Carnegie initiative. In 1918 the Carnegie Corporation commissioned Columbia University economist Charles C. Williamson to report on the future of library education.¹²⁷ Like Abraham Flexner before him, Williamson gave the Carnegie founders a prescription that he could

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¹²². The stethoscope, for instance, in origin has little to do with any imperative of care: for centuries a physician would listen for a heartbeat by putting his ear to the patient's chest, and by all accounts this method worked fine until one doctor in 1816 felt uncomfortable when pressing his head against a young woman. See Waicman, supra note 15, at 70.


¹²⁴. See id. at 33 (identifying five psychological benefits of medical technology for physicians: appeal to their sense of wonder and curiosity, lure of the immediate, unambiguous values, avoidance of uncertainty, and power).

¹²⁵. See generally Ehrenreich & English, supra note 77, at 40 (noting that society has viewed physicians as idealized Men and credited such male doctors with the exclusive ability to cure patients).


¹²⁷. See Hildenbrand, supra note 20, at 44.
have stated in four words: higher standards, fewer women. And like Flexner's report, the Williamson advice was welcomed by its audience and proved immediately influential.

After Williamson emphasized the "need of checking the feminization of library work as a profession," Columbia University and the University of Chicago established academic programs to provide the necessary training. Backed by his Carnegie funders, the Williamson report installed a two-tier scheme of librarianship. Women would continue attending schools like the Pratt Institute, which emphasized clerical tasks and the needs of employers. Low-prestige female librarians were indispensable: at least since 1877, administrators had been deeming women librarians a stupendous bargain, eager to work productively for tiny wages. Men, who received almost all the Carnegie grants awarded from 1929 to 1942 to study librarianship in the elite new programs, were to fill the small amount of room at the top.

Today this space at the top can often be identified by the word "information." To some feminist librarians, the term is code for the exclusion of women in the profession. Suzanne Hildenbrand, who cast a feminist eye on the fifty programs in Library and Information Science that are accredited by the American Library Association, found that men predominate in the information science part of the program, while women predominate in library science. Schools favor the information side over the library side when they create full-time faculty lines, even though library science usually attracts larger enrollments. Even when the word "information" is omitted in job titles, librarians are aware of the masculine privilege connotated by

129. Hildenbrand, supra note 20, at 44.
130. See WILLIAMS, supra note 21, at 31 (quoting Justin Winsor, the first president of the American Library Association: "They soften our atmosphere, they lighten our labor, they are equal to our work, and for the money they cost—they are infinitely better than equivalent salaries will produce in the other sex.").
131. See Peggy Sullivan, Carnegie Fellowships for Librarians 1929-1942: A Microcosm of Carnegie Corporation and American Library Association Joint Enterprise, 31 LIBR. & CULTURE 437, 439-42 (1996); see also WILLIAMS, supra note 21, at 36-37 (summarizing a 1904 article in Library Journal stating that women were not capable to hold "the highest administrative positions in libraries", but [were] amply qualified to head 'small or medium sized libraries'").
132. See Hildenbrand, supra note 20, at 45 (adverting to "the old adage: Information science is library science for boys").
133. Among the fifty programs, six schools offer non-ALA accredited master's programs in information science, attracting mostly male students. See id. at 45.
134. Id. at 46.
phrases like "systems librarians, automation consultants, special librarians, [and] automated system vendor representatives." An early essay on the future of the high-tech library described the same dichotomy by noting that women in libraries tend to work in "data," while men are over-represented among "knowledge workers." Detriments to women—barriers to advancement, vulnerability to displacement by computers—follow from the division.

Technology pervades every aspect of this occupational divide, redefining the very essence of libraries and librarianship. Although many female librarians celebrate its contributions, it also conduces to segregation. Once the Carnegie-shaped gender-hierarchy is in place, men above and women below, it appears only natural to allocate technologies on the basis of gender: to fill the ranks of "designers, owners, analysts and executives" from one group and relegate "input, assembly and processing" to the other; to favor men with extra places in the high-prestige sectors of the profession, such as the larger public libraries and research institutions. And so technology in the library can belittle a woman's place there either by

137. See Roma Harris, Information Technology and the De-Skilling of Librarians, COMPUTERS IN LIBR., Jan. 1992, at 8.
139. An informal poll of law library directors, conducted by Robin Mills Schreiber of Emory, indicated considerable enthusiasm about technology among these directors, many of whom are women. See also Laurie Larwood, Women Workers as Users of Computer Technology, 12 COMPUTERS IN LIBR. 38, 39 (1992) (reminding librarians that the original technology in libraries is "the printing press and moveable type," without which librarians and libraries would not exist).
140. Pritchard, supra note 135, at 3. Through his comprehensive surveys of gay male librarians, James Carmichael has refined this point about gendered technology. Almost every respondent who answered Carmichael's question about technology felt that "the computer has improved the male librarian stereotype" of "hair in a bun... glasses on a chain" effeminacy. James V. Carmichael, The Gay Librarian: A Comparative Analysis of Attitudes Toward Professional Gender Issues, 30 J. HOMOSEXUALITY 11, 38-40 (1995).
141. See WILLIAMS, supra note 21, at 12. Law school librarians line up in the same pattern. A 1998 study found that although women held 65.3% of the librarian jobs in law schools, men held a disproportionately large share of the higher-status teaching positions; men also held a majority of the tenured or tenure-track library positions. See Marina Angel, The Glass Ceiling for Women in Legal Education: Contract Positions and the Death of Tenure, 50 J. LEGAL EDUC. 1, 2-3 (2000).
its relative absence—one example being the subspecialty of children’s librarianship—or by its presence, as in the case of cataloguing.

Considered at one time “the core function of the profession,” cataloguing has turned into feminized clerical work, available for purchase from vendors who sell online databases and bibliographic utilities. Administrators say they cut cataloguers from library payrolls because cataloguers are too “expensive,” while computer budgets mushroom. Many accredited programs in library science have no full-time faculty specialist in classification or subject cataloguing. “As is typical of women’s work generally, cataloguing has been ignored and undervalued (except by other cataloguers, of course) at the expense of libraries and their users,” claims Canadian librarian Roma Harris.

A counterpart to this ignoring and undervaluing of women’s catalogue work is the overvaluing of certain technologies, expressed in the credo that patrons can find whatever they want via a computer without professional assistance. This belief persists, even though the inadequacy of such retrieval devices as truncation and Boolean logic, as well as other entrenched shortcomings of electronic data searching—including persistent subject search failure (i.e. zero hits), information overloads (too many hits), idiosyncrasies that make the language necessary in one system useless in another, and poor capacity for the user to view several “cards” or screens simultaneously—have long been documented in the library literature. Because the first Web search engines were developed by

142. Harris, supra note 137, at 10.
144. See Hildenbrand, supra note 20, at 46.
145. Harris, supra note 137, at 11. Other writers lament the decline of cataloguing. See, e.g., Walt Crawford, Starting Over: Current Issues in Online Catalogue User Interface Design, 11 INFO. TECH. & LIBR. 62, 71 (1992) (“[A]n online catalog is a terrible catalog, and there is no way to fix that.”); HAFTER, supra note 143, at 72 (noting that expanded databases now stretch beyond the knowledge base of cataloguers, who at one time would review all of the materials in a subject); Topsy N. Smalley, Computer Systems in Libraries: Have We Considered the Tradeoffs?, 19 J. ACAD. LIBRARIANSHIP 356, 357 (1994) (claiming that cataloguers have ceded “bibliographic control” to programmers, causing “inconsistent record access”).
146. See Smalley, supra note 145, at 359 (citing sources). Forbes magazine, not exactly a feminist critic of information technology as it is marketed by large corporations, ran an unflattering story on how commercial data providers like Dow Jones and Dialog have performed in response to Internet competition. One librarian interviewed for the article rebuked Dialog for its newer pricing structure, a measure that the reporter called “a slap in the face to loyal librarians” that has, so far, not yielded profits to the company. Seth Lubove, Dial-A-Mess, FORBES, Jan. 24, 2000, at 69. Consistent with Smalley’s criticism
nonprofessional entrepreneurs rather than librarians, “accuracy and completeness” have now been forfeited so thoroughly that the user no longer even notices their absence.\textsuperscript{147}

De-skilling within librarianship has consequences for women (and men) who have no intention of seeking employment in libraries, similar to the way male hegemony in American medicine has affected all women (and men), regardless of their occupation. Among the myriad consequences of segregation in the library, argues Christine Williams, is the buttressing of a belief that women have only themselves to blame for their inferior status. The standard response to charges of discrimination against women in libraries is that female librarians are so numerous that they could easily topple the male élites above them if they wanted to: the fact that they have not done so, according to one male writer, “strengthens the suspicion that despite what anyone says, women are more passive and less keenly professional than men.”\textsuperscript{148} This influential conclusion is a statement about all women, not only women librarians.

Another consequence of barring women from decision-making authority in libraries must show up inevitably in the content of the catalogues, CD ROMs, links to the Internet, and bibliographic utilities—to say nothing of books—that are necessary to consolidate, expand, and disseminate knowledge among persons in all occupations. “What’s in all those databases and networks?” demands Sarah Pritchard. “How is it indexed? Who’s doing communication networks, and through whose graces can you get to them?”\textsuperscript{149}

Academic librarian Martin Raish recalls an old movie:

\begin{quote}
about misplaced corporate priorities that affront librarianship, Dialog’s strategy “these days is to appeal to the end user, rather than intermediaries who formerly did most executive researches,” \textit{id.} at 70—another example of how technocentric expansionism tries to deny the very existence of female professionals, to say nothing of the value that they deliver to their clients. The article was circulated extensively in the electronic Law Library Discussion Group. \textit{See} E-mail from Lenore Glanz, reference librarian, Chicago-Kent, to Anita Bernstein (Jan. 29, 2000) (on file with the North Carolina Law Review).
\end{quote}

\textsuperscript{147} Martin Raish, \textit{Academic Librarians Offer the Crucial Human Element in Online Scholarship,} \textit{CHRON. HIGHER EDUC.}, Apr. 21, 2000, at B4, B5. Raish adds that students type “a word or two in a box, hit the enter key, and are happy with the 35,174 items they retrieve.” \textit{Id.}

\textsuperscript{148} \textit{WILLIAMS, supra} note 21, at 47 (quoting a 1971 statement by librarian John Cary); \textit{see also id.} (quoting a 1985 article that attributed women’s concentration in low-level library work to “their ‘inability to acquire and demonstrate power when applying for a position’ ”).

\textsuperscript{149} Pritchard, \textit{supra} note 135, at 5; \textit{see also ZIMMERMAN, supra} note 13, at 63-64 (summarizing research on how information about women is omitted from proprietary databases and expressing concern about it: “People may recognize that books have biases, errors and omissions, but they rarely recognize that computers do.”).
In the 1957 film *Desk Set*, a group of librarians (led by Katharine Hepburn) squares off against an efficiency expert (Spencer Tracy) who has been hired to install a large computer in their corporate library. They are fearful that their skills as researchers and information experts will be devalued—that they may even be replaced by the "electronic brain." That is not the plan, Tracy assures them. EMMARAC—the Electromagnetic Memory and Research Arithmetical Calculator, affectionately called Miss Emmy—"is not going to take over," he says. "It's just here to help you."... Because this is a Tracy-Hepburn romance, we all know that the machine will help them fall in love, and that they will live happily ever after.\(^{150}\)

Differing from this fiction, commentators have concluded that librarianship as a profession has been withering in a vaunted Information Age. Outside experts control librarians from above,\(^{151}\) patron contact has become the province of "informally trained paraprofessionals" who cannot be promoted,\(^ {152}\) and "system and software vendors" have redefined access to knowledge as a commodity.\(^ {153}\) Some go so far as to argue that the library has become an industrial plant in the nineteenth-century mode, where large pools of female labor (resembling Hepburn and her colleagues) follow the orders of management typically embodied in male, to-be-played-by-Spencer Tracy outsiders.\(^ {154}\) In this locale, technology fosters and rationalizes the subordination of women.

### C. Sociology and the Social Sciences

"[T]he purpose of the social sciences is explanation," writes Canadian social scientist Lynn McDonald: "why certain events happen and others do not."\(^{155}\) All the social sciences, especially (but not only) sociology, take an interest in the shared lives of human beings in communities. Explanation coming from these sciences can impel radical change. As McDonald puts it, when researchers seek "causes and effects in a real, social world... the results may be

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152. Hildenbrand, *supra* note 20, at 47.
profoundly critical of existing social arrangements.”5

Any insistence that social science remain neutral or value-free defies history: at the
time of its coinage the term “social science,” singular, stood for
progress, having emerged with reference to a melioristic political
agenda in post-Revolutionary France.6

Despite this liberal pedigree, a puzzling conservatism undergirds
the social sciences. As several writers have noted, social science as an
occupation tolerates or perhaps even encourages complacency and
social inaction among researchers, who are rewarded for their cool
reportage of problems, but almost never for helping to solve them.7
Sociologists have theorized extensively about how and why the social
sciences became estranged from participation in the worlds under
study.8 Without rejecting any of the analyses, I would build on them
by suggesting that a technology of gender-oppression also operates in
this professional realm. Mechanistic, quantified, abstract, neutral-on-
the-surface conceptions of knowledge have become ascendant in the
social sciences in part because they help to subordinate women, in a
milieu where some individuals feel threatened by the prospect of
gender-equity.

Seizing the social sciences helps the enemies of gender-equity to
make segregation stronger in at least three ways. First, reducing the
social sciences to numbers helps to exploit, while also strengthening, a
convenient stereotype that the female brain is adverse to (or, to put it

156. Id. at 10.

157. See Ann Oakley, Gender, Methodology, and People’s Ways of Knowing: Some
Problems with Feminism and the Paradigm Debate in Social Science, 32 SOC. 707, 719–20

158. See, e.g., Herbert Blumer, Threats from Agency-Determined Research: The Case
of Camelot, in THE RISE AND FALL OF PROJECT CAMELOT: STUDIES IN THE
RELATIONSHIP BETWEEN SCIENCE AND PRACTICAL POLITICS 153, 165–67 (Irving L.
Horowitz ed., 1974) (attacking the passive role of sociology in militaristic neo-colonial
government policy); Toby Epstein Jayaratne, The Value of Quantitative Methodology for
Feminist Research, in THEORIES OF WOMEN’S STUDIES 140, 147–48 (Gloria Bowles &
Renate Duelli Klein eds., 1983) [hereinafter THEORIES OF WOMEN’S STUDIES] (objecting
to the convention in graduate education of telling students little or nothing about how to
disseminate their research and put it to use); PETER HARRIES-JONES, INTRODUCTION TO
MAKING KNOWLEDGE COUNT 1, 15 (Peter Harries-Jones ed., 1991) (lamenting the
“chilling effect” that standard research methods have on “social intervention”).

159. See, e.g., Blumer, supra note 158, at 165 (faulting military-industrial influence on
research); Joe R. Feagin, Soul-Searching in Sociology: Is the Discipline in Crisis?, CHRON.
HIGHER EDUC., Oct. 15, 1999, at B4, B5 (noting that government bureaucracies have
funded sociology departments known for their quantitative predilections, such as those at
Indiana and Pennsylvania State universities); Shulamit Reinharz, Experimental Analysis:
A Contribution to Feminist Research, in THEORIES OF WOMEN’S STUDIES, supra note 158,
at 162, 166–72 (blaming “conventional or patriarchal” research methodology).
more bluntly, bad at) mathematics and related subjects.\textsuperscript{160} If enough people believe that girls and women are inherently ill-suited to mathematics, logic, and quantification, and enough people believe that quantification is at the center of the social sciences, then this entire domain will remain relatively protected from female participation—and from female social scientists who would otherwise compete with men.\textsuperscript{161} Second, leaching context and policy out of work and study tends to alienate girls and women, and to put a field under increased male domination.\textsuperscript{162} Third, the exclusion from social science of non-quantitative data helps to cast almost every feminist contention or demand that social scientists make as little more than agitprop, outside the privileged sanctum.

The consequences of this pattern range far and wide. Whereas everyone knows what a physician or a librarian is, the boundaries of "social sciences" elude easy recognition. Accordingly, I discuss the social sciences along a developmental, rather than an occupational, axis. We start with the bad-at-math stereotype. Later in a woman's life, the effects of this weeding-out device continue: first a surrounding context, and then political engagement, get posited out of social science. While numerous professions and disciplines—sociology, social work, anthropology, psychology and others—are affected in separate ways, the social-science consequences of technocentric expansionism transcend occupational divides.\textsuperscript{163}

\begin{itemize}
\item \textsuperscript{160} "The National Research Council has found that the more math that is required for a particular job, the higher the pay and the lower the rate of female participation." SCHIEBINGER, supra note 48, at 162.
\item \textsuperscript{161} For a portrait of sexism in the social sciences as a way to suppress female competitors and credit their contributions to men, see Naomi Weissstein, \textit{How Can a Little Girl Like You Teach a Great Big Class of Men? the Chairman Said, and Other Adventures of a Woman in Science}, in \textit{WORKING IT OUT} 241, 247 (Sara Ruddick & Pamela Daniels eds., 1977).
\item \textsuperscript{162} An ethically diverse group of British women told researchers that they found the context-stripping of science "absurd, unreal, and divorced from the reality of their own lives." JEAN BARR & LYNDA BIRKE, \textit{COMMON SCIENCE? WOMEN, SCIENCE AND KNOWLEDGE} 15 (1998).
\item \textsuperscript{163} Keith Kilty and Thomas Meenaghan, a social work professor and social work dean respectively, dichotomize disciplines and professions: "Whereas disciplines are primarily concerned with knowledge, the professions are primarily concerned with doing something to promote some activity or change." Keith M. Kilty & Thomas M. Meenaghan, \textit{Social Work and the Convergence of Politics and Service}, 40 SOC. WORK 445, 446 (1995). This section and the Article as a whole take a contrary view, finding agendas for change in even the most abstruse disciplines. Later in their article Kilty and Meenaghan retreat from their dichotomy, finding an emergent notion of "discipline" within the profession of social work. \textit{See id.} at 449–52.
\end{itemize}
1. The Math Stereotype: Exclusion in Action

Although this generalization grows steadily weaker, males outperform females in several areas associated with ability in mathematics: for example, boys outscore girls on the math section of the SAT;\(^{164}\) more men than women receive graduate degrees in mathematics and similar subjects, such as computer science, even though women are a majority of matriculated college students overall;\(^{165}\) and men occupy a disproportionately large share of the tenured academic posts in these departments.\(^{166}\) Perhaps equally important, teachers often regard their young female pupils as ill-suited to mathematics even when these girls are performing well, and to think of boys who perform poorly as having significant potential that is temporarily concealed by laziness or inattention.\(^ {167}\) The problematic relation between women and those academic subjects that involve numbers has garnered tremendous attention in the United States and internationally.\(^ {168}\) While a few writers insist that the female brain is simply inferior at math,\(^ {169}\) informed opinion (as contrasted with glib Mars-Venus dichotomies) holds that there is no basis to suppose that women are by nature ill-suited to grasp

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164. In 2000, boys scored an average of 533 on the SAT-Math, whereas girls scored an average of 498. About 94,000 more girls than boys took the test, and among the SAT-takers, more boys than girls were enrolled in or had taken calculus and physics. See Rachel Smolkin, Girls' SAT's Still Lag Boys', PITTSBURGH POST-GAZETTE, Aug. 30, 2000, at A1.


166. See Andrew Lawler, Tenured Women Battle to Make It Less Lonely at the Top, 286 SCIENCE 1272, 1272 (1999) (reprinting National Science Foundation data showing that "women make up only 12.5%" of associate professors and full professors in the natural sciences and engineering).

167. See BARR & BIRKE, supra note 162, at 113.


169. The leading respectable expressions of this view are still Camilla P. Benbow & Julian C. Stanley, Sex Differences in Mathematical Ability: Fact or Artifact?, 210 SCIENCE 1262 (1980); Camilla P. Benbow & Julian C. Stanley, Sex Differences in Mathematical Reasoning Ability: More Facts, 222 SCIENCE 1029 (1983). Steven Goldberg writes that it is unfair to blame sexist stereotyping: most (but not all) women really are bad at logic and quantification, he contends. See STEVEN GOLDBERG, THE INEVITABILITY OF PATRIARCHY 209 (1973) (noting that 'bad at math' is only one of many possible negative stereotypes about women, the others almost never asserted, which suggests that bad-at-math must have a degree of truth: "Why is the stereotype that 'women are illogical' and not that 'women are inarticulate' or 'women are unperceptive'? ").
ENGENDERED BY TECHNOLOGIES

mathematical concepts, and that they fare worse because of social practices.170

Measures of inherent gender-inferiority based on anatomy or biology are dubious, or at least controversial, whereas no scholarly writer has denied that socialization often strengthens and verifies a sense of inferiority among girls and women with respect to mathematics, mechanics, and quantification. This orthodoxy about normal female inferiority appears early, in school. The Educational Testing Service and the College Board, for instance, write standardized tests like the SAT and the Advanced Placement examinations in secrecy, account to no reviewers (even though governmental authority rides on their proclamations about student talent), and do not reveal their bases for composing questions.171 The SAT does a poor job of predicting college grades,172 and is even less able to predict who will succeed in research.173 A veneer of false neutrality hides the gender-politics behind standardized tests.174

170. See generally WALKERDING, supra note 168 (summarizing evidence). Girls earn better grades than boys in school mathematics classes, although they feel less confident about their abilities. See Betty M. Vetter, Myths and Realities of Women's Progress in the Sciences, Mathematics, and Engineering, in THE EQUITY EQUATION, supra note 58, at 29, 30–32. UNESCO data suggest that attitudes toward women and mathematics in various nations are unpredictably allocated. In Kuwait, for instance, where women cannot vote, they comprise a narrow majority (51.6%) of engineering students; in Poland, women receive 62.7% of mathematics and computer science degrees. See Jerry A. Jacobs, Gender Inequality and Higher Education, 22 ANN. REV. SOC. 153, 168 (1996).


172. See Jane Butler Kahle, Opportunities and Obstacles: Science Education in the Schools, in THE EQUITY EQUATION, supra note 58, at 81–82 (summarizing data showing that both the SAT and the ACT underpredict women's performance in college).

173. See SCHIEBINGER, supra note 48, at 176.

174. For instance, the math gender gap on the SAT emerged in 1972—which just happened to be the year that Title IX put pressure on educational institutions to come up with a reason for treating girls and boys unequally. See Goleman, supra note 168 (quoting activist Eleanor Smeal). Also in 1972, the Educational Testing Service made changes in the verbal half of the test to give boys a tiny advantage there: whereas in the past girls had outscored boys, ETS managed to give an advantage to boys by deliberately adding references to science and sports in the reading comprehension passages. See SCHIEBINGER, supra note 48, at 174 (describing how the Center for Women Policy Studies documented this ETS intervention). ETS has never undertaken a similar effort on the math test in behalf of girls, even though experts have established that such a revision would be easy and effective. See id. at 175. “As early as 1973,” writes Schiebinger, “Thomas Donlon of ETS noted that the gender gap in the SAT-Math could be reduced by an increase in the number of algebra questions (on which women excel) and a decrease in the number of geometry questions (on which men score better).” Id.
Conjuncture about the gendered brain rests on an equally shaky base. Speculation that fetal exposure to testosterone may cause small asymmetries in parts of the cortex that are believed to process visual information, thereby creating male superiority in perceiving spatial relations, originated without the benefit of human neuroanatomy studies or a known relation between cortical asymmetry and optical orientation. Most tests designed to measure spatial ability show no difference between males and females, and “it is unclear just what is being measured.” Visual-spatial skills can be “learned skills,” suggesting that if girls were directed to tinkering, model construction, and block-building to the extent that boys now participate in these activities, the already small gender gap in measured abilities would get smaller. At the moment, gendered-

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175. Regarding research into sex differences, psychologist Helen Thompson Woolley stood firm: “There is perhaps no field aspiring to be scientific where flagrant personal bias, logic martyred in the cause of supporting a prejudice, unfounded assertions, and even sentimental rot and drivel, have run riot to such an extent as here.” Quoted in Lynda Birke, In Pursuit of Difference: Scientific Studies of Women and Men, in INVENTING WOMEN: SCIENCE, TECHNOLOGY AND GENDER 81, 101 (Gill Kirkup & Laurie Smith Keller eds., 1992). Woolley spoke back in 1910. Perhaps times have changed.

176. Some add a sociobiological fillip, contending that ancient experience with hunting demonstrates, or has caused, a male advantage in processing visual-spatial information. For instance, anthropologist Helen Fisher attributes the “spatial prowess” of men to their testosterone, and continues:

A million years ago, men used their spatial genius to track zebras and wildebeests. Ten thousand years ago they shot tiny birds on the wing. In the past hundred years, men have used their spatial and mechanical wizardry to string the world with telephone cables, enliven our homes with radios and TV sets, and walk on the moon. FISHER, supra note 73, at 129. As if these leaps of logic weren’t nimble enough—where did “mechanical wizardry” come from? what does spatial talent have to do with the male monopoly on moonwalking?—Fisher’s next two sentences stretch even further from the ostensible starting point: “Tomorrow’s men will continue to design and operate our complex computers—as well as high-tech medical equipment. Because men are so technically proficient and so concerned with rank, male doctors tend to seek the top-level jobs in the most prestigious medical specialties.” Id. at 129–30.

Kathryn Abrams has a crisp rejoinder to the sociobiological notion that ancestral experience with hunting gives men an edge in visual orientation. See Kathryn Abrams, Social Construction, Roving Biologism, and Reasonable Women: A Response to Professor Epstein, 41 DEPAUL L. REV. 1021, 1023–25 (1992) (pointing out that keeping several toddler or running children in view is as challenging to one’s eyesight as hunting).


178. Birke, supra note 175, at 59; see also Paula J. Caplan et al., Do Sex-Related Differences in Spatial Abilities Exist?, 40 AM. PSYCHOL. 786, 797 (1985) (concluding that the literature is rife with errors, prejudice, and bad studies).

179. ANNE FAUSTO-SterLING, MYTHS OF GENDER: BIOLOGICAL THEORIES ABOUT WOMEN AND MEN 34 (2d ed. 1992) [hereinafter FAUSTO-SterLING, MYTHS]; see also id. at 34–35 (noting that Eskimos of both sexes test unusually well in spatial
brain conjunctures focus mainly on the corpus callosum, the bundle of nerve-fibers that connect the left and right brain hemispheres: as biologist Anne Fausto-Sterling has detailed, the corpus callosum is not a discrete organ but rather a collection of links to other parts of the brain, making its exact boundaries undefined and therefore its exact nature unknowable; depending on how they slice it—speaking literally—researchers obtain divergent evidence for their hypotheses, including those pertaining to gender. The brain is notoriously hard to study, but one might have hoped for more progress beyond the assertion made in 1674 that most women are intellectually inferior to men because their "cerebral fibre" is softer.

Even if the association between brain anatomy and mathematical ability were understood, however, socio-cultural factors are overwhelming. What else can explain why some societies do not cultivate a belief in female math-inferiority? If fetal hormonal exposure makes the male brain better in math—or indeed if any unvarying, absolute biological condition causes males to outperform females in this field—why do boys and girls perform equally well on standardized tests until junior high school? Perhaps most functioning, probably reflecting their cultural backdrop of vast expanses of snow, where even a small feature can be a significant landmark.


182. EASLEA, supra note 28, at 69 (quoting Nicholas Malebranche); see also Joan E. Bertin & Laurie R. Beck, Of Headlines and Hypotheses, in MAN-MADE MEDICINE 37, 40 (Kary L. Moss ed., 1996) (noting that “at the end of the nineteenth century the Surgeon General of the United States asserted as a ‘scientific fact’ that ‘the brain of a woman is inferior in at least nineteen different ways to the brain of a man’”).

183. See Jacobs, supra note 170, at 168.

184. According to 1997 data from the National Center for Education Statistics, boys and girls have similar mathematics and science proficiency scores at age 9; at age 13 the math scores are about the same for boys and girls, but since 1970 13-year-old boys have been slightly outperforming their female cohorts in science. See NAT'L CTR. FOR EDUC. STAT., FINDINGS FROM THE CONDITION OF EDUCATION 1997: WOMEN IN MATHEMATICS AND SCIENCE, 3–4 (1997), available at http://nces.ed.gov/pubs97/97982.html (last visited Aug. 26, 2001) (on file with the North Carolina Law Review). One seldom-noted point about the gender gap in high school math scores is that boys drop out of high school at a higher rate than do girls, suggesting that fewer low-scoring males than females have shown up for their tests. See Janet S. Hyde et al., Gender Differences in Mathematics Performance: A Meta-Analysis, 107 PSYCHOL. BULL. 139, 150 (1990). No one seems to think that hormones released at puberty activate a preexisting tendency formed by earlier hormonal exposure. See GOLDBERG, supra note 169, at 199 (rejecting this possibility). To explain the unexpectedly good job that young girls do on their childhood math tests as compared to their later inferiority vis-à-vis boys, the ever-ready
noteworthy of the gender gap in school-age mathematics, considering
the vast disparity that it is asked to support, is its small size:185
although the average girl performs about as well as the average boy,
the average female student considering a math major or the average
female candidate for tenure and other adult rewards will fare much
worse.186

The bad-at-math stereotype functions to exclude women in fields
other than the social sciences. Writers describe a variety of settings
where the stereotype has unfairly displaced women: unless being
good at math is pertinent to a subject, any gender that is bad at math
should be welcome there, just as persons of all heights and eye colors
are welcome. Gender-segregationists might have been expected to
demonstrate a relation between math talent and their field before
they could exclude anyone from the field based on lack of math
talent. Yet segregationists are held to no such standard.

Engineering and computer science offer examples, away from the
social sciences, of how the bad-at-math stereotype excludes girls and
women without good cause. Regarding engineering, one sociologist
Goldberg does suggest that the math topics in which school children get tested become
subtler and more difficult as the children grow older, thereby demanding more of the
typical girl than she can deliver. See id. at 198–99.

185. Goldberg mentions with scorn "the irrelevance of exceptions." A small gap, he
notes, is still a real gap: "the fact that there are some six-foot women and five-foot men"
does not disprove "the biological nature of human height." GOLDBERG, supra note 169, at
94–95. True. The flaw in this analogy is that the gap in average height between men and
women is not often used to justify a different gap (of much greater size), the way the small
math-test gap among school children is used to help entrench socially determined
outcomes, such as wage patterns or membership in a profession.

186. Continuing the point just broached, see supra note 185 and accompanying text,
feminists would contend that a woman who is talented at mathematics is entitled to the
same status rewards that "good at math" bestows on a man. She does not enjoy them. For
a summary that concludes that women hold lower ranks in the physical sciences and
engineering departments than can be explained or predicted by meritocratic measures
like publication rates, see GERHARD SONNERT, WHO SUCCEEDS IN SCIENCE? THE
SCIENCE 1271, 1271 (1999) (noting continuing discrimination against women faculty in the
fields of science and engineering); Jeffrey Mervis, High-Level Groups Study Barriers
Women Face, 284 SCIENCE 727, 727 (1999) (noting that only 5.9% of the National
Academy of Sciences members are women). But see generally JONATHAN P. COLE, FAIR
SCIENCE (1979) (insisting that women in science have received their due).

To illustrate the point with rough numbers, suppose that "in order to become a
respected engineer one must have a spatial ability in at least the ninety-fifth percentile of
the population." FAUSTO-STERNING, MYTHS, supra note 179, at 33. Based on current
test results, 7.35 percent of males would be above this threshold, compared to 3.22 percent
of the females. Assuming that the only obstacle to a respected engineering career was this
immutable inferiority, women should occupy a third of the total number of respected
engineering positions. Their actual share is much smaller. See id.
who has studied this profession extensively urges its leaders to “[r]emove scores on mathematics tests as the major standard of success in engineering education.”\textsuperscript{187} Experts have been urging to no avail since at least 1918 that mathematics should not be placed at the center of engineering education: at least eight important skills for engineers—covering verbal, visual, and manual tasks—are simply not taught or tested in the bachelor's programs.\textsuperscript{188} One engineer attributes mechanical disasters to the impoverished education of engineers, who are trained to see every problem they encounter “as an exercise in numerical systems analysis.”\textsuperscript{189}

Computer science in schools is another redoubt of unexplained segregation. When math stereotypes keep women and girls away from computer training, no explanation can justify the exclusion: “most computer applications are nonnumeric.”\textsuperscript{190} Younger girls tend to prefer the computer language LOGO; schools that offer programming have tended to teach them the algebraic BASIC, to no pedagogic advantage.\textsuperscript{191} Computer terminals do not grow spontaneously in the math corridor of a high school rather than, say, near the French language classroom: some decisionmaker sites them in one location rather than another.\textsuperscript{192}

2. Leaching Out Context

Quantification as a method focuses narrowly on a small set of criteria, gaining depth but casting aside large portions of what is being studied. Gendered implications follow. For instance, Christine Williams contends that the quantitative researcher’s preference “to concentrate on difference, focusing on the ‘tails of distributions and not their centers’ ” conduces to rigidity and a strongly dichotomous view of gender.\textsuperscript{193} Quantification-enthusiasm, Williams continues, means that experiments get designed and redesigned only for the sake of reliability; consistency of results gets pursued to the exclusion of all

\textsuperscript{187} Hacker, supra note 26, at 54.
\textsuperscript{188} Id. at 47.
\textsuperscript{190} Linda H. Lewis, Females and Computers: Fostering Involvement, in WOMEN, WORK, AND TECHNOLOGY 268, 270 (Barbara Drygulski Wright ed., 1987).
\textsuperscript{191} Id. at 276.
\textsuperscript{193} Christine L. Williams, Case Studies and the Sociology of Gender, in A CASE FOR THE CASE STUDY 224, 227 (Joe R. Feagin, Anthony M. Orum & Gideon Sjoberg eds., 1991).
else, including measures that would interest women. Another feminist sociologist, Dorothy Smith, argues that because quantification is so alien to their needs and experiences, women should eschew quantitative sociology altogether.

When applied to gender as a source of learning differences, these rather airy academic comments on quantification in the social sciences turn out a bit better-founded than one might first expect. Evidence from the literature on pedagogy does suggest that women and girls prefer to assess problems in some kind of context, as the means to an end. Men and boys, by contrast, are often interested in artifacts (such as computer manipulations and graphics) as ends in themselves. Studies of computers in employment report that girls and women express a desire for clear statements about the purpose and function of machines. Thus the distaste, or lack of interest, that some girls and women manifest when offered training in a technical subject may be distaste for only one of many possible approaches that can be used to present new material, rather than for an entire subject or discipline.

These findings emphatically do not say that male equals abstraction, female equals the concrete particular. The message rather is that enthusiasm for quantification and abstraction to the exclusion of all else tends to discourage female participation, whereas attention to the uses or consequences of these abstractions tends to stimulate this participation. Given this gender-divide and the

194. Id. at 239-40.
195. See Dorothy E. Smith, A Sociology for Women, in THE PRISM OF SEX: ESSAYS IN THE SOCIOLOGY OF KNOWLEDGE 135 (Julia A. Sherman & Evelyn Torton Beck eds., 1979). For an example of feminist disagreement with this suggestion, see Jayaratne, supra note 158, at 145-49 (contending that feminism and quantification are not inherently adverse concepts).
196. See Lewis, supra note 190, at 275-76 (citing Ellen McClain, Do Women Resist Computers?, POPULAR COMPUTING, Jan. 1983). One scholar, for instance, writes about the additional enthusiasm that girls brought to a programming exercise when the problem was presented as a way to read bar codes at cash registers. See Griffiths, supra note 17, at 151.
197. See Lewis, supra note 190, at 275-76; see also Geewax, supra note 50 (quoting a female executive: “The engineering pressure right now is very technology-gee-whiz focused, but there’s not much on ‘Why would I want to do this? How would I use it responsibly?’ ”).
198. See Kimberly Blanton, Market Values: There Should Be More to Economics Than Self-Interest, BOSTON GLOBE, Jan. 14, 2001 (Magazine), at 12 (reporting that several prominent women economists with strong mathematics credentials “question the profession’s growing reliance on mathematical techniques that, in seeking to describe the mechanics of the economy as a physicist might demonstrate a theorem, only obscure what is important about an economy: whether its actors are better or worse off, whether its outcomes are fair”).
attendant effects on status and even income, it behooves social scientists (and schoolteachers) to assess the losses and disadvantages of this exclusion. Until this accounting is made, feminist suspicion of quantification-fetish as a technology of gender-segregation remains justified.

3. Subtracting Political Engagement

A twentieth-century stereotype in the social sciences has assigned to men the role of thinkers, unaffected by any agenda other than the pursuit of Truth, and removed from the fray. In their complementary role, women are seen as bustling about, interfering and (at best) trying to do good. The social sciences place men serenely above desire, while women are allotted desire as a specialty: they nurture, meddle, or inject emotion into investigation. The expression of overt desire for change marks written work as not pristine, agitprop rather than scholarship. At most it can be only advocacy, which is always subordinate to real science.

As was mentioned, it is not obvious why the study of society reaches its highest peak when it refuses, in the name of science, to consider the possibility of making the world better based on what researchers learn. Both the origins of the social sciences and the imperiled state of society suggest that this attitude of cold, superior distance—a rejection of potential improvements even before they are known—forfeits much of the value of what social scientists find.

199. As Dorothy Smith elaborates, women in the workforce are assigned those tasks "which give concrete form to the conceptual activities. They do the clerical work, the computer programming, the interviewing for the survey, the nursing, the secretarial work." Dorothy E. Smith, Women's Perspective as a Radical Critique of Sociology, 44 SOC. INQ. 7, 10 (1974).

200. For an expression of this value in an essay sympathetic to feminist efforts, see Jerry A. Coyne, Of Vice and Men: The Fairy Tales of Evolutionary Psychology, NEW REPUBLIC, Apr. 3, 2000, at 27, 27 (contending that much of evolutionary psychology is advocacy rather than science).

201. This orthodoxy within social science is so odd and unexamined that observers have found it difficult even to pinpoint when, let alone why, it arose. Prevailing explanations of the orthodoxy neglect gender. The philosopher Jürgen Habermas, for instance, finds pertinent the enthusiasm that Auguste Comte held for the concept of positivism: this founding father of sociology, notes Habermas, used "positive" to rhapsodize about the actual versus the imaginary (real is better than chimérique), certainty versus the undecided, exact versus indefinite, and useful versus vain. See JÜRGEN HABERMAS, KNOWLEDGE AND HUMAN INTERESTS 74 (Jeremy J. Shapiro trans., 1978). In building sociology as a discipline, Comte invoked what resembles our contemporary dichotomy between hard and soft. See supra note 24 and accompanying text. But neither half of Comte's division rules out the political engagement that Habermas esteems.

Perhaps the Cold War provides a fuller explanation: in a militaristic era, it became rational for the social sciences to seek those privileges of the natural sciences that
The attitude would remain inert, however, without the animating motive of gender-segregation.

The divorce of social work from sociology is an occupational illustration of the same gendered phenomenon that removes political engagement from the social sciences. Consider the career of the most celebrated American social worker, Jane Addams, born in 1860. Addams began her professional career in 1889, when the division between sociology and social work was not yet sharp. By the middle of her career, according to Mary Jo Deegan, author of an intellectual biography, 202 a consensus had emerged that Addams was a social worker and not a sociologist. 203 Yet Addams fulfilled all the official defining criteria of a sociologist (a test prepared by a German scholar who claimed that the fulfillment of even one criterion would entitle an individual to this label)—especially recognition from the most exalted sociologists of the day that Addams was their peer and colleague. 204 Deegan concludes that the only basis for striking Addams from the ranks of sociology must be that her social work in Chicago—or even her informed, experienced-based opinions about what should change in society—somehow nullified her professional status. 205

This experience lines up with a professional division that endures. Social work has long maintained the commitment to societal improvement that the social sciences have tended to cast out and disparage. The commitment appears in the manifesto of this support a state of war, and thus to valorize the official natural-science ideals of neutrality and distance from politics. Academic sociology and political science were reputed in the postwar years to have a scandalous taste for Marxism, moreover, and so researchers acquired an incentive to appear neutral, free of this taint. The postwar National Science Foundation worked assiduously to promote an image of the social scientist as a dedicated laboratory technician. See generally Feagin, supra note 159 (summarizing this history); infra Part III.B (exploring the role of militarism in technocentric expansionism).

Theorizing along these lines is incomplete, I would contend, when it lacks attention to the tendency within the social sciences, especially sociology, to regard political engagement in feminine and therefore disparaged terms. "John Dewey," writes educator Ellen Lagemann, "was unusual among his peers in his insistence that theory and practice should be reciprocal. Not coincidentally, he was additionally unusual in his strong support for feminist causes." Ellen Condliffe Lagemann, Whither Schools of Education? Whither Education Research?, 50 J. TCHR. EDUC. 373, 374 (1999).

203. See id. at 314.
204. Id. at 9–13.
205. Id. at 313; see also id. at 8 (noting that after the first World War, sociology became a male discipline and social work a female one and that almost every woman trained in Chicago sociology in the early twentieth century was channeled into social work).
profession, a document filled with words about meliorism—"assist," "curative," "preventive"—aimed at augmenting "the maximum potential in individuals, groups, and communities." A social work Code of Ethics, promulgated in 1996, demands "social and political action" toward distributive justice, while a staunch professional literature continues to insist that social work embraces values that must be honored in the curriculum and in practice.

For nearly a century, however, social work has been haunted by a proclamation from none other than Abraham Flexner, the famed revisionist of American medical education, who warned an audience of social workers in 1915 that social work was in danger of never becoming a true profession. Although this looming prospect generated a mélange of reforms and reexaminations, some pointing in opposite directions, much of the effort cohered around an attempt to disparage the venerable "values" of social work, substituting technocentric innovations. Cost-cutting norms, the financing of social work through managed care, and individualistic or psychology-based theories of human behavior all conduced to a quasi-rigor. Gender lay below the roiling surface of these disputes. As social work scholar Mary Swigonski has argued, the posture of the


208. "A profession that prides itself on a humanitarian value base cannot rely on a research grounded in the assertion that its methods can and should strip values from its work and findings." Mary E. Swigonski, The Logic of Feminist Standpoint Theory for Social Work Research, 39 SOC. WORK 387, 388 (1994); see also Roberta R. Greene, Point/Counterpoint, Is Foundation Content An Archaic Educational Construct? Yes!, 36 J. SOC. WORK EDUC. 7, 9 (2000) (referring to "the social work mission," which emphasizes "the importance of social change"); Susan P. Robbins et al., Ideology, Scientific Theory, and Social Work Practice, 80 FAMILIES IN SOC'Y 374, 375 (1999) ("Social work is, by its very nature, a value-based profession.").

209. See Gibelman, supra note 206, at 299.

210. See STANLEY WENOCUR & MICHAEL REISCH, FROM CHARITY TO ENTERPRISE: THE DEVELOPMENT OF AMERICAN SOCIAL WORK IN A MARKET ECONOMY 88–89 (1989); Kilty & Meenaghan, supra note 163, at 448 (noting new emphasis on accountability and "the assumption that welfare [is] inherently negative").

researcher as understood by scientific positivism—distant from the
object studied, and standing in an attitude of "observation or
manipulation" in the name of objectivity—collides directly with social
work's goal of enhancing the dignity of clients. This collision,
according to Swigonski, should provoke a critical response from
feminists.\footnote{212 Swigonski, supra note 208, at 389–90; see also Larry W. Kreuger & John J. Stretch,
How Hypermodern Technology in Social Work Education Bites Back, 36 J. SOC. WORK
EDUC. 103, 111 (2000) ("Our laboratory is in the community, not in our offices.").}

A debate about mechanical technologies also infuses the disputes
about social work as a profession. Technological innovations have
imposed dubious new values into social work—including dexterity,
visual acuity, and education via equipment rather than student-faculty
interaction—and disparaged older ones. According to social work
scholars Larry Kreuger and John Stretch, social work holds
environmental conservation in high esteem, and therefore
disapproves of technological proliferation.\footnote{213 See Kreuger & Stretch, supra note 212, at 106–09. The authors write that the
production of a single six-inch silicon wafer generates 2,840 gallons of waste water, in
addition to other pollutants; they also denounce as contrary to social work values the
manufacture of plastics and semiconductors, especially in poor countries. See id. at 108–
09.}
The authors identify gender-exclusion as another consequence of
technology that is contrary to social work values: female social
workers, they claim, frequently find themselves alienated at their
workplace.\footnote{214 Id. at 109.}

Regardless of whether social work has used technology and
scientific positivism successfully to shore up its status as a profession,
the occupation itself remains an emblem of gender-segregation.
Seventy-five percent female and (perhaps as a consequence) very
badly paid, struggling for basic recognition, contemporary social
workers suffer the costs of an occupational dichotomy that disparages
political and social commitment as feminine.\footnote{215 Id. (citing Merete Lie, Technology and Gender Versus Technology and Work:
Social Work and Computers, 40 ACTA-SOCIOLOGICA 123, 123–41 (1997)).}
This dichotomy delivers occupational status and a venue for political engagement at a
price: the power that women attain via social work extends only over

\footnote{216 See Stanley Aronowitz, White Shirt, Blue Collar, THE NATION, June 14, 1999, at 54, 54.}
despised sectors of the population,\textsuperscript{217} while social work is routinely disparaged as grimy, trivial, and meddlesome.\textsuperscript{218} A contrasting ideal of social science lies pristine and out of reach.

D. Lower and Higher Education

One stable, constant, little-changed element of education policy in the United States is its rhetoric about the need for change. This rhetoric contains a distinctly gendered dimension. For more than a century the classroom and the mostly female teachers who work in it have been regarded as mute Nature—dumb, in two senses of that word—and thus ever in more need of discipline to secure male control. What, exactly, is wrong with American schools? Critics identify something resembling effeminacy.

1. Machismo and the Curriculum

Examining the familiar complaint that that schoolchildren in the United States do not get an education as good as prevails in other countries, the educator Gerald Bracey finds Cold War militarism and very few facts.\textsuperscript{219} Since the Sputnik era, popular attacks on American schools (notably a \textit{Life} magazine series that juxtaposed pictures of Russian boy-scientists against their clownish American counterparts\textsuperscript{220}) have decried weakness in the nation's training of future scientists, engineers, and mathematicians.\textsuperscript{221} When the Soviet Union began to fall apart in the 1980s, Bracey argues, a more robust enemy was invented to replace it: Japan, Germany and Korea put "a nation at risk"\textsuperscript{222} with their relentless skill in teaching mathematics and science to alien, eager-to-conquer and very foreign youngsters.\textsuperscript{223}

\begin{enumerate}
\item \textsuperscript{217} See Angela Woollacott, \textit{From Moral to Professional Authority: Secularism, Social Work, and Middle-Class Women's Self-Construction in World War I Britain}, 10 J. WOMEN'S HIST. 85, 88 (1998).
\item \textsuperscript{218} See CHARLES EDGLEY & DENNIS BRISSETT, A NATION OF MEDDLERS 137 (1999) (likening social workers to gossips and nosy neighbors); Dale White, Social Workers Focus on Family, SARASOTA HERALD-TRIB., Mar. 25, 1996, at 1A (noting the stereotype).
\item \textsuperscript{219} See Gerald W. Bracey, \textit{What Happened to America's Public Schools?}, 48 AM. HERITAGE 38, 40 (1997).
\item \textsuperscript{220} Id. at 44–46 (citing \textit{Crisis in Education}, LIFE, Mar. 1958).
\item \textsuperscript{221} Bracey, supra note 219, at 44.
\item \textsuperscript{222} U.S. DEP'T OF EDUC., A NATION AT RISK (1983). On the methodological errors and biases in this report and in alarms about education generally, see Evans Clinchy, Bashing American Schools, 51 NIEMAN REP. 58 (1997).
\item \textsuperscript{223} See Bracey, supra note 219, at 44–46, 51. For a vivid example of media overreaction to the nation-at-risk fearmongering, see Susan Tifft, \textit{The Future of U.S. Schools: A Crisis Looms in Science}, TIME, Sept. 11, 1989, at 68.
\end{enumerate}
The perdurable critique scapegoats both American teachers, who tend to be female, and tendencies associated with femininity, all in aid of a very questionable assertion. Elementary schoolteachers in the United States work longer hours, teach more classes, and have less preparation time for each class than their counterparts in eighteen other Western nations. Their efforts are far from unavailing: contrary to myth, American schoolchildren do not perform poorly in comparison to children in comparable countries. The American educational system coexists with unique American challenges: big gaps between rich and poor, erratic and vulnerable school funding, numerous household languages other than the English used at school, and a tradition of moderating academic pressures with recreational opportunities in a balance that many have found admirable. The education picture has been getting brighter rather than dimmer: the National Assessment of Educational Progress has reported "modest but steady" gains in American schooling ever since measurements began in 1970. Even if one were inclined to think that a rich country could do a better job of educating its children, moreover, schools simply have not earned blame for every social failure that the American public likes to lay at their feet.

2. The Slur on Teacher Autonomy

Just as science and mathematics in the curriculum stand for the need to extirpate those feminine tendencies that weaken the nation against its foreign rivals, back-to-basics educational reform seeks to defeat what it disparages as maternal: a nurturing, contingent, subjective approach to education. Here I offer no contention about
a female voice in the classroom nor, certainly, would I say that women are good teachers by nature. The target of technocentric expansionism identified here is rather the authority and spontaneity of teachers, who are mostly women. This potential is suppressed within a system that often gives plenty of voice, and therefore power, to administrators, parents, teachers-union officials, school boards, and education consultants. As the curriculum scholar Madeline Grumet has pointed out, nothing inherent in the idea of a curriculum presupposes rigid control from above: in order to carry out its mission, indeed, a curriculum demands "action rather than ... acquiescence" by the teacher. Yet top-down acquiescence is proposed as a universal cure for what technocentric expansionists deem a dangerous irregularity.

In this standard picture of educational reform, the teacher is deficient, but unfortunately we are stuck with her: attracting a brighter or more virile substitute in the market would cost too much. This mild-mannered menace would inflict less harm on "a nation at risk" if managers and administrators issue strong "prescriptive remedies and packaged answers" that curb her natural tendency to stray from order. While one cannot condemn all these remedies and answers in one blast, many share the themes of centralization and a superseding of individual teachers.

"technology." Most usages refer to control and a lost, mythic past. See generally Alfie Kohn, The Schools Our Children Deserve: Moving Beyond Traditional Classrooms and "Tougher Standards" 5–6 (1999) ("Back to basics? When did we leave? . . . We used to copy facts from the World Book; today, our kids download them from the Web.").

230. GRUMET, supra note 224, at 172; see also Glenda Griffin, Teaching as a Gendered Experience, 48 J. TCHR. EDUC. 7, 9–12 (1997) (summarizing research findings and anecdotes about thwarted autonomy).


232. See Salary Squeeze, NEA TODAY, Apr. 2000, at 7 (noting that despite the hue and cry over inadequate pay for teachers, the problem is unabated); cf. JORDANOVA, supra note 38, at 30–31 (summarizing the view that childrearing is too important to be left to women, but because men are too important to perform mundane tasks, women should obey the childrearing orders that husbands, physicians, and other male authority figures give them).


234. At the national level, a voguish Comprehensive School Reform Demonstration program offers a docile response to these accusations. Under this $145 million federal appropriation, anyone who "comes up with a school reform model and can get a district to write up the application" can receive a $50,000 planning grant to import a model with a cheerful title: Success for All, Core Knowledge, and Accelerated Schools are especially...
The connection between technocentric expansionism and educational reform has been summed up with reference to Frederick Winslow Taylor, the management consultant who at the turn of the twentieth century broke jobs into interchangeable units and measured them with time-and-motion studies.\(^\text{235}\) A more recent connection between technocentric expansionism and education reform derives from the influence of military ideology on the design of public education:\(^\text{236}\) a Chicago school superintendent told a journalist that the officer's training manuals he had received during his decade in the National Guard Reserves inspired him to install a scripted curriculum.\(^\text{237}\)

Along with reining in the autonomous teacher, technocentric expansionists have decreed that the measure of teaching is quantitative: better numbers on standardized tests.\(^\text{238}\) President George W. Bush devoted a large portion of his first major domestic initiative to a call for annual testing in the schools.\(^\text{239}\) Even before such encouragement, standardized tests had been flourishing, in part because they are profitable for the businesses that prepare and grade them; for local government units, they are cheap and efficient to administer.\(^\text{240}\) School districts are now eager consumers of this popular products. See Richard Whitmire, Reforming School Reforming Movement: Panel Suggests Standards, GANNETT NEWS SERVICE, Feb. 2, 2000, available at Lexis, News Group File. Even the noted back-to-basics entrepreneur E.D. Hirsch, a principal of Core Knowledge, has expressed concerns about the lack of commentary from research psychologists and sociologists who might have something to say about whether any of these packages work; many educators share this concern. See id.; see also Herbert J. Walberg & Rebecca C. Greenberg, Educators Should Require Evidence, 81 PHI DELTA KAPPAN 132, 133 (1999) (noting negative evaluations of reform programs and the paucity of data about their effects). See generally Nelson, supra note 231, at 389 ("The names keep changing...but the smell of a centralized, results-oriented, assessment-focused reform remains.").


237. See Jacques Steinberg, Teachers in Chicago Schools Follow Script from Day 001, N.Y. TIMES, Nov. 26, 1999, at A1. This masculine ideal is imposed on 26,000 teachers, 76.4% of whom are women.

238. For a survey of the relation between seizing control of classroom teachers and a focus on standardized tests, see Jodie Morse, Sticking to the Script, TIME, Mar. 6, 2000, at 60.


240. See KOHN, supra note 229, at 74–75.
The tests shape curricula: one script for Chicago schools that drew national attention included day-by-day increments modeled to track the Iowa Test of Basic Skills. Few partisans of standardized tests bother to wonder what exactly is being counted and measured. One favorite device, the norm-referenced test, ranks each pupil’s score against others. This model, originally created to sort individual children into different tracks and now misused to compare aggregate populations, cannot measure what, or how much, students have learned; it serves chiefly to identify a bottom tier of schools, students, and teachers. That which cannot be quantified—such as all the subjective elements of teaching—are posited out of measurement.

3. The Technology of Educational Bureaucracy

Top-down management places the administrator and the teacher in “separate spheres” that resemble the gendered divide between work and home, public and private. The line separates (male) curriculum developers from (female) curriculum deliverers. It is a vestige of the nineteenth-century identity of middle-class women as nurturers. A hundred years ago this notion gave some women an exceptional chance to join the world of respectable paid employment. Once women were admitted into the teaching profession, however, this alleged essence of theirs became the basis of prescribed docility.

Although a veneer occasionally covers the divide between those who command and those who obey commands, several observers

241. See Jim Yardley, A Test is Born, N.Y. TIMES, Apr. 9, 2000, § 4A, at 32 (noting increased demand for these tests).

242. See Steinberg, supra note 237.

243. See KOHN, supra note 229, at 77–80 (noting that norm-referenced tests exaggerate meaningless differences, report triumphs or gains that are rooted entirely on the competition’s having fallen, and promote a feeling of dejection among students); Alex Caputo-Pearl, How The Stanford 9 Test Institutionalizes Unequal Education, L.A. TIMES, May 2, 1999, at M6.

244. On “separate spheres” as ideology, see Linda K. Kerber, Separate Spheres, Female Worlds, Women’s Place: The Rhetoric of Women’s History, 75 J. AM. HIST. 75 (1988); on separate spheres in education, see Sara E. Freedman, Teaching, Gender, and Curriculum, in THE CURRICULUM: PROBLEMS, POLITICS, AND POSSIBILITIES 234 (Landon E. Beyer & Michael W. Apple eds., 1998).

245. See Freedman, supra note 244, at 207.

246. See Nelson, supra note 231, at 390.

247. For example one vendor, Success for All, requires teachers to consent before it will supply its module to a school. See http://www.successforall.net (stating that at least eighty percent of the teachers in a school must vote for “participation” before the vendor will supply the module) (last visited Aug. 28, 2001) (on file with the North Carolina Law
have refused to infer that teachers are autonomous. As feminist scholars have established in other contexts, the fact that women appear to accept or tolerate certain conditions does not mean that these conditions do not oppress women. Many decades of de-skilling in teacher education and practice have instilled in teachers the belief that they do not have, and cannot aspire to have, professional autonomy. Their apparent acquiescence in top-down bureaucratic management technologies does not necessarily manifest approval or consent.

In response to this bureaucratic gender-segregation, schools of education have failed to intervene in behalf of teachers, their alumnae and clientele. Education schools decline to use their power to challenge the notion of teachers as pawns. One critic argues that these faculties see themselves as designers and builders of models: they assign to “mostly male” administrators the task of mediating between male theoreticians and female classroom workers. A further layer of masculine authority is found in the central administration of universities, which see their schools of education as feminine (no matter how strenuously education-school leaders try to portray themselves as masculine theoreticians) and isolate them at the margins of campus.

E. Summary and Transition to Part II: Two Recurring Themes

The “culprit” of Four Professions and a Culprit is technocratic expansionism. Medicine, librarianship, the social sciences, and education have all exploited technologies of gender-segregation. Literal machines (such as fetal monitors) and cultural barriers (such

Review). Whenever teachers vote for a reform package they look like professional decisionmakers, or at least consumers: they choose a product rather than have it imposed upon them by a distant bureaucracy.

248. Educator Wade Nelson calls the teachers’ affirmative votes for Success for All and similar modules “the product of de-skilling that results from top-down movements and centralized control,” adding that “[m]andates and prescriptions preempt initiative and creativity.” Nelson, supra note 231, at 390.

249. See CHAMALLAS, supra note 66, at 102–06 (summarizing the literature).

250. See Lagemann, supra note 201, at 378–75.

251. Wade Nelson characterizes teachers as “pawns” and (male) reformers as “origins.” Nelson, supra note 231, at 389.

252. Lagemann, supra note 201, at 374.

253. See id. at 375 (noting that Teachers College, like Barnard and the affiliated seminaries, is located at the edge of Columbia University); see also James H. Sutton, Undermining a Profession, 75 PHI DELTA KAPPAN 158, 159–60 (1993) (noting a trend whereby universities decline to maintain the accreditation of their schools of education, in what the author sees as a manifestation of contempt for women and feminine tendencies).
as the bad-at-math stereotype) have operated to denigrate women and keep them out of privileged classifications. Unifying this theme of dichotomous difference are two revealing elements found in all of these sectors: the concept of a semi-profession, subordinate to a full profession, and the valorization of sight, one of the five senses, as a source of superior distance.

1. The Semi-Profession

The somewhat disused term "semi-profession" describes subordinate partner-jobs that support various high-status occupations. One occupation, of exalted status, has a complement occupation that is charged with mundane, repetitious, practical, or concrete tasks. The semi-professional employee works as a subordinate to a true professional, or an administrative élite.

The first characteristic that earns the modifier "semi" is an absence of autonomy. Because the semi-professional worker holds a job that has a name, and usually an established sequence of training and experience that yields occupational qualification—and because withholding the "professional" designation can sound insulting—polite observers are often willing to grant him or her the status of belonging to a profession. But the occupation does not quite merit the description of profession, in this traditional sense of the word, because it takes orders from outside its ranks. The semi-professional cannot exercise autonomy to determine the services that clients or patients will receive.

The second characteristic that distinguishes professions from semi-professions, related to the first, is that in order to rise within a semi-profession an individual must become a supervisor. Whereas a

254. In his comments on a draft version of this Article, Timothy Lytton queried whether "technologies" as used here means three distinct things: first, "specialization," and, second, "scientific rigor," he suggested, in addition to (third) what one could find in a dictionary under "technology." In response, I wrote several passages in Part I to emphasize the relationship among specialization, scientific rigor, and technology, to support my contention that they are all parts of a whole. See, e.g., supra text accompanying note 192 (noting placement of computers in schools); supra note 213 and accompanying text (linking silicon wafers, plastics, and semiconductors with the profession of social work). Readers may still share Professor Lytton's view that I have aggregated that which ought to be separate. See Bernstein, supra note 70, at 44 n.201 (relating a colleague's perception of my taxonomy as being in the "lumper" rather than the "splitter" mode).

255. Semi-professionals have achieved some limited autonomy, particularly in areas that the ascendant profession does not want to serve. See, e.g., Emily Friedman, *Nursing: Breaking the Bonds?*, 264 J. AM. MED. ASS'N 3117, 3119 (1990) (noting that physicians have permitted nurses to practice autonomously only in low-paying settings).
physician, lawyer, professor, or clergyman is thought of as working alone—able to exercise all-crucial autonomy without close attention from a more experienced or accomplished senior colleague—semi-professionals take orders, usually within a bureaucracy, and are sanctioned if they manifest solitary indications. Semi-professional practitioners often lament that the only reward for good performance for the worker is a promotion to supervisory ranks, which creates duties different from the ones at which he or she succeeded. Scholars have deemed nursing the quintessential semi-profession. Like other semi-professionals, the nurse works against a backdrop of male-dominated authority, here both professional (the physician) and administrative (the institutional employer). And like other occupations surveyed earlier in this Part, nursing developed a self-conscious identity as a modern profession in the late nineteenth century, even though it had extensive antecedents stretching back for centuries; the essence of this modern identity is gender-segregation.256

"Every woman is a nurse," Florence Nightingale declared famously in 1859;257 the association of nursing duties with the domestic tasks of women continues.258

Just as medicine has nursing to express a feminine contrast under conditions of subordination, the three other professions surveyed in this Part—librarianship, the social sciences (with related occupations), and education—also use job categories to separate male/exalted from female/disparaged. "Information" in a job title, and "librarian" out of it, makes an intelligible statement about gender-privilege in the library.259 Sociology and the social sciences have social workers to disparage context and political commitments as feminine.260 The school of education distances itself from the schoolteacher, while other divisions of a university distance themselves from the school of education, in an effort to maintain the simple two-tier hierarchy that characterizes a semi-profession.261

256. So argues Julie Poliafico, a female nurse and daughter of a male one. See Julie A. Poliafico, Nursing’s Gender Gap, 61 RN 39, 40 (1998); see also HENRY ETZKOWITZ ET AL., ATHENA UNBOUND: THE ADVANCEMENT OF WOMEN IN SCIENCE AND TECHNOLOGY 23 (2000) (noting that the arrival of women in nursing brought a new "natural" prescription of nurturance).

257. FLORENCE NIGHTINGALE, NOTES ON NURSING 3 (1859).

258. Sociologist David Gray wrote in 1989 that nursing students are still "taught to be unassertive in dealing with patients or physicians and administrators [and] to consider professional achievement as masculine." David E. Gray, Militancy, Unionism, and Gender Ideology: A Study of Hospital Nurses, 16 WORK & OCCUPATION 137, 141–42 (1989).

259. See supra notes 132–47 and accompanying text.

260. See supra Part I.C.3.

261. See supra notes 251–53 and accompanying text.
The hierarchy should not be misperceived as consensual: despite dispiriting conditions, semi-professional workers have struggled energetically to escape the ignominy and low pay of gender-segregation. Their leaders have long suspected that recruiting men into the occupations would improve pay and status; and so nursing, teaching, librarianship, and social work have all have carried out extensive programs of what might anachronistically be called affirmative action. Such efforts toward equality have largely failed: a "glass escalator" gives men a boost in nursing, social work, teaching, and librarianship. In the feminine occupations, recounts sociologist Christine Williams, men have for decades received extra opportunities, often from female supervisors. Technology, even when inserted into the semi-professions as bait to lure men into feminine occupations (and thereby help women), has supported and justified male privilege.

2. Distance

A second common theme of our four-professions-and-a-culprit study is the function of sight, a uniquely distancing power. Of the five senses, sight most strongly permits the subject to engage in perception while remaining apart from the object perceived: to look at an object is to maintain separation from it, whereas to touch something or someone means to be touched in return. This asymmetry between

262. See WILLIAMS, supra note 21, at 35-44.
263. See Christine L. Williams, The Glass Escalator: Hidden Advantages for Men in the "Female" Professions, 39 SOC. PROB. 253, 253 (1992); see also Evans, supra note 18, at 227 (noting advantages for men in nursing).
264. See WILLIAMS, supra note 21, at 35-38; Williams, supra note 263, at 258-61.
265. Here librarianship offers the clearest illustration. Libraries recruited men with promises to place them "in the areas of administration, science and technology, and computer information systems." Nancy P. O'Brien, The Recruitment of Men Into Librarianship Following World War II, in THE STATUS OF WOMEN IN LIBRARIANSHIP 63 (Kathleen Heim ed., 1983). This recruitment effort permitted men without librarian credentials to run libraries: their purported expertise in technique demoted women's librarianship to the level of instrument, rather than an end in itself. See Kenneth E. Carpenter, A Library Historian Looks at Librarianship, DAEDALUS, Fall 1996, at 85, 85. Women often acquiesced in the recruitment of men, believing that the occupation needed gender-balance in order to achieve respect. Yet a profession that thought it could raise its status by recruiting men learned that "these recruits moved quickly into the high-status jobs while the overall status of the profession ... changed little," writes academic librarian Sarah Pritchard. "The most elite technical specialties, rather than raise the rest of the profession, in fact try to divorce themselves from it by creating new names: information manager, chief information officer." Pritchard, supra note 135, at 4.
266. See IRIS MARION YOUNG, Breasted Experience: The Look and the Feeling, in THROWING LIKE A GIRL AND OTHER ESSAYS IN FEMINIST PHILOSOPHY AND SOCIAL THEORY 189, 193 (1990). For a refinement of this thesis, accepting provisionally "that...
gazer and gazed-upon implies unequal power: the person who can see without in turn being seen will assert control, and often disciplinary authority, over the object.267

The four-professions-and-a-culprit survey has offered varied examples of the distancing and power-asymmetry that accompany the privileging of this one of five senses. Traditional midwifery once positioned an attendant near the laboring mother. This attendant had crouched near the birthing chair, poised to touch; the man-midwife or obstetrician, displacing her, locked the mother flat into stirrups and substituted his gaze for direct physical contact.268 Librarianship, as we have also noted, set aside places for men that afford them superior vantage points: vaunted “information science” high above the bricks-and-books library; consultantships and management positions away from much-handled collections and grubby patrons; and the job of thinking about machines and systems, without having to touch them.269 The tactile aspects of librarianship—data entry, cataloguing, putting bookshelves in order, working in children’s collections—stand for low pay and de-skilling within the field. In education and the social sciences, distance and privilege line up with the authoritative gaze in numerous respects. From the claim that visual and spatial superiorities distinguish the male brain and justify male dominance, through the hierarchy of education expressed as a function of space between teacher and pupil (to educate young children is necessarily to touch them, while light teaching loads and other distances from students signify prestige in the university), past the rejection of context and particulars as integral to social science, technocentric expansionism has established that up close is a low place to be.270

In contrast to sight, which permits the distance of a universalist stance, touch eliminates the pristine space between subject and

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268. See supra notes 113–14 and accompanying text.

269. See supra Part I.B.

270. See supra Parts I.C.–I.D.
object. The subject must favor sight over tactile contact if he wants to avoid contamination.271 "Without a place outside the world to stand," as Iris Marion Young puts the point, "touching also steps down from the clouds of universalism; a knowledge that is in touch with things knows them in their concreteness, and not merely as the instances of general laws imagined from a mathematical mind."272 This expressly feminist description of sight-privileged-above-touch recalls the writings of Carol Gilligan and others critiquing those theories of moral development (associated with Jean Piaget and, more notoriously, Lawrence Kohlberg) that honor abstractions above particulars.273 Sight privileged over touch yields a hierarchy redolent of gender. The ranking of physicians above nurses, educational theorists above classroom teachers, schools-of-everything-else above schools of education, and the like all parallel the ranking of male above female.

II. THE ORIGINS OF TECHNOCENTRIC EXPANSIONISM

Technocentric expansionism as a technology of gender-segregation derives from complex antecedents that call for attention. Unless policymakers can build and maintain an understanding of this misogynous history, technology-based triumphalism will continue to slur and disparage women while remaining able to contend that all such outcomes are natural and inevitable. This Part recounts the construction of science and technology as realms without women. A notion of Woman as an Other—alien, feared, and denied full citizenship—holds lingering influence.

Section A begins this Part with a survey of the ancient roots of technocentric expansionism, linking these traditions with the formation of a modern market economy in the nineteenth century. Section B, moving freely among several centuries, locates intellectual antecedents of technocentric expansionism in both ancient and modern thought. Notwithstanding the conventional belief that vast change takes place over the centuries, certain themes have proved enduring.

271. Luce Irigaray calls this privileging "oculocentrism." IRIGARAY, supra note 114, at 48.
272. YOUNG, supra note 266, at 194.
273. For a summary of this controversy, see Linda S. Gump et al., The Moral Justification Scale: Reliability and Validity of a New Measure of Care and Justice Orientation, 35 ADOLESCENCE 67, 67–69 (2000).
A. From Ancient Misogyny to the Modern Economy

1. Misogyny as Faith

However discontented a feminist might now feel about her world, contemporary conditions for Western women compare favorably with a long record of past misogyny. Leading figures in all areas of human learning—philosophy, the natural sciences, the social sciences and their precursors, even literature and the arts—have in the past described women as debased, inferior, even poisonous. Some of the most revered thinkers of Western history—Aristotle, Hegel, Rousseau, Kant, Freud, and others—expressed ideas about female inferiority that are now almost unmentionable. This unmentionability is a basis for feminist hope: the future has always portended improvement. At the same time, however, misogynous history is not dead: it has a foundational place in contemporary society, particularly within the culture of contemporary science and technology.

Over the centuries, technocentric expansionism has been almost a religious crusade, rooted in faith and emotional fervor rather than empirical necessity. This notion of misogynous faith opposes the standard view of science as entirely secular, if not antagonistic to religion. Yet the two share much common ancestry: as David Noble has demonstrated, such titans of modern Western science as Galileo, Newton, Descartes, Francis Bacon, and Robert Boyle were men of intense Christian faith, inclined to obey the commands of clerics. One must fast-forward to Charles Darwin in the nineteenth century to find a great scientist who had no use for clergymen or religious dogma and scientists as a professional group, who may

274. The most pertinent work is NOBLE, A WORLD WITHOUT WOMEN, supra note 15, at 242-43 (identifying a strain of misogynous monasticism in Western thought). See also EASLEA, supra note 28, at 3-6 (noting dogmatic, irrational elements of faith in technology); NOBLE, THE RELIGION OF TECHNOLOGY, supra note 17, at 223 (contending that religion is allied with science, not antagonistic to it).


276. See NOBLE, A WORLD WITHOUT WOMEN, supra note 15, at 216-40. Galileo is famous for his stance against Church doctrine, but could also be remembered for piety: he sojourned to Rome to face the Inquisition even though Venice had offered him asylum, and he insisted on placing his young daughters under the authority of a Franciscan convent, an environment that made them unhappy. See id. at 216-18.

have renounced God, have not repudiated what Noble calls their "celibate, homosocial, and misogynous" past.\textsuperscript{278} If the pantheon of science is permeated by faith in a religious creed, then the misogynous traditions within that creed—the tenet that Woman caused the fall of Man, the renunciation of life shared with women in favor of celibacy and other separations, the exclusion of women from positions of ecclesiastical authority, the withholding of education and literacy from girls, the notion that women are physically polluted and therefore sources of contamination—become relevant to an understanding of Western science within Western society.

The misogyny that religion and science have held in common consists of more than revulsion and repudiation: both disciplines have associated knowledge with control, and adherents of both have looked at the world in search of mastery, architecture, and overarching design.\textsuperscript{279} In the seventeenth century, men set out to attain science in religious terms: First man was to regain the powers of Adam, wrote Joseph Glanvill, founder of the Royal Society of London. Later, perhaps, man could reach "a truly divine understanding of creation rather than its mere Adamic reflection," thereby achieving "the divine power of creation itself."\textsuperscript{280} Studies of scientific knowledge that women have gained using very different methods illustrate the gendered nature of this endeavor.\textsuperscript{281} Aspiring to divine authority, men of science, beginning in the seventeenth century, sought a "masculine birth" comparable to the creation of the world.\textsuperscript{282} Knowledge, divinity, and the arrogation of generative power away from women thus converged.

2. The Age of Science

Historians have deemed the seventeenth century a high point in both the formation of modern science and the history of Western misogyny.\textsuperscript{283} Britain began the century with the ascension of James I

\textsuperscript{278} NOBLE, A WORLD WITHOUT WOMEN, supra note 15, at 163.
\textsuperscript{279} See AMOS FUNKENSTEIN, THEOLOGY AND THE SCIENTIFIC IMAGINATION 298–99 (1986).
\textsuperscript{280} NOBLE, THE RELIGION OF TECHNOLOGY, supra note 17, at 61–62.
\textsuperscript{281} See, e.g., EVELYN FOX KELLER, A FEELING FOR THE ORGANISM: THE LIFE AND WORK OF BARBARA McCLINTOCK 148–51 (1983) (noting McClintock’s intense interest in individual units); Donna Haraway, Primatology is Politics by Other Means, in FEMINIST APPROACHES TO SCIENCE 77, 99–104 (Ruth Bleier ed., 1986) (describing field primatology, a discipline that women virtually reinvented).
\textsuperscript{282} See MERCHANT, supra note 16, at 170 (quoting Francis Bacon’s famous phrase, "the masculine birth of time").
\textsuperscript{283} See Susan Bordo, The Cartesian Masculinization of Thought, 11 SIGNS 439, 453 (1986) (stating that historical research “has forced us to recognize the years between 1550
in 1603, following the death of Elizabeth. James, who led an extraordinarily misogynous life, perceived himself as a restorer of long-deferred and eternally proper masculine governance. He supported extensive legislation against women and witches, and promoted a young, ambitious courtier, Francis Bacon.

More than any other figure in the history of science, Bacon brought technology and masculinity into the understanding of scientific knowledge that prevails today. For millennia, human beings had thought of nature as an integrated whole, acting upon itself. The Old Testament notion of man as holding dominion over everything in the world moderated this concept of the earth’s organic identity, but did not lay out a design for men to interact with the earth. Bacon crafted a design. He depicted nature as disorder that could be understood only when redirected, altered, plumbed, and cut into pieces. “By art and the hand of man,” Bacon wrote, nature could be “forced out of her natural state and squeezed and molded.” Knowledge requires mechanistic displacement. Carolyn Merchant ascribes to the scientific revolution of the seventeenth and eighteenth centuries a vision of reality and the cosmos: Once an organism, the world became a machine. With science thus connected to motion, mechanics, and masculine ambitions, the union of science and technology was almost complete.

The heirs of Francis Bacon, like their leader, thought of science as technology, “a philosophical enterprise inextricably bound up in
both method and purpose with the useful arts.  With the rise of industrialization, Bacon’s successors in the early nineteenth century could look forward not only to a culmination of the purpose of science but the accretion of wealth. Gender continued to play a role in this development.

3. The Nineteenth-Century Market

The exclusion of women from control over capital gained momentum in the nineteenth century. At one time women had played an equal, if not dominant, role in such activities as dairying, brewing, baking, and textile production; they also enjoyed near-equal access to occupational guilds. The common-law distinction between real and personal property, giving a husband control over everything a wife owned except her freehold land, had mattered little until the rise of the market; when the market began to rise, most of capital, being personal rather than real property, migrated to the dominion of men.

Equally important, the market fostered a gendered ideology. Contrary to the hopes of nineteenth-century thinkers like Charlotte Perkins Gilman, who linked economic development with progress for women, industrialization perpetuated gender-segregation. Hopes for progress had been well founded: “industrial capitalism, with its neutered and disembodied conception of labor as a commodity, theoretically abolished distinctions between male and female in the labor market.” Women did finally begin to gain access to universities in the nineteenth century, and gender-egalitarian legislation appeared for the first time during this period. These developments, however, owed as much to commercial pressures and the interests of commerce as they owed to nascent feminism or egalitarianism. Although the market offered liberation to women, its imperatives did not entirely serve to set them free.

289. NOBLE, THE RELIGION OF TECHNOLOGIES, supra note 17, at 57.
290. See Arnold & Faulkner, supra note 87, at 36.
291. Id. at 38.
292. See CHARLOTTE PERKINS GILMAN, WOMEN AND ECONOMICS: A STUDY OF THE RELATION BETWEEN MEN AND WOMEN AS A FACTOR IN SOCIAL EVOLUTION 145 (1898) (“As women become free . . . so becomes possible the full social combination of individuals in collective industry.”).
293. NOBLE, A WORLD WITHOUT WOMEN, supra note 15, at 244.
294. See infra Part III.A.2.
295. See NOBLE, A WORLD WITHOUT WOMEN, supra note 15, at 266–72 (depicting connections between investments from industrial tycoons and nineteenth-century expansion of higher education for women); infra Part III.A.2 (noting commercial antecedents of the Married Women’s Property Acts).
The modern market found gender convenient. A notion of domesticity—featuring a woman who worked only inside the home, available to make purchases and identify new consumer needs, married to a man assigned the job of earning money for these transactions—suited the ambitions of commerce. Concurrently, an ideology of sexual romanticism, positioning Woman in every respect as the opposite of Man, created a useful female worker: as Barbara Ehrenreich and Deirdre English have argued, a submissive, emotional, and tender-minded nature is understood to direct Woman to accept a low wage, and also to nurture others at work. Later, when the jobs run out, she knows she should return docilely to the hearth. This quaint figure, central to the ideology of separate spheres, remains central to the American labor force.

B. Mind Over Nature

We return to the century that brought forth an idea of Nature as mute matter to be conquered. Around when Bacon was writing that the man of science in his dealings with Nature must “lay hold of her and capture her,” Cartesian rationalism, a different yet related development, arose. Réné Descartes enjoyed the company of intellectual women, eschewed Baconian metaphors about penetration and plunder, and acquired many female followers by insisting that philosophy should flourish away from university libraries and the credentials they could bestow only on men. Yet he, like Bacon, nevertheless contributed to gender-segregationism in science.

The dualism of Cartesian thought built an enduring divide. Cogito, ergo sum separates the intellect from everything else, ascribing reality only to the thinker while casting everything else as a passive object. Questing cogitation, which to Descartes was the source of everything true, asserted a dichotomy that separates subject from object, mind from body (or matter), order from wilderness, and vitality from inert stasis: its mechanistic philosophy proclaimed “the
death of nature," in Carolyn Merchant's phrase, whereby the earth becomes a barren machine.  

Scholars have assembled a catalogue of that which Cartesian rationalism has served to denigrate. Brian Easlea lists "sentience," "occult forces," "sympathies and antipathies," "heat and cold ... taste, colour and odour," and adds that Descartes transformed nature "from a semi-divine, creative maternal figure to mere (very uninteresting) matter and motion." Karl Stern notes the etymological connection between mother and matter, both demoted to inert status in Cartesian thought, and also various losses: a forfeiture of "poetic knowledge" (obtained "by union with and attachment to the object," in contrast to the separation of scientific rationalism), a "devaluation of wisdom," and an abandonment of history. It is a short step from Cartesian rationalism to the idea of "power over nature," notes Carolyn Merchant: "an ontology of interchangeable atomic and human parts," this power denies holism, the central tenet of ecology, and leads to environmental disaster.

The connection between Descartes and technocentric expansionism, as Merchant explains, lies in their shared seventeenth-century mechanism. From cogito, ergo sum planners can create systems theory, stochastics, and probabilistic guides to decisionmaking. Karl Stern finds it telling that it was a "great workman of modern technology, Henry Ford," who "made the famous statement: 'History is bunk.' In a more veiled and refined form, by implication, this statement is already contained in Descartes's philosophy." The mechanism of both technology and Descartes decrees the primacy of the present and future over the past.

Consequences to technology are a subset of consequences to persons; the seventeenth-century rationalism linked with Descartes,

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300. MERCHANT, supra note 16, at xvii-xviii.
301. EASLEA, supra note 28, at 72-73.
302. Karl Stern, Descartes, in FEMINIST INTERPRETATIONS, supra note 267, at 29, 36-46.
303. MERCHANT, supra note 16, at 293-95. Consistent with Merchant's contention that environmental ruination has followed Bacon's view of the earth as a machine to be controlled by masculine design, some scholars identify environmental activism as a woman's domain. See, e.g., Ruth Perry, Engendering Environmental Thinking: A Feminist Analysis of the Present Crisis, in WOMEN, SCIENCE, AND TECHNOLOGY, supra note 28, at 302, 306 (noting that perhaps because women are held responsible for the health and safety of families, "[g]rassroots activists at the local level, internationally, tend to be women. (Inevitably, as these movements become bureaucratized, men often move into leadership positions.")
305. Stern, supra note 302, at 46.
privileging rationalism, necessarily neglected or debased those persons whose rational nature was already in question. The first reader of Descartes to raise the question of gender was Princess Elisabeth of Bohemia, who noted in a 1643 letter to the philosopher that domestic duties were interfering with her ability to ponder and master the separation of mind and body. This point extends well beyond a claim of insufficient leisure time: Elisabeth was telling Descartes about the attention to context that derives from the "demanding character of women's lives." Cartesian rationalism and its conception of mind as separate from body never grappled fully with this fundamental criticism. Heirs of this tradition found it convenient to assign the body—not only its care, feeding, and cleaning, but its essential nature—to women.

Notwithstanding its close ties to one era and one philosopher, the seventeenth-century dichotomy stretches back to antiquity and forward to the present. For instance, when Aristotle theorized that a fetus is created by the union of sperm and menstrual blood—that is, the father contributing active force and the mother only a passive environment—he made an assertion about the nature of a woman that continues to hold influence, despite the updates that biology has offered over the last millennia. Spermatozoa are still thought of today as vigorous, determined swimmers racing purposefully toward the bloblike egg—a grossly inaccurate view of fertilization, which would never take place but for the energetic movements and resourceful adaptations of the female body. Similarly, when the

306. See Lloyd, supra note 46, at 46–50 (noting that Descartes changed the Western conception of Reason by rendering it "highly restricted," "highly abstract," and pure, even though he never intended to eliminate women from Reason or even to discuss what human beings know through their "inferior senses").

307. See Thomas E. Wartenberg, Descartes's Mood: The Question of Feminism in the Correspondence with Elisabeth, in Feminist Interpretations, supra note 267, at 190, 190–91.

308. Id. at 199–200.

309. Id. at 209–10.


311. See Susan Bordo, Unbearable Weight: Feminism, Western Culture, and the Body 12–13 (1993) (quoting a popular guide to pregnancy and birth); see also Easlea, supra note 28, at 242 (quoting psychologist Anthony Storr: "the spermatozoon swims actively ... the ovum passively awaits its penetration"); Otto Weininger, The Nature of Woman and Her Significance in the Universe, in Misogyny in the Western Philosophical Tradition 206, 222 n.2 (Beverly Clack ed., 1999) ("The quiescent, inactive, large egg-cells are sought out by the mobile, active, and slender spermatozoa.").

312. See Bordo, supra note 311, at 13 (stating that fertilization usually results from the union of a traveling egg and a "lolling" sperm); Schiebinger, supra note 48, at 145–46 (describing how the egg uses finger-like projections to capture the sperm cell and usher it
same unseen actor in *Look Who's Talking* provides the voice for both a sperm and the person, Mikey, that it would later beget,313 one might recall the seventeenth-century scientists who claimed that they could see tiny individuals when they peered at semen under the early microscopes.314

The idea of women as immobile, passive, and possessing little agency or animating energy endures. The most famous treatment of this continuing condition, Simone de Beauvoir’s *The Second Sex*, spoke in terms of existentialist ethics: “Every subject plays his part as such specifically through exploits or projects that serve as a mode of transcendence; he achieves liberty only through a continual reaching out toward other liberties.”315 The alternative is mere “immanence,” where one does not act but is acted upon.316 Existentialist ethics regard immanence as inconsistent with full membership in the human race. Social practices enforce immanence. A person excluded from the professions, denied a full education, schooled to be coy in her sexual dealings, cast out of public discourse, pressed to regard motherhood with its fetters as her one true occupation, and encouraged to obey the will of male relatives rather than her own wishes is a person denied transcendence.

The premises of technocentric expansionism are entirely different from the life of this immanent unfortunate. Technocentric
expansionism transcends. Its entire mode is one of movement. When Abraham Flexner rewrites standards for higher education,317 a Chicago school superintendent pushes day-to-day scripts into the classroom,318 a male obstetrix invents the new name "obstetrician" for himself and his fellow man-midwives,319 sociologists expunge activism and engaged critique from the social sciences,320 and engineers redefine drafting as a task fit only for machines or ill-paid women,321 to name a few examples, they certainly fulfill the existentialist ideal of taking up "exploits or projects."322

A fervent commitment to activity necessarily involves disdain for the passive and immobile. Technocentric expansionism thus inflicts a double blow on Woman. At the same time that it effects a change in work or education that leaves female participants worse off, it denounces the status of nature that human society has attributed to its female half. Its insistence on equating femaleness with inertness has occasioned a revisionist history of women in many domains, notably science: women as scientific and technological innovators have suffered a thoroughgoing erasure.323

317. See supra notes 93–100 and accompanying text.
318. See supra note 237 and accompanying text.
319. See supra note 109.
322. See supra text accompanying note 305.
323. Dale Spender's Women of Ideas explores the theme of erasure. See DALE SPENDER, WOMEN OF IDEAS (AND WHAT MEN HAVE DONE TO THEM) passim (1982); see also Dara Horn, The Shoulders of Giants, in WOMEN, SCIENCE, AND TECHNOLOGY, supra note 28, at 42, 43 (referring to astronomer Cecilia Payne-Gaposchkin: "Every high-school student knows that Isaac Newton discovered gravity, that Charles Darwin discovered evolution, and that Albert Einstein discovered the relativity of time. But when it comes to the composition of our universe, the textbooks simply say that the most abundant atom in the universe is hydrogen [without crediting this fundamental point to its female discoverer]."); Hilary Rose, Nine Decades, Nine Women, Ten Nobel Prizes: Gender Politics at the Apex of Science, in WOMEN, SCIENCE, AND TECHNOLOGY, supra note 28, at 53, 56–59 (noting that Einstein withheld and concealed the mathematical contributions of his wife, Mileva, that were necessary to his work on relativity, and that Rosalind Franklin, who took crystallographic photographs that Francis Crick, James Watson, and Maurice Wilkins needed for their Nobel-prizewinning identification of DNA, suffered the misappropriation and denial of her contributions); Autumn Stanley, The Patent Office Clerk as Conjurer: The Vanishing Lady Trick in a Nineteenth-Century Historical Source, in WOMEN, WORK AND TECHNOLOGY, supra note 190, at 118 (describing how in the nineteenth century the U.S. Patent Office grossly undercounted female patent-holding inventors).
III. THE USE-VALUE OF TECHNOCENTRIC EXPANSIONISM AS A TECHNOLOGY OF GENDER-SUBORDINATION

What links past injustices with contemporary practices? Unless these traditions continue to press ahead, one might deem the history of technocentric expansionism deceased and defeated. This Part, relying on statistics about gender-inequity, explores technocentric expansionism as a vital, even thrusting, force. Far from dead, technocentric expansionism derives its energy from current pressures and demands.

Accordingly “the use-value of technocentric expansionism” refers to the conditions that encourage and sustain technocentric expansionism as a technology of gender-segregation; the idea of “use-value,” or utility, simply relates antecedents to outcomes. Just as a harasser probably does not think of himself as deploying a “technology of sexism,” technocentric expansionism proceeds independent of conscious human motive. Continuing the review of historical sources, this section discusses how and why it proceeds.

A. The Challenge to Gender-Subordination: Egalitarian Ideas, Emancipatory Laws

Like other varieties of invidious discrimination, gender-segregation as an ideology harbors the seeds of its own destruction. Any schema that exalts one group of human beings and disparages another will provoke observers to note flaws, or at least exaggerations, in the paradigm. The experience of being disrespected will motivate members of the disparaged group, along with their sympathizers, to struggle against prejudice. And the segregationist credo will often contain elements that can be used against it. From the rise of learned, scientific misogyny in the seventeenth century through the present time, gender-segregation has been vulnerable to challenges.

324. See supra notes 50–51, 165–67, 170, 174, 184 and accompanying text.
325. See Franke, supra note 8, at 762.
326. For examples of civil rights contentions in behalf of minorities that their authors regarded as consistent with majoritarian precedents rather than alien, see ANDREW SULLIVAN, VIRTUALLY NORMAL: AN ARGUMENT ABOUT HOMOSEXUALITY 185 (1995) (arguing that equal rights for gay men and lesbians is just logical, not a radical demand); Diana Schaub, The Spirit of a Free Man, 140 PUB. INT. 86, 90 (2000) (noting that Martin Luther King, Jr. had conceived of the Constitution as a “promissory note” owed to all Americans).
1. The Belief That Women Are Persons

Starting in the seventeenth century writers began to assert that women, being creatures of reason, were the peers and equals of men. Poems, essays, and full-length books asserted that women constituted an unjustly disadvantaged class, cut off from the serious learning and rational discourse that could have given them a basis to defend themselves against unfairness. Presaging the Enlightenment of the eighteenth century, seventeenth-century thinkers maintained the faith in reason and individual autonomy that would later prove enduring. They had trouble being heard.

Whereas the seventeenth century marked neglect for feminist ideas, the eighteenth brought a ferocious backlash. Jean-Jacques Rousseau in particular decreed that his ideals of universal and natural human rights emphatically did not extend to women; Rousseau took trouble to delineate a limited and subordinated female role. In launching a famous attack on Rousseau, using his own words to identify the bad logic and shaky reasoning behind his conclusion that women exist for the pleasure of men, Mary Wollstonecraft provoked extraordinarily vicious jibes—attacks that in hindsight suggest a kind of perverse progress: influential men were beginning to hear, if not often heed, the message that women are persons.

Several women of the eighteenth and early nineteenth centuries made notable gains in pressing the point that women and men share a common humanity. The salon culture of the day, where affluent and scholarly European men and women came together to converse, provided a forum. Germaine de Staël gave the writings of Wollstonecraft and her predecessor Mary Astell a thorough airing in mixed company. Her countrywoman and contemporary Gabrielle-Emilie du Châtelet also wrote passionately on the rights of women.

328. See SPENDER, supra note 323, at 35–36 (linking Mary Wollstonecraft to seventeenth-century feminist writers like Mary Astell and “Sophia”).
329. The chief work is JEAN-JACQUES ROUSSEAU, EMILE (Barbara Foxley trans., Dutton & Dent 1993) (1762). For a review of Rousseau’s writings on women, see SUSAN MOLLER OKIN, WOMEN IN WESTERN POLITICAL THOUGHT 140–66 (1979) (chapter on Rousseau titled “Equality and Freedom—For Men”).
330. See supra note 45.
332. See Smith, supra note 327, at 32–34. Although she is best known for her intimate relationship with Voltaire—which may have helped her to be heard—du Châtelet was also a translator of the works of Leibniz and Mandeville; she also translated Newton’s Principia and restated it into more accessible prose. See id.
In the United States, Aaron Burr declared that Wollstonecraft's *Vindication of the Rights of Woman* had won him over, and he "tried to rear his daughter according to its principles." Abigail Adams pressed her husband John to extend his politics of citizenship and freedom to women. Although none of these communications effected immediate social change, they opened a discussion that grew insistent: Ideals of the day—liberty, justice, citizenship, individual rights—either did or did not include women. If they did not, why not? And if a woman was just as much of a human being as a man, then her lesser social status was unjust and had to change.

Egalitarian challenges to gender-segregation reached a crucial juncture when John Stuart Mill began to address the subject of female subordination, both alone and in collaboration with his wife Harriet Taylor. Mill, "the only major liberal political philosopher to have set out explicitly to apply the principles of liberalism to women," is a central figure in the history of the idea that women are persons, and his principal feminist work, *The Subjection of Women*, also holds a unique place. As an accomplished theorist (*Principles of Political Economy* and *On Liberty* were published many years before *The Subjection of Women*), Mill lent the liberal-feminist cause some of the authority that his era was willing to give some economists and political philosophers. As a prominent man, the firstborn son of a distinguished "philosopher, historian, economist and psychologist," Mill could not be dismissed with the same jeers and scorn that had greeted his female predecessors. From his vantage point in utilitarianism, Mill had a philosophical base to venture the suggestion that the subordination of women was a great loss, destructive of talent useful to society. The waste could be felt at home: Mill believed that living with an uneducated, frivolous, trivial wife debased a man, and in the aggregate ensured "that people in general are kept down in [a] mediocrity of respectability."

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335. OKIN, supra note 329, at 197.
336. SUSAN LEIGH ANDERSON, ON MILL 1 (2000).
337. Quoted in OKIN, supra note 329, at 213. For another expression of this utilitarian-feminist theme, see *supra* note 56.
Although the feminism of John Stuart Mill has been described as falling short of current egalitarian thought, his challenges to gender-subordination remain powerful. Mill said that the status of a wife amounted to nothing more or less than slavery. He maintained that any shortfall or inadequacy in the achievements of women could be taken only as proof of their subordination, not their inherent inferiority; women had never been given a chance to enjoy free lives. At the same time, he argued that the unusual accomplishments of certain women over the centuries of history demonstrated that prejudices against them were baseless. The foundational injustice of subordinating women, Mill continued, goes on to support much more evil:

Think what it is to a boy, to grow up to manhood in the belief that without any merit or exertion of his own, though he may be the most frivolous and empty or the most ignorant and stolid of mankind, by the mere fact of being born a male he is by right the superior of all and every one of an entire half of the human race: including probably some whose real superiority to himself he has daily or hourly occasion to feel.

A large public was listening. While Mill's commitments to liberty and democracy were influencing the abolitionist cause in the United States, his feminism strengthened—some contend that it started—the women's suffrage movement in Britain. As the political upheavals of the nineteenth century progressed, an ideal of civil rights, framed in the United States as part of the call to emancipate slaves, supported a related ideal of female emancipation. It was almost time for the law to acknowledge that women were persons.

338. See OKIN, supra note 329, at 226-27 (noting that Mill endorsed the traditional division of labor within the family, where the man works for money and the woman cares for children); id. at 229 (noting that Mill did not recognize that a woman's work inside the home is unpaid labor, and therefore did not believe that this work gave her a claim for income).
339. See ANDERSON, supra note 336, at 27.
340. See Mill, supra note 45, at 171 (claiming that "[n]o one is thus far entitled to any positive opinion" on the natural differences between men and women).
341. See OKIN, supra note 329, at 223.
342. Mill, supra note 45, at 176.
343. See ANDERSON, supra note 336, at 27, 29.
344. Mill's contemporary Frederick Douglass also regarded abolition and feminism as related causes:

Many who have at last made the discovery that the Negroes have some rights as well as other members of the human family, have yet to be
2. Legal Change in the United States

The first significant laws enacted in the United States that might warrant the adjective "feminist" were the Married Women's Property Acts, adopted in the states in the middle of the nineteenth century to remove some of the disabilities that had burdened women under the common law. Gradually, and with frequent amendments and revisions, these statutes permitted married women to control property and income, to make contracts, and to participate in litigation (as both plaintiffs and defendants) separately from their husbands.

Historians attribute the Married Women's Property Acts to a new generation of economic needs rather than to feminist activism. Separate property for married women was valuable to debtors, who could benefit from insulation; for creditors, who wanted to know where they would stand in the event of nonpayment; and for fathers, who wanted to pass some of their holdings to their daughters without the burden of granting legal title to a male trustee. Nineteenth-century concentrations of wealth, cut loose for the first time from ancient links to land, made divisions of property rights expedient and possible. Despite such commercial antecedents, however, the Married Women's Property Acts took on a feminist flavor, and they grew to influence the common law and public perceptions of female status.

Almost contemporaneous to the Married Women's Property Acts, but different in source, was the suffrage movement. Historian Robert Jackson, noting that the word "male" in the Fourteenth Amendment was the first explicit sex distinction in the United States, was convinced that women are entitled to any... It is perhaps needless to say, that we cherish little sympathy for such sentiments or respect for such prejudices.

Frederick Douglass, Editorial from The North Star, in HISTORICAL WRITINGS, supra note 334, at 83, 84-85.


346. See id. at 154; PEGGY A. RABKIN, FATHERS TO DAUGHTERS: THE LEGAL FOUNDATIONS OF FEMALE EMANCIPATION 125-38 (1980). Female activists, motivated by feminism, played a strong role in this law reform effort, however. See RABKIN, supra, at 106-17.

347. See ROBERT M. JACKSON, DESTINED FOR EQUALITY: THE INEVITABLE RISE OF WOMEN'S STATUS 32 (1998); see also supra note 291 and accompanying text (noting that the separation of wealth from land did not benefit women in the nineteenth century).

Constitution, reads this word as evidence that members of Congress had become more, not less, aware of feminist demands for justice: "[C]ongressmen, for the first time, could not take men's dominance for granted." Led by women and credited to feminist activists like Susan B. Anthony and Elizabeth Cady Stanton, the suffrage movement finally won its goal in 1920 with the ratification of the Nineteenth Amendment. It is not obvious why this male redoubt fell. Probably the weakening of property qualifications for the vote, which expanded voting to working-class men, and the Fourteenth Amendment provision of the vote to African-American men, helped to weaken the gendered solidarity of opposition. For whatever reason, egalitarianism had achieved another triumph: the constitutional proclamation that a woman could be a full citizen of the United States.

The third great legislative moment of gender-egalitarianism, the passage of antidiscrimination statutes, began in the early twentieth century. As with the suffrage cause, state-level lawmaking preceded the famed Equal Pay Act of 1963 and the Civil Rights Act of 1964. The Equal Employment Opportunity Commission eventually began to enforce antidiscrimination law in behalf of women. By the mid-1970s, judicial victories were in place. About the same time, women began to reap some benefits of affirmative action.

Defeats accompanied victories in the twentieth-century, and the combination of failure and success sheds light on the conditions that made technocentric expansionism valuable as a technology against women. After the Equal Rights Amendment (ERA) was pronounced dead in 1982, researchers Joyce Gelb and Marian Lief Palley lined up wins against losses—on one side, the Equal Credit Opportunity Act of 1974, the Pregnancy Discrimination Act, and Title IX; on the other

349. U.S. CONST. amend. XIV, § 2; JACKSON, supra note 347, at 35.
350. Robert Jackson mentions class, but not race, as a factor. See JACKSON, supra note 347, at 44-45.
352. Originally the EEOC was charged with a duty to conciliate and persuade; in 1972 Congress authorized the agency to sue in federal court. See M. Isabel Medina, A Matter of Fact: Hostile Environments and Summary Judgments, 8 S. CAL. REV. L. & WOMEN'S STUD. 311, 321 (1999).
353. See, e.g., Brennan v. City Stores, Inc., 479 F.2d 235 (5th Cir. 1973) (holding that the Equal Pay Act precluded an employer from paying a "seamstress" less than a "tailor"); Diaz v. Pan Am. World Airways, Inc., 442 F.2d 381, 388 (5th Cir. 1971) (holding that femininity was not a bona fide occupational qualification for flight attendants).
side, legislation like the failed ERA and the Hyde Amendments stopping federal funding of abortion—in an attempt to identify what makes for feminist success. Gelb and Palley found that feminist policy measures are relatively likely to win acceptance when they avoid a direct challenge to gender-inequity. To win, a gender-equalitarian proposal must appear incremental rather than confrontational, attract allies outside feminism, and remain open to compromise.

This type of finding, which can be interpreted as hostile to activism, annoys some feminists. Its relevance here is not as strategic advice but as a suggestion that feminist achievements in public policy have been only fitfully associated with a feminist movement. And thus the converse: Anyone desiring to retard and reverse feminist gains faces a developing contrary consensus that equality under the law for women is normal, just, and American, rather than a narrow crusade limited to radicals.

In summary: For statutes abolishing the common law disability that prevented women from making contracts and owning property, we have creditors to credit. For the Nineteenth Amendment, female voters can thank not only the storied nineteenth-century women suffragists but also male abolitionists and civil rights leaders. For pay equity statutes, labor unions and open-minded state legislatures were important agents of change. Behind the addition of “sex” as a protected category into the Civil Rights Act of 1964 as a late amendment to the bill, one can find no evidence of feminist values or education among members of Congress, beyond their simple willingness to accept this word in the statute. Because these successes all preceded the development of contemporary feminist organization, this vision of gender cannot be dismissed as partisan politics.

Anyone who opposes gender-equity, accordingly, now has little room to take principled stands against the claims of women in a society that has extended legal, philosophical, and economic citizenship to both sexes. With the possible exception of evolutionary psychology, there are no respectable rationales left to support unequal pay, figurative glass ceilings that impede promotions, exclusion from professions or other remunerative skilled work, and denial of training or vocational opportunities. The inferior social

355. Id. at 7–8, 208–17.
356. See Jackson, supra note 347, at 64.
status that results from reduced income, honor, power, and mobility can no longer be accepted as the natural lot of an American woman. Because of the consensus that women are not inferior to men, unequal allocations that result from segregation are now widely denounced as unjust.\textsuperscript{357} Pressures mount on the enemies of gender-equality, who must either abandon segregationism or depict it as a minor, unfortunate side effect of something good, like progress.

\textbf{B. Meeting the Challenge: Political Alliances}

Technocentric expansionism as a technology of gender-segregation can find partners and cohorts within various institutions. One key ally is militarism:\textsuperscript{358} if war is indeed the “ancient parent” of technology,\textsuperscript{359} as Hugh Drummond has claimed, then enthusiasm for one will sometimes overlap with enthusiasm for the other. The profits of such alliances are extensive.

1. Military Honors

Since the middle of the twentieth century, the natural sciences have occupied a place of prestige that practitioners in other fields and disciplines continue to covet;\textsuperscript{360} this place of honor is partially attributable to World War II and its aftermath. During the Cold War, the sciences—relatively insulated from fears of Communist influence—seemed almost natural repositories of largesse from a federal government that found itself bigger and richer than ever. A wide consensus held that technological expansion deserved both public and private support; and so to the extent that an ambitious researcher or developer could relate his work to technology, he too

\textsuperscript{357} For statements of this truism written by nonfeminists, see Planned Parenthood v. Casey, 505 U.S. 833, 856 (1992) (“The ability of women to participate equally in the economic and social life of the Nation has been facilitated by their ability to control their reproductive lives.”); George P. Fletcher, \textit{Domination in Wrongdoing}, 76 B.U. L. REV. 347, 347 (1996) (calling “the alleged dominance of women by men . . . undoubtedly unjust and wrong”).

\textsuperscript{358} One line of inquiry that might be taken up here is the relation among technology, masculinity, militarism, mechanization of the human body, and orders to kill. For a discussion of this relation, see Richard Rambuss, \textit{Machinehead}, 42 \textit{CAMERA OBSCURA} 97 (1999) (finding all of these elements in the Stanley Kubrick film \textit{Full Metal Jacket}). I prefer to note it only in passing, however, given the distance between technocentric expansionism in civilian society (the concern of this Article) and anyone’s actual enlistment in the armed forces. Nevertheless, the highly gendered nature of the military may be considered at least an additional attraction, if not a central credential, for those who favor military-based technologies to maintain gender-segregation.

\textsuperscript{359} DRUMMOND, \textit{supra} note 12, at 51.

stood to share in the wealth.\footnote{361 See Feagin, supra note 159, at B5.} We have seen how this locus of privilege made the social sciences more preoccupied with quantification and other borrowed hallmarks.\footnote{362 See supra note 197 and accompanying text.} It suggests a similar effect on individuals who contemplate using technology as a technology of gender-segregation: even if using technology for new inroads will not always succeed in keeping women subordinated and excluded in the long term, it promises a payoff of money and status when invoked in aid of the national defense.

Defense spending has enriched many recipients while permitting the gendered military to underwrite, and even create, new consumer markets. Military budgets brought Americans the Internet,\footnote{363 See RONALD J. DEIBERT, PARCHMENT, PRINTING, AND HYPERMEDIA: COMMUNICATION IN WORLD ORDER TRANSFORMATION 131 (1997).} the sprawl of mainframe computers and their more compact descendants,\footnote{364 See BORSOOK, supra note 39, at 20.} and gains in research that framed technological problems in terms of war and destruction.\footnote{365 See Edwards, supra note 24.} These expenditures begat artificial intelligence and artificial human organs. A range of civilian goods (such as small telephones, cheap personal computers) derive from military-based investment.\footnote{366 See Sarah S. Jain, Inscription Fantasies and Interface Erotics: A Social-Material Analysis of Keyboards, Repetitive Strain Injuries and Products Liability Law, 9 HASTINGS WOMEN'S L.J. 219, 225 (1998) (noting that the Remington company had nothing to make after the United States government cancelled an arms contract at the end of the Civil War, and so sought to produce civilian goods—notably the first mass-produced typewriter).} The other-people's-money antecedents of high-tech innovation are not often mentioned in current policy discussions.\footnote{367 See Langdon Winner, Cyberlibertarian Myths and the Prospects of Community (1997), at http://www.rpi.edu/~winner/cyberlib2.html (last visited Aug. 26, 2001) (on file with the North Carolina Law Review).} Some Silicon Valley entrepreneurs, like their predecessors on the western frontier who denounced the federal government while taking federal handouts to support transportation and agriculture, prefer to credit only themselves for their vast wealth.\footnote{368 See BORSOOK, supra note 39, passim & 20–21 (noting that in northern California, entrepreneurs who espouse libertarianism would have failed utterly without good roads, an educated workforce, decent police protection, inspectors who monitor building safety, reliable banking, and a rule of law).} But technology has for centuries been a dependent endeavor, and contemporary technology is no exception to this dependency. The connection between military spending and civilian enrichment gives technocentric expansionists a chance to innovate and grow under conditions of lavish subsidy.
2. Leveraging Military Strength into Civilian Power

As observers of the military-industrial relation have noted, dealings between warriors and industrialists are bilateral, and the benefits of alliance go both ways. Technocentric expansionists who derive money and power from their benefactors—among them government research-and-development programs, venture capital, and corporate parents—generate rewards for them in return. Claims on a defense budget sound more convincing, or less directly related to mere profit, when they are buttressed by the imperatives of science. One party brings priestly esteem to the transaction, while the other can finance this disinterested purity and give it something concrete to do.

Similarly, the connections between technology and government strengthen the authority of technocentric expansionists over civilian life. Borrowing the rhetoric of invasion, mistrust, preparedness, and defense, technological purveyors contribute to a militaristic tenor in public discussion. Decades of relative peace have not diminished this power of technocentric expansionism to influence government policy. Hoping for a victory like the Allied triumph starring Franklin Roosevelt and Dwight Eisenhower, successor Presidents have gone on to announce “wars” on drugs, poverty, cancer, and other blights, thereby entrenching and enriching various quasi-military providers.


370. Outside the United States, Israeli society presents a powerful example of the phenomenon; Israel's pervasive military has been credited for the training of an enormous high-tech civilian sector. See Michael A. Hiltzik, Israel's High-Tech Boot Camp, L.A. TIMES, Aug. 23, 2000, at C1.

371. Consider for example the symbiotic relationship between physicians and suppliers of medical technology. The exchange has given manufacturers external, respected validation and new markets, while physicians get a base for university prizes like journals and conference, as well as a device to recruit bright students, who in turn strengthen the focus on technological expansion. See Moran & Alexander, supra note 100, at 578; see also Cassell, supra note 123, at 117.

372. For a facetious comment on this militarism, see David Frum, The Tory from New York, AM. SPECTATOR, Nov. 1996, at 74 (noting that Senator Daniel Patrick Moynihan "was an officer in the War on Poverty, the War on Drugs, the War on Crime, the War on Cancer . . . a series of debacles beside which the military history of Italy begins to look impressive"). On the enrichment of those who sell goods and services to support these pseudo-wars, see JOEL DYER, THE PERPETUAL PRISON MACHINE: HOW AMERICA PROFITS FROM CRIME (2000) (describing the growth of private prisons and other investments); RALPH M. MOSS, CANCER THERAPY: AN INDEPENDENT GUIDE TO NON-TOXIC TREATMENT AND PREVENTION 2 (1995) (claiming that the “war on cancer”
Access to the national government gives technocentric expansionism a base for political influence, as well as a line in the budget.

The military-industrial relation is useful also in the suppression of criticism. Once technological innovation links itself successfully to the safety of the nation, technoskeptics automatically become "soft"—a word this Article has encountered before on national defense. Again, the absence of an external enemy-nation poses little rhetorical problem for technocentric expansionists. Enthusiasts for technology continue to invoke national security when they demand more government spending, without saying on which basis they identify the national interest.

C. Meeting the Challenge: Psychological Utilities

1. Access to Flattery and Reassurance

A demographic of anxiety sustains technocentric expansionism. "Fear of falling," the phrase that social critic Barbara Ehrenreich coined to describe a diffuse anxiety about the future, pervades those individuals and groups who have access to technology. People who have enough income to live on and reasonable prospects for security as they age nevertheless perceive their society to be changing, too fast and for the worse, in Ehrenreich's view: their entitlements feel a little shaky to them, their privileges in doubt. Because their literal survival is as assured as can be, these persons have the leisure—and perhaps the provocation—to foster a more free-floating and inarticulate uncertainty.

373. See supra notes 24, 201 and accompanying text.
374. See Bracey, supra note 219, passim.
375. See Holmes, supra note 31 (noting that the National Science Foundation, an unnamed "federal commission," and the President's Information Technology Advisory Committee have all sounded an alarm about national inadequacy in science and technology).
377. As Deborah Malamud has shown, the "middle class" is an ill-defined group; following Professor Malamud, here I refer not to a range of annual incomes but rather a self-definition connected to variables like education. See Deborah C. Malamud, Class-Based Affirmative Action: Lessons and Caveats, 74 TEX. L. REV. 1847, 1880 (1996).
378. Economist Juliet Schor argues that the Ehrenreich thesis has been strengthened by the expanded 1990s wealth base that enriched much of the middle class. See Juliet B. Schor, Keeping Up With the Trumps, WASH. MONTHLY, July/Aug. 1998, at 34, 34.
Technocentric expansionism assuages this insecurity. A current consensus that technological change cannot be stopped has created a demand for reassurance: individuals want to know that change, though vast, will not sweep everything away. In this view, the familiar ordering of privilege is associated with stability: New machines, it is promised, will not supersede comforts like gender-segregation. Although a literature has long been contending, rather wistfully, that technology will liberate men and women from gender roles, this utopia—just like the equally futuristic idea of applying common knowledge about mechanics and leverage to revise the hoisting-and-lifting elements of job descriptions—does not yet exist. Technocentric expansionists propose to make moves, and at the same time to keep an existing order in place. That not everyone benefits from social stasis is beside the point to the influential sufferers of fear of falling.

Although men and women both experience middle-class fear of falling, preexisting conditions of gender-segregation allow technocentric expansionism to emerge as a source of more comfort for male sufferers. Recall the suggestion that a woman is more likely than a man to experience and value technology as the means to an end rather than an end in itself. If the generalization is valid, then a woman will regard her washing machine or cellular telephone or math credentials as neither good nor bad per se—a dependent variable. A man, however, "loving the machine for itself," may gain emotional sustenance from the technologies in his life. As Judy Wajcman has shown, at least some men regard technology as part of who they are, "and through their identification with technology men form bonds

379. Cf. MADSON PIRIE, TRIAL AND ERROR AND THE IDEA OF PROGRESS 158 (1978) (arguing that new ideas must be supported by conservative tendencies in order for progress to ensue).
380. The literature includes science fiction—see, e.g., URSULA LE GUIN, THE DISPOSSESSED: AN AMBIGUOUS UTOPIA 219–26 (1974) (envisioning a utopia where science has been severed from the impulse to dominate); MARGE PIERCY, WOMAN ON THE EDGE OF TIME 125 (1976) (describing a society in harmony with the natural world)—as well as essays such as Donna Haraway, A Manifesto for Cyborgs: Science, Technology and Socialist Feminism in the 1980s, in FEMINISM/POSTMODERNISM 190, 192 (Linda Nicholson ed., 1990) (contending that the "cyborg," part human and part machine, "is a creature in a postgender world").
381. See generally supra notes 13, 33, 68–69, 293 and accompanying text (noting the failure of technology to improve job prospects for women).
382. See supra Part I.C.2.
383. TURKLE, supra note 24, at 196.
These bonds build a gendered refuge from anxiety and vulnerability. Observers cannot delineate where the comforts of occupational refuge (away from women) end and the comforts of economic refuge begin; technocentric expansionism delivers both at the same time.

The gender-segregation that characterizes the work-life of computer hackers, nuclear strategists, Air Force pilots, and astronauts is not only occupational but rhetorical. High-status male retreats—Los Alamos, MIT labs, the inside of a Mercury Rocket—provide geographic instantiations of a more pervasive privilege. Valorization of technology firmly links the culture surrounding science and machines with a general authority to resolve disputed questions about truth or policy. Technocentric expansionism delivers flattery and reassurance—along with power—to the side of a dispute that can claim a stronger connection to the objectivity associated with science and technology.

The flattery is illegitimate. As we have had occasion to note, the history of science and technology provides numerous illustrations of irrationality, perversity, short-sightedness, internal contradictions, and blind bigotry; erroneous assertions in the name of science; claims about progress that in fact move backward; criteria to exclude women from good jobs, and men from bad ones, that serve no purpose other than gender-segregation; and willful suppression and destruction of the contributions that female talent has offered in the past and could offer in the future.

Writers have examined the "torture, oppression and carnage" that technology has facilitated. Yet despite this
history, proponents of technocentric expansionism have cast dissenters as ignorant fools, dreamers, throwbacks, faddists, mystics, sentimentalists, New Age hypocrites, and so on—this name-calling often substituting for engagement with their critics’ ideas. The unvarying rightness of science gets transferred to those who claim to speak in its name.

While invoking science to prove their objectivity, technocentric expansionists often aggregate their adversaries as—all in one lump—hostile to science, and therefore suspect. A hoax that Alan Sokal published in 1996, purporting to be a postmodernist manifesto against scientific truth, strengthened a notion that leftist academics in particular are all equally wacky, every one of them tarred with the same nonsense. The idea of Science thereby not only unites diverse technocentric expansionists, some of whom know little about any discipline or its applications, into an élitist that gets to share in vicarious prestige; it also unites critics and dissenters into an inferior, and frequently ridiculed, subclass. Flattery and reassurance continue.

2. Ambiguity: The Lure of a Partial Rather Than a Total Bar

Sexism is a uniquely ambiguous form of bigotry: no other class of subordinated persons is so complicitous as women in its own

never conceive another child, that the child being conceived at this very moment be the last human being ever to exist”).

389. “There’s a tendency to personalize everything in this society—Noble is a pain in the ass; Noble is a troublemaker; Noble is a gadfly—rather than deal with the issues,” said techno-critic historian David Noble, when a reporter asked him to comment on the charge that he was “abrasive.” Jeffrey R. Young, David Noble’s Battle to Defend the “Sacred Space” of the Classroom, CHRON. HIGHER EDUC., Mar. 31, 2000, at A47.


391. Sokal, a physicist, published a paper impenetrably titled “Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity” in Social Text, admitting only after its publication that it was a spoof and that he had duped the editors who had accepted it for publication. See Alan Sokal, A Physicist Experiments with Cultural Studies, LINGUA FRANCA, May/June 1996, at 62, 62.

392. Sokal himself took pains to state his leftist credentials. See id. at 48 (noting a stint teaching in Nicaragua under the Sandinists). The leading aggregation of the academic left into a nutty monolith is PAUL GROSS & NORMAN LEVITT, HIGHER SUPERSTITION: THE ACADEMIC LEFT AND ITS QUARRELS WITH SCIENCE (1994). On Higher Superstition’s thesis, see Rose, supra note 15, at 29 (contending that although Gross and Levitt know very well that “the academic left” is diverse, they get around this basic flaw in their argument by saying that “disparate social criticisms” work in partnership “by refraining from attacking one another”).
oppression. The same ties of family, erotic love, and ethnic kinship that keep women from a gendered identification of where their interests lie also make gender-subordination more gentle than other types of discrimination. The phenomenon cannot move full force and in a straight line: both the agents and the victims of gender-subordination are also persons situated in communities of both genders, with loyalties extending across the divide.

In this ambiguous setting, technocentric expansionism puts most women in a disadvantaged category while also affording women individual access to exceptional opportunities. It thereby honors Margaret Mead’s hypothesis about a “relationship between masculinity and pride” while permitting a small number of women to study, enjoy, or advance science and technology. As long as the domain remains a male one, occasionally a favored or beloved or determined woman can enter; large numbers will be segregated out. This stasis, moreover, can remain in place without articulation or explanation.

Under the partial bar of technocentric expansionism, options stay open. Because nobody will insist on perfect segregation, the number of places allotted each gender in a particular sector can change as needed, without formal reversal. This ideology of freedom, consistent with the Enlightenment origins of technocentric expansionism, regards participation in scientific and technical endeavors as a matter of individual choice rather than social prescription, and so the handful of women recognized for scientific achievement are seen not as exceptions in a segregationist culture but proof of a prevailing liberty.

IV. COUNTERTECHNOLOGY: LEGAL WEAPONS

This Part argues that “discursive strategies” can sustain an effort to use the law against the gender-segregation that is achieved by technocentric expansionism. Verbal methods to effect a shift in power in favor of subordinated persons call for recognition of both the infirmities and strengths of law-based advocacy against behaviors that do not directly violate existing law. In this understanding, technocentric expansionism becomes accountable to “the law” in a

393. See generally LERNER, supra note 35, at 217 (arguing that patriarchy requires “the cooperation of women”).
394. See MEAD, supra note 385, at 160.
395. See Allen & Faigley, supra note 57, at 143.
diffuse, nonadjudicatory sense. The strategy aspires to put technocentric expansionism on the defensive.

A. Prologue: The Relevance of Law, Beyond Adjudication and Statutes

That the law concerns itself with much more than adjudication and legislative enactments is now a truism. Although lawyers are trained to fix attention on the decisional law that appellate courts publish, a wide-ranging consensus now finds “the law” in a host of other sources. In a related development that takes the law even further from its traditional center, legal scholars have described the function of various societal practices as at least complementary to, if not substitutes for, legal rules. To almost every observer, American law is sweeping, pervasive, and all-encompassing.

Given this vast expanse, the question raised here is not so much What is Law? as it is In which realms is law of consequence? The struggle against technocentric expansionism can thus relate itself to law by recognizing that strategic, instrumentalist uses of law are not limited to “impact litigation” featuring plaintiffs and pleadings. If technocentric expansionism is a technology of gender-segregation, and gender-segregation is an endeavor that the law condemns, then activists who oppose technocentric expansionism can make some common cause using the law, even though particular legal rules or judicial practices lend little direct assistance to this cause.


398. More than a century ago Oliver Wendell Holmes wrote about the Vermont justice of the peace who refused to enter judgment in favor of a plaintiff who suffered the breaking of a churn—because, Holmes chuckled, this justice could not find any mention of churns anywhere in his statute-book. See Oliver Wendell Holmes, Jr., The Path of the Law, 10 Harv. L. Rev. 457, 474 (1897). Today the joke seems funnier, or at least more incongruous: imagine purporting to find the law in one book and only in a book.

Consider that law is of consequence in public discussion all over the United States, far from the courtroom. Television programs, especially police dramas, bring constitutional criminal procedure into the center of households. Consumer protection takes the form of laws, norms, and voluntary practices. Workplace sexual harassment is simultaneously a violation of the statutory protection against discrimination on the basis of sex, a very popular topic of conversation, a notion associated with the United States, and, according to at least one scholar, part of a general downfall of privacy and constitutional government. The First Amendment alone—one amendment out of twenty-six—has helped to declare numerous rights and to hamper dozens of attempted actions by the government. "Substantive due process" and "fundamental rights" at one time did not bring disputes over life and death, procreation and visitation, marriage and divorce, and love in all its forms into the Supreme Court docket, but now they do, blurring the boundary between private life and public concern. Law has been at the center of American preoccupation since the early days of the Republic. Now more than ever before, it permeates common understandings about what is right and good and wise and fair.

Although such popular understandings do not always line up with what the law actually requires or prohibits, they give activists enough room to work. Technocentric expansionism, as we have seen, pushes women away from workplace esteem and the educational routes to that status. Members of the public can grasp that this force of exclusion offends the principle of antidiscrimination, even though practitioners have been careful enough to escape redress.

B. Technocentric Expansionism and the Burden of Proof

"Technocentric expansionism is a technology of gender-segregation." Is that so? Conventions of scholarship oblige me to

400. See Bandes & Beerman, supra note 62, at 7 (stating that "we have diligently watched every episode of NYPD Blue ever televised" in order to write about Miranda).


402. Examples abound. See, e.g., Troxel v. Granville, 530 U.S. 57, 63 (2000) (grandparent’s visitation rights); Washington v. Glucksberg, 521 U.S. 702, 735 (1997) (right to commit suicide with assistance); Michael H. v. Gerald D., 491 U.S. 110, 118 (1989) (right to be declared the father of one’s biological child). The Supreme Court has rejected all of these assertions of rights. As the divided opinions suggest, however, the Court has been willing to deem all of the claims important public matters, refusing to relegate them to homes, bedrooms, and hospital wards.
prove my assertion, or at least to support it with some evidence. Contrary to conventional belief, however, it is not the case that one seeking to establish the truth of a new affirmative proposition always has the burden of proof. For instance, economic analysis of civil liability favors, at least preliminarily, assigning the burden of proof to defendants. Moreover, a consensus—ranging far beyond feminist commitments—holds that this burden is manipulable to support favored outcomes. Anyone who wants to make a claim like "The math requirement seems to be keeping women out of this job," or "Our shop tools don't really have to weigh fifty pounds," does not necessarily have to defeat a null hypothesis to the contrary.

Inverting traditional allocations of the burden of proof has an extensive parallel in the discourse of progressive activism. A variety of phrases achieve power when they flip a cliché or a truism, startling the listener. Neologisms, tendentious puns, and reclamation of pejorative nouns move in a direction that resembles burden-

403. See RICHARD H. GASKINS, BURDENS OF PROOF IN MODERN DISCOURSE 2 (1992) ("[P]ositive assertions . . . are deemed guilty until proven innocent.").

404. The "burden of proof" is used here somewhat loosely to note what is more precisely called the burden of persuasion. See Leo P. Martinez, Tax Collection and Populist Rhetoric: Shifting the Burden of Proof in Tax Cases, 39 HASTINGS L.J. 239, 246–49 (1988) (explaining author's use of "burden of proof" in a similarly loose fashion).

405. A plaintiff has no incentive to bring a claim she knows lacks merit, if she expects to go to trial. If most claims that are filed are meritorious, then it makes no sense to require the plaintiff to prove a given claim's merit; better to require the defendant to prove it lacks merit (which he will not waste time doing if it is in fact meritorious).

Bruce L. Hay, Allocating the Burden of Proof, 72 IND. L.J. 651, 652 (1997). The problem is more complex, as Professor Hay goes on to detail. Yet it remains fundamental that economic analysis, despite its reputation for conservatism, does not begin by automatically favoring defendants on this point. Nor is it obvious that discourse and litigation are very different devices: although it is cheaper to hurl an accusation than to mount an action in court, discursive strategies are cheaper than litigation for defendants too.


407. See Allen & Faigley, supra note 57, at 150 (mentioning terms ranging from the successful "mail carrier" and "date rape" to the obscure rephrase of PMS as Pubertal Masculine Syndrome).

408. See id. at 152 (noting Mary Daly's definition of "papal bully" with reference to "Pope John Paul II, who told an audience of 4,000 women from around the world who work as maids for priests that they can never thank the Lord enough for letting them serve the clergy").

409. Id. at 152–53 (listing "queer," "faggot," and "crone").
shifters. They cloak new ideas in familiar garb while throwing
tradition into question. Reversals force the unexpected to change
places with the expected, challenging the allocation of social privilege.

The twentieth-century history of activism in the courts can be
seen as a story about the burden of proof. In *Brown v. Board of
Education*,\(^{410}\) the Supreme Court rejected the option of overruling
*Plessy v. Ferguson*\(^ {411}\) in a forthright manner.\(^ {412}\) The *Plessy*
precedent had allowed litigants to prevail when they could prove that segregated
facilities were unequal in some tangible respect; *Brown* held that
segregated schools were "inherently unequal."\(^ {413}\) The Court could
have said "irrefutably unequal," or *per se* violative of the Equal
Protection Clause, but chose not to. Chief Justice Warren thus did
not eliminate all hope for segregationists but instead shifted the
burden of proof to them, putting "unbearable weight" on the scale:
they would now face the impossible challenge of proving that their
segregated schools were equal, down to the intangibles.\(^ {414}\) By shifting
the burden of proof, the Court was able to achieve a just result
without the provocation of overruling a precedent.

The tradition of manipulating burdens of proof without quite
saying so continues in the law. Tiers of analysis in equal protection
cases—"strict scrutiny," "intermediate scrutiny," and "rational
basis"—force the government to work very hard in behalf of its
classifications based on race, for instance, but ease the government's
burden with respect to many other classifications.\(^ {415}\) Challenges to the
constituency of statutes pose questions about the burden of proof:
Legislation may deserve a "presumption of constitutionality" (a
principle more or less invented to rescue the New Deal from attack);
but this presumption has never been stable, and judges have invoked
it selectively depending on whether they liked the contents of a
statute.\(^ {416}\) Similar volatility surrounding the burden of proof emerges
whenever the political constituencies that had felt themselves injured
by a particular idea or principle begin to find the idea useful: ask an
environmentalist how strong an obstacle "federalism" should pose to

\(^{410}\) 347 U.S. 483 (1954).

\(^{411}\) 163 U.S. 537 (1896).

\(^{412}\) *Brown*, 347 U.S. at 495.

\(^{413}\) *Id.*

\(^{414}\) GASKINS, *supra* note 403, at 55.

\(^{415}\) *See generally* LAURENCE A. TRIBE, *AMERICAN CONSTITUTION LAW* § 16 (2d ed.

1988) (detailing the model of equal protection).


2000) (claiming that Supreme Court decisions about the constitutionality of legislation are

inconsistent).
the enactment or constitutionality of legislation, for instance, and you might get an answer of "It Depends." 417

Well then: who has the burden of proof with respect to technocentric expansionism? Indeterminacy can be adumbrated only by something like fairness. Again a return to Brown v. Board of Education may prove useful. The Brown holding about the inherent inequality of segregation did not spring full-formed from the head of Earl Warren. Decades of effort, including much litigation, had built the case that racial segregation in American schools needed to be undone by the government that had imposed it. At all social levels—the University of Maryland law school closed to Baltimore native Thurgood Marshall; 418 Jim Crow-era deprivations for the children and grandchildren of slaves 419—government was identified as an active agent of injustice, not a mere a bystander to private bigotry. Before Brown could declare segregation presumptively unequal, the Court needed arguments and facts about what would be just. The burden of proof thus moves away from protesters, and gets shifted to defenders of the status quo, whenever fairness is at stake.

Contrary to what adherents of technocentric expansionism might believe, this discursive shift in the burden of proof does not depart from established methods to obtain and derive truth under conditions of uncertainty. It flourishes in mathematics 420 and in science. 421 Technocentric expansionism, accordingly, should be called to account. Persons who hold relevant knowledge and power to effect change should be prodded to say why a practice, or criterion, or choice of machinery that leaves women worse off should remain in place.

417. Personal communications suggest to me that federalism and "devolution," once anathema, no longer provoke environmental activists—at least not always.
418. See RICHARD KLUGER, SIMPLE JUSTICE 179 (1975).
419. See id. passim.
420. Mathemetician Claudia Henrion writes that, stereotypes and popular notions about mathematics notwithstanding, "the idea of [mathematical] proof is evolving, shifting, and subject to social negotiation." CLAUDIA HENRION, WOMEN IN MATHEMATICS: THE ADDITION OF DIFFERENCE 245-46 (1997); see also id. at 244 (observing that the influence of computers has moved the discipline closer to an untidy and uncertain realm of experimentation).
421. Philosopher of science Helen Longino, seeking a principled middle ground between relativist dismissals of all scientific truth and the need to call a misogynous culture to account for its treatment of women, argues for a "transformative dimension of critical discourse" amounting to a shift in the burden of persuasion, where scientists would open themselves to dissent and questioning from below. See Helen E. Longino, Subjects, Power, and Knowledge: Description and Prescription in Feminist Philosophies of Science, in FEMINISM AND SCIENCE, supra note 266, at 264, 272-73.
C. What About Technocentric Expansionism Warrants Burden-Shifting?

Following the convention that proponents of a new affirmative proposition have the burden of proof unless they can point to reasons that justify a shift, I note several developments that support imposing this burden on those who maintain occupational segregation.422

1. Widespread Pay Inequity

Working women in the United States receive less income from their employment than working men: one prevailing estimate is that they earn about seventy-five cents for every dollar that men earn.423 Controlling for a host of variables such as time in the workplace cannot explain the disparity, and statisticians are compelled to infer that discrimination is at work.424 While some observers believe that the gap will close within a few years, such speculation has proved over-optimistic in the past.425

Rationalizations for pay inequity—among them that women enjoy low-paying jobs more than high-paying ones;426 women are
investing their human capital someplace other than the market; women lack the aggression necessary to compete with men in the Darwinian employment jungle; women arrived too recently in the job market to deserve equal pay; and all right, women are being treated unjustly, but any attempt to rectify the injustice would in principle be worse—have worn thin. It is absurd to presume that a majority of the population living under capitalism—a harsh strain of capitalism, at that—would prefer less income over more, dependency over independence, and weakness over strength. No reason supports the conjecture that what is variously called anatomy, biology, or evolutionary psychology has given women this perverse set of tastes. Few observers revere “the market” or any other dogma enough to believe that wrongful discrimination in employment is always a chimera; the pay inequity problem has not been made invisible by libertarian blinders. What then explains the acceptance

WOMEN’S FIGURES: AN ILLUSTRATED GUIDE TO THE ECONOMIC PROGRESS OF WOMEN IN AMERICA 36 (1999). Engineering is posited to be an unattractive occupation to these women because skills deteriorate fast. See id. But see Richard Anker, Theories of Occupational Segregation by Sex: An Overview, 136 INT’L LABOUR REV. 315, 329 (1997) (noting that the converse—credentials that shift to reflect either male or female participation—is just as plausible). Notwithstanding these fixed facts, continue Furchtgott-Roth and Stolba, “occupational segregation has diminished and will continue to diminish.” FURCHTGOTT-ROTH & STOLBA, supra, at 36. The authors thus favor human malleability and change when they want to make sanguine predictions, but switch to a paradigm of rigid sameness—women always wanting to stay home with the children, job descriptions that cannot be modified—as soon as malleability begins to embarrass their conservative stance.

427. See GARY S. BECKER, TREATISE ON THE FAMILY 42 (1991). Winner of a Nobel Prize for tautology—it is hard to think of another word for a theory that circumstances reveal choices and choices determine circumstances—Becker offers scant explanation of how exactly women effect their investment in human capital. His conception has been strongly attacked. See generally Anker, supra note 426, at 318 (summarizing criticisms).

428. See Browne, supra note 36, at 1005-06.

429. See generally Explaining Trends, supra note 424 (noting that this hypothesis cannot explain all of the pay gap). I discuss the “only recently” rationale for workplace inequity, which seems never to grow obsolete no matter how many years of inequality go by, in Anita Bernstein, A Letter to a Female Colleague, 68 CHI.-KENT L. REV. 317, 319 (1992).

430. See BLUM, supra note 70, at 1 (noting alarm); Paul Weiler, The Wages of Sex: The Uses and Limits of Comparable Worth, 99 HARV. L. REV. 1728, 1794 (1986) (stating that although comparable worth activists have identified an important problem, “we should be leery about embarking on such a novel and risky venture”).

431. American capitalism offers citizens neither the generous social spending of Western Europe nor the Japanese insistence on preserving jobs, even those that technology could readily eliminate, for the sake of near-universal employment. See EDWARD LUTTWAK, TURBO-CAPITALISM 107-08, 116-26 (1998).

432. See generally Abrams, supra note 176, at 1024-25 (contending that childbearing and lactation capacities do not of themselves cause women to withdraw from their careers).
of unreasoned, even circular attempts to argue that women aren’t really harmed by pay inequity?

A possible explanation—which helps to outline a strategy of shifting the burden of proof—is the belief that pay inequity is too deep and intractable to be cured, and so it is better to deny the fact of injustice than to live with the dissonance of a problem that cannot be fixed. “Equal pay and equal work,” in Lin Farley’s phrase, remains so elusive that some call it contrary to nature. Venerable statutes, however, remind us that American women workers have a legal right to be paid as well as men, and that they have been pursuing this goal for many decades. That judicial victories under the Equal Pay Act, the Civil Rights Act, and related state statutes are very rare (in relation to the size of the problem) demonstrates that doctrinal and societal barriers keep women workers from the courts, not that seventy-odd cents to the dollar is all right with its recipients. Such victories will remain rare in the near future. But if law exists beyond adjudication and legislation, as this Part has argued, then it becomes possible to think of widespread pay inequity as contrary to—though not directly preventable or remediable by—American law.

A connection between technocentric expansionism and pay inequity is manifest, not directly from employment history but from the content of masculinist ideologies in the workplace. Although evidence of women being paid less than men for the same work dates back to the sixteenth century, the rise of industry—with production moved outside of the home into factories—entrenched significant new pay disparities between men and women. Inside the firm, contemporary “management” is an offshoot of “engineering”: both are nineteenth-century domains of masculine control, with severe implications for women’s pay. This article has already noted the connection between technological change and the strengthening of masculine hegemony in the professions. Studies of the trades and other non-professional employment reveal a comparable record.

433. LIN FARLEY, SEXUAL SHAKEDOWN 30 (1978). In 1999 the Secretary of Labor included a verse in a Mother’s Day card: “Roses are red, violets are blue, men earn a dollar, shouldn’t women earn it too?” Mary Lynn F. Jones, Labor Secretary Alexis Herman, THE HILL, May 19, 1999, at 17, 17.
434. See supra Part IV.A.
435. See Arnold & Faulkner, supra note 87, at 47.
436. Id. at 44–45.
437. For other studies of technological change as a source of gender-segregation in non-professional work, see SYLVIA WALBY, PATRIARCHY AT WORK: PATRIARCHAL AND CAPITALIST RELATIONS IN EMPLOYMENT (1986) (examining clerical work and the
2. Occupational Segregation

If you hold a job, odds are high that a fellow worker in the same workplace, holding the same job, and working at the same shift is a man if you’re a man, a woman if you’re a woman.\(^{439}\) Moreover, a majority of women workers in the United States would have to transfer into male-dominated sectors in order to achieve a gender-balanced work force.\(^{440}\) Almost every job title evokes gendered images that either rule out one gender or beget modifiers—such as “male nurse” and “lady lawyer”—and thereby shape careers: young children regard certain paths as closed to them; families lend financial and emotional support to some occupational choices and not others; prospective employers view job applicants as a bit deviant when they cross the gender line.\(^ {441}\)

When one considers that, despite the identification of most occupational categories as either male or female, gender has no inherent bearing on whether a person can do almost any job, the prescriptive and coercive effects of occupational segregation emerge as contrary to justice. Occupational segregation takes freedoms away from people who have done nothing to deserve any deprivation. It also threatens economic efficiency: to the extent that segregation discourages individuals from investing in vocational training or seeking new directions at work, it wastes valuable human resources, and imposes costs on employers who seek talented workers.\(^ {442}\)


\(^{438}\) The leading work on technology as a source of gender exclusion in the trades is a Marxist-feminist study, Cynthia Cockburn, Brothers: Male Dominance and Technological Change (1983). Cockburn depicts a workplace where men exclude women in reaction to the anxieties that arise from industrialization. In a later book she argues that men have appropriated technology as their own in order to assert dominion over women beyond the workplace. See Cockburn, supra note 29, at 8–14.

\(^{439}\) See Barbara F. Reskin & Irene Padavic, Women and Men at Work 54–55 (1994).

\(^{440}\) See id. (noting that according to 1990 data, fifty-three percent of women workers in the U.S. would have to transfer into male-dominated sectors in order to achieve an integrated work force); see also The World’s Women 1995: Trends and Statistics 127 (United Nations 1995) (noting significant disparities in wages based on gender all over the world, a gap that got larger rather than smaller in some countries during the 1980s).

\(^{441}\) Marc Poirier adds “welder,” “bus driver,” and “nanny” to the list, and suggests that “telemarketer” is one of the handful of gender-neutral occupational titles. Marc R. Poirier, Gender Stereotypes at Work, 65 Brook. L. Rev. 1073, 1093–97 (1999).


\(^{443}\) See Anker, supra note 426, at 315.
response to the contention that occupational segregation must not be unjust because affected individuals have not protested in great enough numbers, or must not be inefficient because of the high transaction costs associated with remediation, one can again recall *Brown v. Board of Education*: As a general rule, separate is not equal. The mere fact of segregation based on a trait assigned at birth should raise concerns about both unfairness and inefficiency.

As we have seen, technology has been part of this problem, even though one might have predicted a century ago that machines would reduce gendered limitations. Instead, history is replete with examples of relatively integrated work settings that became either women’s ghettos or bastions of male exclusivity after the onset of technological change. Integration remains a dream: Lewis Mumford’s paean to Neolithic culture—“where everyone can perform as a man or woman any task that anyone else is qualified to do”—connects gender-integration to a host of joys. Conditions of occupational segregation, buttressed by technology, have caused humanity to forfeit a better way to live and work.

3. Unequal Detriments from De-skilling

The denigration of workers’ skills is a subset of occupational segregation that calls for particular attention here, in light of its close connection to technology. Just as optimists might have believed that machines would soon equalize upper-body strength and thereby permit men and women to share the same jobs, they might also have thought that machines would take over the routine, mechanical aspects of production, freeing human beings to express themselves. Over the centuries of industrialization, however, work has become

444. *See supra* note 69 and accompanying text.


446. Mumford refuses to concede (as I probably would) that the gains occasioned by technology outweigh the losses:

Most of the equipment that makes for domestic comfort, the hearth, the chest, the closet, the storeroom, beds, chairs, cooking utensils, drinking vessels, blankets, woven clothes and hangings—in short, the whole furniture of domestic life—are neolithic or chalcolithic inventions: mostly before 2000 B.C. If some wicked fairy were to wipe out this neolithic inheritance, leaving us only vacuum cleaners, electric washing machines and dishwashers, electric toasters, and an automatic heating system, we should no longer be able to keep house; indeed we should not even have a house to keep—only unidentifiable and uninviting space-units . . . .

*Id.* at 161.
more rather than less repetitive, depriving workers of stimulation, variety, and a chance to use many of their talents.  

The prevailing view of de-skilling is that it is unfortunate yet necessary, an inevitable consequence of progress; dissenters say that more intelligent policymaking would halt the trend.  Regardless of which side is right, de-skilling indubitably has inflicted poverty, physical injury, emotional suffering, and alienation from the body on its victims. Some categories of human beings suffer these hurts more than others.

A feminist exercise in shifting the burden of proof would freshen this weary struggle over de-skilling by adding a new category. Poor people and people of color are not the only groups that suffer disproportionately from the descent of once-dignified jobs into robotic, ill-paid oppression. Feminist scholars have argued that the very concept of "skill" is a gendered one, lacking independent content beyond its association with maleness. The phenomenon of de-skilling is thus ready for feminist challenge. One might raise the

447. The classic on this subject is BRAVERMAN, supra note 34.
449. See Jain, supra note 366, at 219 n.1 (enumerating some statistics about repetitive strain injury, an affliction that befalls de-skilled workers: 230,000 carpal tunnel surgeries a year; 57 million lost workdays in 1989; $27 billion annually in medical treatment and lost income).
450. See Ryan, supra note 448, at 8.
451. Lewis Mumford laments a comprehensive mechanization of human life. See MUMFORD, supra note 445, at 266 ("The lesson of the ant-hill, that specialized work can best be done by sexual neuters, was increasingly applied to human communities, and the machine itself thus tended to become an agent of emasculation and defeminization.").
452. See generally Carol J. Haddad, Technology, Industrialization, and the Status of Women, in WOMEN, WORK, AND TECHNOLOGY, supra note 190, at 33, 44 ("[C]urrent applications of new technology to industries and occupations in which women are heavily concentrated have served to reduce worker skill and control over the work process and have intensified preexisting sexual divisions of labor, despite their potential for improving the economic status of women."); Lee Murray, Women in Science Occupations: Some Impacts of Technological Change, in WOMEN AND TECHNOLOGY 93, 108–10 (Urs E. Gattiker ed., 1994) (describing a survey of male and female laboratory workers that found gender significant: women reported less influence on the decision to install new technologies into their workplace, and often believed that when new technologies were not introduced, the reason was that their jobs were too unimportant to warrant this investment); supra Part I.B (noting "the erosion of a woman's profession").
simple query: Why are women being made to suffer more than men?  

4. Inconsistent Assertions About Female Inadequacy with Respect to Science and Technology

Feminist attention to "the double bind" has yielded numerous accounts of how a woman will be disadvantaged no matter which of two competing alternatives she chooses. For instance, a "feminine" demeanor connotes weakness, while acting "masculine" is unbecoming to a woman. Employers and co-workers regard both motherhood and childlessness as flawed, problematic states. And almost any action that a woman might take in response to an unplanned out-of-wedlock pregnancy—an occasion that always involves a man too—can provoke onlookers to criticize her severely. We may add technocentric expansionism to the list of double-binders. Just when one partisan in the endeavor will fault women for lacking a trait, another will disqualify them from something good on the ground that they have the trait in too much abundance. These contradictions add up to a pernicious incoherence.

Consider the terms "science" and "technology," which have been paired for most purposes in this Article but bear somewhat different meanings. Barbara Drygulski Wright points out that women have been excluded from each, on contradictory bases: women are thought of as too refined for the "hard hat and dirty fingernails" of technology, but also "too earthy, too bound to their own hearth and family" for science: they allegedly lack the "necessary greatness of spirit or intellect." The idea of great science consisting of paradigm shifts—leaps of intuition and creativity—inverts the traditional idea of the scientist as a perfectly logical and rational calculator, who is master but also servant of immutable laws; both stereotypes have valorized masculinity and belittled its contrast. Two views of

455. CHAMALLAS, supra note 66, at 17-18.
456. Contemporary feminists were not the first ones to notice. See OKIN, supra note 329, at 216-17 (pointing out John Stuart Mill's observation that in one culture, women are stereotyped as cold, whereas they are voluptuous in another; the French say women are fickle, and the English call them constant).
457. See supra notes 15, 254 and accompanying text.
greatness in science, each opposing the other, come together in their exclusion of women.459

Similarly technocentric expansionism has faulted women for their inability to bond together like "men in groups" and also for an excessive natural sociability that obstructs the isolation necessary to do first-rate technical work;460 for succeeding in medicine where men failed and also for failing where men succeeded;461 for making inadequate contributions as inventors, based on a history that includes the United States Patent Office’s practice of overlooking and denying women as inventors, even in its official roster of women patent holders;462 for preferring quantitative over qualitative approaches to their academic research, and vice versa;463 and for high scores, low scores, and middling scores on tests.464

Once again, we are not in a juridical realm where the forensic technique of impeachment can expose a speaker as untrustworthy. Conflicting claims of technocentric expansionism have been expressed by different individuals in different centuries and different places, and each cannot be held responsible for all the assertions of others. Nevertheless, the cumulative weight of these double-bind attacks on women is heavy indeed. David Noble’s scathing indictment—"since technology was defined at the onset as masculine, rooted as it was in the religion of technology and, hence, in the myth of a masculine millennium, women were, by definition, excluded and

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459. See id.
460. See BORSOOK, supra note 39, at 243.
461. See supra notes 84–86, 116–17 and accompanying text.
462. See Stanley, supra note 323, at 118.
463. Compare DEEGAN, supra note 202, at 45–46 (noting that before 1928, quantitative data analysis in sociology was dismissed as “women’s work”), with Smith, supra note 199 (linking qualitative work with women’s interests, and contending that women are adverse to quantitative sociology).
464. On high scores: The fact that females obtain higher grades in all school subjects, including mathematics, is rarely publicized. When it is, ... successes are presented as failures: ‘Those explanations that allow girls’ success at all say that it is based on rule following, rote learning, and hard work, not proper understanding. Hence, they negate that success at the moment they announce it: girls ‘just’ follow rules, they are ‘good’ compared with ‘naughty’ boys who can ‘break set’ (make conceptual leaps).’
Denise Fréchet, Toward a Post-Phallic Science, in (EN)GENDERING KNOWLEDGE: FEMINISTS IN ACADEME 205, 212 (Joan E. Hartman & Ellen Messer-Davidow eds., 1991) (citation omitted). On middling scores, see Sarah J. Stage, Book Review, 268 J. AM. MED. ASS’N 1944 (1992) (noting the idea that “men ranged from genius to idiot while women clustered at the center, mediocre by nature”). Steven Goldberg takes low scores as proof of female inferiority in GOLDBERG, supra note 169, at 195 n.69.
whatever women did was, by definition, not included”—begins to seem almost understated. Thus although technocentric expansionist testimony against women cannot be impeached with its inconsistencies, it can be questioned. Put on the defensive rather than left free to indulge in whichever half of a pair of stereotypes suits them, technocentric expansionists would be gradually disarmed, forced closer to consistency.

D. Vocabulary

Because concerns about fairness justify reallocation of the burden of proof, opponents of technocentric expansionism can work with law-based concepts that have helped elsewhere to achieve such a shift. This vocabulary fights unjust gender-segregation by emphasizing its resemblance to numerous social ills: in this section I invoke discrimination, negligent behavior (the kind about which an injured plaintiff knows little and a defendant is remaining unhelpfully mute), damage to the environment, and destructive technological change. Just as the "right to privacy" and "the right to remain silent," neither of which is stated in the Constitution, have acquired a self-renewing discursive power, so too can phrases and concepts inform the battle against technocentric expansionism.

1. "Disparate Impact"

Employment discrimination law has recognized, albeit with some wavering and retreat, that those persons who exclude a worker from opportunity in violation of the worker's statutory rights—based on her race, or her sex, or a disability that does not interfere with her ability to do the job, or another proscribed characteristic—will seldom assist her attorney by manifesting clear evidence of unlawful intent. The Supreme Court first noted this simple fact back in 1971, subsequent decades have only increased sophistication and wariness among employers, making discriminatory motive even harder for the typical claimant to prove. A doctrine of disparate impact thus rescues

465. NOBLE, THE RELIGION OF TECHNOLOGY, supra note 17, at 223.

466. Whenever someone explains or defends the exclusion of women from an opportunity based on any stereotypic rationale, call it X, this person might perhaps be estopped from ever asserting Not-X as a basis to exclude women from something else. It is also fair to ask, in response to the proffered X, "Does that mean that you disavow and repudiate Not-X?"

467. See Griggs v. Duke Power Co., 401 U.S. 424, 431 (1971); see also St. Mary's Honor Ctr. v. Hicks, 509 U.S. 502, 534 (Souter, J., dissenting) (noting that "employers who discriminate are not likely to announce their discriminatory motive").
certain claims from summary disposition when the claimant cannot
directly prove that the employer acted out of a discriminatory motive
or desire.\footnote{468. See Mark A. Rothstein et al., Employment Law 209 (2d ed. 1999) (noting
that disparate impact has been limited to certain statutory claims, and is not available for
claims brought under the Equal Protection Clause of the Fifth Amendment).}

According to the doctrinal formulation, when she proves
disparate impact the plaintiff has presented prima facie evidence of
discrimination. Her employer faces a burden whose definition has
emerged from dialogue between Congress and the Supreme Court: it
must produce evidence of its "business necessity" for the challenged
Supreme Court precedents). I return to "business necessity" below. See infra Part IV.D.2.}

Scholars of employment law generally think of intent as
irrelevant to statutory claims of disparate-impact discrimination. Disparate impact is not a proxy for unprovable animus but a violation
in and of itself: "the consequences of employment practices" are

Elsewhere I have expressed my
doubts that unlawful discrimination can ever be identified without
reference to fault;\footnote{471. Steven J. Kamenshine, The Cost of Older Workers, Disparate Impact, and the Age
401 U.S. at 432).} here I would say only that the widely shared
understanding about the irrelevance of motive seems inconsistent
with the opportunity of an employer to present its reasons for
discrimination, which partake inevitably of fault (and which courts
usually find compelling enough to refute the plaintiff's prima facie
evidence).\footnote{472. See Bernstein, supra note 30, at 497–501.}

Nevertheless, the opportunity to identify liability
without fault lends rhetorical power to our counterdiscourse against
technocentric expansionism.

Applied to the problem of technocentric expansionism as a
technology that strengthens gender-division, this non-fault notion of
disparate impact permits feminist activism to escape the predictable
charge of male-bashing.\footnote{473. See Michael Selmi, Proving Intentional Discrimination: The Reality of Supreme
Court Rhetoric, 86 Geo. L.J. 279, 336–37 (1997).} To say that women have experienced a
disparate impact following the introduction of a technology into a sector of work or training is emphatically not to accuse anyone of intentional discrimination against women, nor even to ask for rectification of this unfortunate consequence. Indeed, speaking the phrase "disparate impact" flatters decisionmakers by implying that they will do the right thing when informed.

In response to those who criticize disparate-impact doctrine for its apparent feebleness in buttressing plaintiffs' judgments, I would not disagree but instead contend that the disparate-impact heuristic should fare better in public dialogue than it has fared in the courts. The policy of deeming even one "neutral" reason for discrimination sufficient to save an employer from an adverse judgment is less unjust in the courts, where the consequences of a plaintiff's judgment gain the ponderous weight of precedent. In a realm of conversation, however, one may say something casual like, "Sure, that engineering-degree requirement was a good idea two years ago, but look how your female participation has dropped since then, and have you thought about those other strategies that wouldn't have a disparate impact on women yet take you where you want to go?"

Disparate-impact discourse contains an inherent tentativeness: it can merely suggest, never prove, an injustice. Judges have expressed this tentativeness by concerning themselves with the procedural rights of the accused, and hesitating to apply the brand of unlawful discrimination on an actor who may have done nothing particularly faulty. And so it remains difficult for claimants to win employment discrimination cases based on disparate impact alone. The appeal of the concept is evidenced, however, by its wide acceptance. Courts use it; Congress recited it in the 1991 amendments to Title VII; and the

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475. See Richard J. Lazarus, Pursuing "Environmental Justice": The Distributional Effects of Environmental Protection, 87 NW. U. L. REV. 787, 830 (1993) (arguing that it is too easy for defendants to come up with a pretext); Selmi, supra note 473, at 337-38 (surveying precedents to conclude that the Supreme Court tends to side with employers whenever employers offer justifications).

476. Cf. Albemarle Paper Co. v. Moody, 422 U.S. 405, 425 (1975) (providing a version of this query in formal, doctrinal prose). The echo of Microsoft's old slogan "Where do you want to go today?" is intended.

477. I have written previously about the reluctance of claimants to "wield the sword" of fault. Anita Bernstein, Law, Culture, and Harassment, 142 U. PA. L. REV. 1227, 1281 (1994). In this context, I think courts and judges would experience a similar hesitation, perhaps to a greater degree.
idea has proved very influential outside the United States.\footnote{478} Its
discursive potential remains to be developed.

2. "Business Necessity"

This term amounts to a kind of excuse for employment
discrimination. Title VII as amended requires an employer whose
employment practice causes disparate impact on persons based on
their race, color, religion, sex, or national origin to demonstrate that
the practice is consistent with business necessity.\footnote{479} "Business
necessity" has excused a variety of job requirements challenged as
discriminatory, such as physical strength, college degrees, and even a
rule that unmarried women not become discernibly pregnant.\footnote{480}

Like "disparate impact," the concept of "business necessity"
functions more easily as counterdiscourse than as doctrine that tries
to determine the outcome of litigated cases. Congress and the courts
have had trouble specifying exactly what will insulate from liability a
practice whose impact falls disproportionately on members of a
protected class.\footnote{481} (For example, two appellate decisions, published
just a month apart, reached directly contrary answers to the question
of whether business necessity permits a workplace ban on beards,
notwithstanding the race-correlated dermatological effects of being
forced to work clean-shaven.)\footnote{482} I do not mean to overstate:

\footnote{480. See \textit{ROTHSTEIN ET AL., supra} note 468, at 170-71. In the pregnancy case,
Chambers v. Omaha Girls Club, Inc., 834 F.2d 697 (8th Cir. 1987), the plaintiff
had worked for a club for teenage girls. She was fired because the employer
deemed her a poor role model after her pregnancy became known. The Eighth Circuit held
that even though the employer could not validate the stated effect of an out-of-wedlock
pregnancy on the club's clientele, the requirements of the business necessity defense were met. \textit{Id.} at 702.}
\footnote{481. For variations on "business necessity," see Wards Cove Packing Co. v. Atonio,
490 U.S. 642, 659 (1989) (replacing "business necessity" with an inquiry about "whether a
challenged practice serves, in a significant way, the legitimate employment goals of the
employer"); New York City Transit Authority v. Beazer, 440 U.S. 568, 587 n.31 (1979)
(requiring a "manifest relationship" between the practice and "legitimate" employer
goals); Diaz v. Pan Am. World Airways, Inc., 442 F.2d 385, 388 (5th Cir. 1971) (inquiring
whether the practice relates to the "essence" of the business). After \textit{Wards Cove},
Congress reinstated "business necessity" as the defense, and the federal courts now work

\footnote{482. Compare Fitzpatrick v. City of Atlanta, 2 F.3d 1112 (11th Cir. 1993) (finding
the practice justified as a matter of business necessity), \textit{with} Bradley v. Pizzaco of Neb., Inc., 7
F.3d 795 (8th Cir. 1993) (finding the practice unjustified). The beards cases are analyzed
in HAROLD S. LEWIS, JR., \textit{CIVIL RIGHTS AND EMPLOYMENT DISCRIMINATION LAW}
272-73 (1997).}
concept of business necessity is not incoherent nor fatally indeterminate; it is just difficult to apply in determining liability *vel non*. Commentators agree that no authoritative account of the concept has emerged from statutory and judicial developments.\(^4\)

Again, the discursive meaning is manageable. Moving technology and technocentric criteria into a new area usually poses a risk to the status of women, and so anyone who effects this importation ought to be able to show why it is necessary.

3. "Disfavored Contention"

In cases gathered by Fleming James in his classic article on the burden of proof, decisional law reveals an inclination to regard certain types of assertions as disfavored.\(^4\)\(^4\) A litigant who asks the court to reach a disfavored contention is obliged to work harder than the adversary who disputes her assertion. Although no definite catalogue of disfavored contentions exists, disfavor tends to fall on all claims that an opponent acted reprehensibly. For example, according to James, courts disfavor the contention of fraud.\(^4\)\(^5\)

In the 1950s Edward Cleary went a step further with negligence, suggesting that this contention is so disfavored that not only must the plaintiff prove that the defendant was negligent; he must also prove his own freedom from negligence, both requirements having been established in aid to disfavor this particular contention by plaintiffs.\(^4\)\(^6\)

The history of technocentric expansionism contains several unarticulated premises that ought to have been called "disfavored contentions" long ago. Private employment practices that disadvantage women workers warrant disfavor. This provisional disapproval need not harden into utter condemnation. Just as fraud and negligence, however disfavored, can be quite accurate as conclusions, so too can detriment to women as a group in an occupation result even where employers or leaders in a profession or industry are quite innocent. Disfavor simply forces the person who disadvantages women, rather than the women harmed, to squirm initially with discomfort. Let industry leaders explain why the percentage of women in an occupation is getting smaller when the work is improving and larger when the work is worsening; why pay trends are enriching men at the expense of women; why mathematics

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483. See Lewis, *supra* note 482, at 276; Rothstein et al., *supra* note 468, at 172.


485. Id. at 64.

has been declared necessary to various jobs now, when it hadn’t been necessary in the recent past; why industrial robots designed as male have received respect denied to real women in similar workplaces.\footnote{487. The last query comes from ZIMMERMAN, \textit{supra} note 13, at 82–83; the rest of them have been noted \textit{passim} throughout this Article.}

As a locution, “disfavored contention” does not contain much mass appeal. It is a lawyer’s—or perhaps high-school debater’s—double-negative tangle; in many situations, only a lawyer or scholar would confidently identify the contention to be deemed disfavored. Despite Fleming James’s efforts, the phrase did not catch on.\footnote{488. A search of “disfavored contention” in Lexis’s MEGA library on March 5, 2001 found only seven citations in caselaw.} I favor it as one of several bows in the quiver of counterdiscourse, rather than a lone weapon. Its formality announces to gender-segregationists that propositions of logic belong not only to them but to feminist activists who choose to avail themselves of their tone and authority.

4. “Smoking Out”

Another subconcept of shifting the burden of proof is a metaphor about what to do when differences between antagonists leave the factfinder unable to determine what has really happened. Though by no means a rule of civil litigation, the concept of “smoking out”\footnote{489. For a good illustration of what the term encompasses, see Teacher's Manual to \textit{DAN F. DOBBS \& PAUL T. HAYDEN, TORTS} 199–200 (1997).} holds that when the equal inability of plaintiff and defendant to establish their version of the facts would otherwise demand a defense verdict (that is, if the court were to follow conventional rules about the allocation of burdens), court-created pressure can encourage a defendant to part with information in his possession by declaring that unless he can exonerate himself by revealing the missing facts, he will be liable. This process is associated with the negligence doctrine of res ipsa loquitur, which occasionally assigns to a defendant the task of exonerating herself.\footnote{490. See, e.g., Ybarra v. Spangard, 154 P.2d 687, 691 (Cal. 1944) (compelling all defendants to “giv[e] an explanation of their conduct” after they had all professed not to know how the plaintiff suffered his injury); Byrne v. Boadle, 159 Eng. Rep. 299, 301 (Ex. 1863) (“[I]f there are any facts inconsistent with negligence it is for the defendant to prove them.”).} It is related to the broader notion that, as Leo Martinez puts the point in an article about burdens of proof in taxpayer litigation, “the burden of proof is
assigned to the party with particular knowledge about a matter at issue."

Accordingly, I propose that activists choose an instance or two of what they suspect is technocentric expansionism, and ask decisionmakers there to account for the apparent detriment to women. As with a disfavored contention, the suspicion that a putative technocentric expansionist has in fact injured women without good cause might be wrong, but the smoking-out posture presumes that this suspicion will be right most of the time. Look around, accuse carefully, and await what is smoked out.

The tactic becomes especially useful whenever technocentric expansionism tries to entrench gender-segregation from behind a barrier. Oracular proclamations of female inferiority, with no identified speaker, warrant suspicion. Who or what is behind the curtain? One obvious nominee for smoking-out treatment is the SAT—particularly the math portion—which has been intoning for years that girls, even if they have done well in school, lack innate capacity. Ample reasons to distrust this message have piled up over the decades: the air surrounding the SAT now has a stench too strong to ignore.

491. See Martinez, supra note 404, at 253.

492. Unfair? Saul Levmore concedes the risk of injustice in smoking-out pressure: applying smoking-out incentives on people who may have done nothing wrong reminds him of the threat to destroy the cities of Sodom and Gomorrah on the ground of "wickedness" even though a (small) number of the denizens sentenced to this destruction were, in fact, not wicked. But Levmore is so persuaded of the utility of smoking out, or "overextraction," that he recommends taking the device beyond its limited sphere of res ipsa loquitur into new settings, such as the investigation of crimes. See Saul Levmore, Gomorrah to Ybarra and More: Overextraction and the Puzzle of Immoderate Group Liability, 81 VA. L. REV. 1561 (1995).

493. See supra notes 164, 171-74 and accompanying text. The SAT received a blow in February 2001 when University of California president Richard Atkinson announced his proposal to drop the SAT as an admission requirement for the eight-campus system. See Richard Atkinson, Test Skills, Not Aptitude, ATLANTA J. CONST., Mar. 5, 2001, at A9 ("As a cognitive psychologist, I had worried about the use of the SAT for many years \\

494. See Alfie Kohn, Two Cheers for an End to the SAT, CHRON. HIGHER EDUC., Mar. 9, 2001, at B12 (summarizing the failure of the SAT to correlate with any aspect of future performance: "So what does it measure, other than the size of students' houses?"). I would not apply the smoking-out tactic unless such a strong stench were present; mere inequality would not suffice. To suggest that standardized test scores should be repudiated whenever they do not conform to a politically correct egalitarian ideal is ludicrous, even if all agree in the importance of the ideal: if the test scores are valid, which they may well be, a repudiation would hurt those persons who would benefit from
purpose than convincing girls (and others) that they "aren't really smart," that their success in school results only from their passivity and diligence.  

Again we need to recall the contrast between discursive and juridical uses of the countertechnology. Smoking-out the SAT does not mean issuing a subpoena to the Educational Testing Service demanding that it produce its methods, practices, statistics, validations, or rejected questions. In the discursive sense, smoking out does not focus on a named defendant. Nor does it seek to destroy any particular practice: for all we now know, the SAT may be better than all feasible substitutes; some cures have been worse than diseases. Instead the exercise of smoking out seeks discussion and explanations, following circumstantial evidence that injustice exists. An activist might like to hear from those who write and market the test, but also want to smoke out the prejudices and assumptions of other players behind the curtain, such as college admission officers (who have access to information that could prove or disprove the predictive power of the test), prospective employers who want to know SAT scores long after an applicant's first year of college (when the thin predictive value of the test has completely disappeared) and journalists who print this tidbit about middle-aged politicians. Smoking out destabilizes what would otherwise rest rigidly in place. The critic or activist uses the device to find the human agency behind walls, edifices, and other barriers.  

5. "Environmental Impact Statement"

An environmental impact statement (EIS) describes the environmental consequences of an undertaking (typically some kind of construction, like a power plant or a storage facility) as they are anticipated before the project begins. The National Environmental Policy Act (NEPA) requires an EIS for all "major Federal action significantly affecting the quality of the human environment." A
contribution to environmental law that arose in the United States, the EIS now precedes various government actions in more than a hundred countries, usually pursuant to statutory authority.499

Although federal courts in the United States, notably the Supreme Court, have tended to construe the EIS requirement in very narrow terms, permitting governmental agencies to get away with omissions, half-truths, bureaucratic secrecy, and crabbed definitions of the term "human environment,"500 the statute articulates a generous vision of sustainability and ecological health. Many commentators from the environmental-law community lament the failure of NEPA to be read as it is written: in their view the executive branch, abetted by the judiciary, has been evading its statutory duty to consider the environment in all its facets before taking action.501

Whereas most of the writers despair of reversing what now prevails within federal administrative law, such pessimism need not blight a counterdiscursive strategy against technocentric expansionism.

The strategy could take many forms. Anne Simon, an administrative law judge in the Massachusetts Department of Environmental Protection, offers a useful variation on environmental impact statements that could be applied to technocentric expansionism: she proposes that the government be obliged to produce a Gender Impact Statement (GIS) every time it takes action that would have significant effects on the lives of women qua women.502 New or expanded military bases, housing construction, and transportation development are examples of government projects that Simon argues would warrant a GIS, particularly if there is reason
to believe, for instance, that the rate of rape in a region would be affected. Following Simon, activists could demand an EIS or GIS when the federal government proposes a change in policy that looks as though it might be technocentric expansionism, in aid of gender-segregation.

As an alternative to Simon’s GIS, activists Judy Smith and Ellen Balka propose a Sex Role Impact Statement, which “would be used just like the Environmental Impact Statement (EIS) which is legally required before development decisions can be made.” Smith and Balka elaborate on the queries they would broach: “The central question would be what effect would this development have on sex roles?”

Would it broaden or restrict women’s traditional options? Would it increase or limit women’s chances for economic self-sufficiency? Would it decrease or increase the time needed for home and family maintenance? Would it increase or decrease women’s mobility? Would it reduce or increase women’s privatization in the home? Would this development be dangerous to women’s health? Would it make sex roles more interchangeable so that either women or men could do what needed to be done or would it re-enforce traditional sex role stereotyping and division of labor?

One can imagine the sneer from a certain strain of conservatives—those who think the EIS and its siblings are the offspring that are begotten when bureaucrats join tree-hugging activists in a tyrannous embrace: and as if that weren’t enough, add feminism?—but such a reaction would be unjust. First, as Simon notes, the courts are not remotely open to the possibility of requiring an impact statement related to gender or sex roles. Freedom to worsen the gender-environment will not, in the foreseeable future, be abridged by an actual obligation to create such a statement. Second, any sneering at the EIS would conflict with traditional conservative distrust of the United States government, the only entity whose

503. Id. at 150–51.
505. Id.
506. Id.
507. Simon, supra note 500, at 151.
activities are directly inhibited by NEPA.\textsuperscript{508} Conservatives are supposed to question the decisionmaking powers of bureaucrats.

Moreover, this shift in discourse has precedents. Other writers, mainly men, have argued for a broadening of the impact statement. Theodore Roszak, a Ph.D. historian, novelist, and head of the Ecopsychology Institute at California State University, partakes of both legal and extralegal concepts in pressing an argument that the "environment" of an EIS should take into account aesthetic and psychological impacts.\textsuperscript{509} California sex therapist Marty Klein writes that "any proposed project or policy decision that has implications for the public's sexuality" ought to be accompanied by a sexual environmental impact statement; Klein includes "gender-roles" under the rubric of sexuality (complementing Balka and Smith, for whom gender-roles are the central focus).\textsuperscript{510} If the occupations of these California-based writers make environmental-impact extensions sound eccentric or extreme, consider the sober report of the Canadian Environmental Assessment Agency: According to its website, several nations whose first ventures in environmental assessment had emulated what had been done in the United States now extend the concept to address sustainability generally, not only the minimization of impacts.\textsuperscript{511} These recognitions of effects stake out much wider territory than would the impact statements recommended here. A radical revision of the environmental impact statement is not necessary to see technocentric expansionism as the pollution that it is.

\textsuperscript{508} I happen to have no objection in principle to imposing an impact-statement obligation on at least some private actors, in addition to the government, before they can attempt technocentric expansionism. But I tend to prefer parsimonious approaches to law reform. \textit{See} Bernstein, \textit{supra} note 30, at 450 (proposing a "respectful person" standard for hostile-environment sexual harassment only, even though it could be used in other locales of contention); Anita Bernstein, \textit{The New-Tort Centrifuge}, 49 DEPAUL L. REV. 413, 414-16 (1999) (acknowledging that the strategy of parsimony has weaknesses); \textit{see also supra} note 422 (rejecting an invitation to go beyond parsimony).

\textsuperscript{509} "Lawyers could suggest, for instance, in a court of law that destroying a natural beauty or polluting it or paving it over is an assault upon the mental health of a community, children especially. It doesn't seem to me far-fetched . . . ." \textit{Quoted in} Nancy Ross-Flanagan, \textit{It's Only Natural}, DALLAS MORNING NEWS, Dec. 16, 1996, at 8D. Roszak, a nonlawyer, does not appear to advocate a new, distinct cause of action; he rather proposes a rhetorical expression that could be heard and spoken in court without jarring the existing sensibilities there.


\textsuperscript{511} \textit{See supra} note 483 and accompanying text.
6. "Technology Assessment"

Related to, but distinct from, the EIS is technology assessment, "a comprehensive form of policy research that examines the technical, economic, and social consequences of technological applications." Technology assessment has also received feminist attention. Although some writers regard technology assessment as more or less coterminous with the EIS, this effort would widen the idea of the EIS in that it invites consideration of more variables, and does not confine itself to actions by the government; it narrows the task inasmuch as it addresses only "technology," rather than the varied projects that are described in environmental impact statements.

512. This definition was once used by the now-closed Congressional Office of Technology Assessment. See OFFICE OF TECHNOLOGY ASSESSMENT, STRATEGIES FOR MEDICAL TECHNOLOGY ASSESSMENT 201-02 (1982).

513. See JANINE M. MORGALL, TECHNOLOGY ASSESSMENT: A FEMINIST PERSPECTIVE 102 (1993) (dividing feminist technology assessment into three categories: attention to science and technology as part of a system of domination; analysis of gendered divisions of labor; and looking for values embedded in technologies). Corlann Gee Bush adds that technology always has implications for women, which cannot be presumed always benign or always malevolent. See Bush, supra note 10, at 155 (arguing that each technology warrants attention for its "valence").

514. See Smith & Balka, supra note 504, at 83-84.

515. One example of feminist technology assessment (distant from our focus on the workplace and vocational training, but illustrative of the method) is an examination of in vitro fertilization as a treatment for infertility. See H. Patricia Hynes, A Paradigm for Regulation of the Biomedical Industry: Environmental Protection in the United States, in MADE TO ORDER: THE MYTH OF REPRODUCTIVE AND GENETIC PROGRESS 197-98 (Patricia Spallon & Debora Steinberg eds., 1987). Patricia Hynes assesses this technology by comparing it to an alternative, which is to "research industrial, environmental, and medically induced causes of infertility. Recommend reduction in exposure to chemicals and technologies identified to cause infertility and that they be taken off the market. Quantitate % change in fertility expected." Id. at 199. Costs of this alternative, according to Hynes: zero to women. Costs are considerable, perhaps, to industry; but Hynes expects industry to recoup savings from lessened liability. Benefits of this alternative: infertile women will bear children, and other incidental health gains should follow as well. In vitro fertilization fares much worse in this assessment: Hynes lists as costs "adverse effects from hormones; trauma to ovary; risks from anesthesia with repeated operations; risks from procedures for monitoring IVF; potential damage to uterus; risk of ectopic pregnancy," with the only offsetting benefit being the ability of infertile women to bear children, which was just one of several benefits Hynes associates with the alternative. Id. One may disagree with the constituents of this assessment—I would question both the vague "research and recommend" alternative and the content of the cost-benefit ledger—but Hynes has won deserved praise from one of her critics, who notes that only something like feminist technology assessment can rescue public discussion of in vitro fertilization from the one-sided boosterism and public relations that come from its salesmen. See MORGALL, supra note 513, at 135-36 (pointing out that Hynes has provided valuable attention to iatrogenesis, false estimates of costs and benefits, conflicts of interest among
Like the EIS, "technology assessment" bears a history that can support agendas for social change. The United States Congress expressed its commitment to the endeavor via its Office of Technology Assessment (OTA), which opened in 1972 and closed in 1995. OTA, which accomplished a great deal on a tight budget, won strong admiration in scientific-policy communities. This reputation for integrity has survived the agency. OTA reports are still frequently cited, and policymakers in many disciplines—the legal academy included—continue to recognize and call for technology assessment. In this post-OTA age, organizations like the International Center for Technology Assessment (ICTA) take on projects like the one proposed generally in this Article: non-governmental assessments from the standpoint of avoiding harm rather than promoting the expansion of technology.

providers, commerce in body parts, and the misleading description of what is in fact an uncontrolled experiment as confident science).


517. Neither failures in its research nor even the arrival of Gingrichites in Congress explains its abrupt demise: OTA died rather as a victim of the isolation that an agency will acquire when, eschewing partisanship, it does not reliably please powerful allies. See Warren E. Leary, Congress's Science Agency Prepares to Close Its Doors, N.Y. TIMES, Sept. 24, 1995, at A26 (noting admiration, and analyzing reasons that Congress declined to fund OTA).


520. For example, in 1998 the ICTA performed an assessment of an important technology: privately owned and operated automobiles. The Center began by questioning whether the costs of this technology are reflected accurately in the monies that motorists and other beneficiaries expend on it. Taking into account quantifiable phenomena—tax subsidies to the oil industry, government program subsidies, fuel shipment expenses, state motor-vehicle bureau expenses, urban sprawl, traffic delays, illness associated with air pollution, and miscellaneous externalities—the ICTA concluded that the true price of a gallon of gasoline is somewhere between $5.60 and $15.14.

Through its Center for Food Safety, the ICTA has also urged an assessment of recombinant Bovine Growth Hormone (rBGH), a synthesized protein fed to cattle to increase their production of milk, which is suspected of causing harm to human consumers. See Center for Food Safety News – Spring 1999, at http://www.centerforfoodsafety.org (last visited Aug. 24, 2001) (on file with the North Carolina Law Review). The validity of this technology assessment was supported by the news in early 1999 that Canadian regulators rejected rBGH, finding strong reasons to conclude that it was harmful to cattle, and doubting its safety for humans. No industrial country other than the United States permits rBGH to be used within its borders. Id.
The concept of technology assessment can be extended to question the absence of technologies that appear relatively straightforward to manufacture, and profitable to sell in a consumer market. Contraception that works on male rather than female bodies provides a familiar example. Numerous contraceptive inventions (including hormone-based oral drugs and several types of barrier methods) for men have long existed, but remain unmarketed. Less familiar, but perhaps more pertinent to the task of assessing technologies, is the missing microbicide. For more than a decade, AIDS activists have called for an over-the-counter pharmaceutical product containing a substance that would kill HIV on contact, to be inserted into the vagina or rectum without a partner's knowledge or consent. This need has grown more acute with the increase in rates of male-to-female transmission of HIV through vaginal intercourse, and the prevalence of high-risk anal sex. The World Health Organization has already noted the gender politics at issue with respect to this technology. Research into microbicides has received about a tenth of the U.S. government

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521. A 1999 story in Ladies Home Journal on the future of women's health listed several technologies that were “unavailable,” not distinguishing between those that were absent because of politics (the abortifacient RU-486) and those that had not even been thought through (such as the possibility of one meta-therapy for many autoimmune diseases now treated as entirely different). See Ronny Frishman, Women's Health: Today and Tomorrow, LADIES HOME J., Nov. 1, 1999, at 120, 120. This style of reporting provides a valuable insight into the generic question, “Why isn’t there a technological solution to this problem?” As the story indicates, obstacles that block the delivery of technology are not neutral.


525. See Marwaan Macan-Makar, Microbicides: A Beacon of Hope for Women, INTERPRESS SERV., July 16, 2000 (available on Lexis) (quoting WHO report: “By and large, most men, however poor, can choose when, with whom and with what protection . . . to have sex. Most women cannot.”).
funding allotted to vaccine research, despite the apparent attainability of the goal, and the presence of survey data suggesting that 12.6 million women want this product.\textsuperscript{526} Until the missing technology of microbicides is assessed, one provisional conclusion seems fair: the likely consumers of microbicides—that is, women who lack the power to insist on a condom, gay male "bottoms," and the poor of both sexes—are too dispensable to warrant research and marketing efforts in their behalf. Technologies can be, and have been, allocated more for reasons of politics and culture than in response to scientific imperative.

\textbf{CONCLUSION}

Technologies seek to achieve and to accomplish. Whenever a technology cannot apply current knowledge in order to get a task done, it has failed.\textsuperscript{527} A similar purposeful attitude befits the challenge to gender-segregation that is undertaken in this Article. Certain societal practices leave women slighted, disparaged, excluded, underpaid, and otherwise at a disadvantage. This condition has been amply documented and condemned. Discursive tactics—a countertechnology against gender-segregation—can now rely on a vast literature to effect material change in the lives of women and men. The utility of discursive tactics will be measured by their accomplishments.

The challenge is venerable, in part because science is so (justifiably) venerable. For centuries science and related concepts have occupied half a dichotomy, excluding human beings who fall into the category of the Other. This category is said to embody unreason rather than reason, body or matter rather than mind, emotion rather than rational deliberation, and "everyday dirt and disorder"\textsuperscript{528} rather than pristine truth. A nineteenth-century partnership with technology, which gave lofty science an apparatus to acquire vast wealth and the political influence that goes with it, made this dualistic insult even more powerful. The segregationist agenda associated with this conjunction of science and technology, which I have labeled "technocentric expansionism," has had harsh consequences for women. A pessimist might regard these consequences as ineradicable: numerous writers have noted the

\textsuperscript{526} See Laurence, supra note 523, at 25.
\textsuperscript{527} See generally Kilty & Meenaghan, supra note 163, at 446 (noting the utilitarian, purposeful focus surrounding technology).
\textsuperscript{528} Susan Bordo, Introduction to FEMINIST INTERPRETATIONS, supra note 267, at 11.
racism and class bias, not only the sexism, inherent in this divide; and even though a vast majority of human beings fall into the category of disparaged Other, they have not defeated the unjust influence of technocentric expansionism.

In this Article, however, I have proceeded with optimism. From the premise that law in the United States consists of much more than legislation and the outcomes of decided cases, I have argued that technocentric expansionism can be understood as wrong in the eyes of the law. Because the use of science and technology to entrench gender-segregation affronts what antidiscrimination law respects, the problem can be situated in the realm of law and legal thinking. This locale offers uniquely powerful analogies and other argumentative devices.

Let me put my cards on the table: More than analogies and argument ought to be deployed. When an individual or an entity exploits a technological innovation, or a science-based credential, or a stereotype, in order to strengthen gender-segregation and leave women worse off in their employment or training for work, I would like to see this wrongdoer summoned before the judiciary. Those who segregate on the basis of sex, rather than their critics, ought to shoulder the burden of proof: it is they who should have to explain the losses of income, prestige, and opportunity that they inflict. I would like to see victories against them in the courts. Eventually I would like to read the statutes that anticipate these segregationist tactics and proclaim them unlawful. These changes lie further in the future, however, than the discursive changes proffered in this Article. Just as American citizens assert legal rights, routinely associate law with justice, and maintain Miranda as a household word, they can and

529. See id. (associating mind-body dualism with Hegel’s view of the undeveloped “African” and the Greek-philosophy perception of workers as inferior to thinkers: “the other folks have the bodies ... I am the mind”); see also STEPHEN JAY GOULD, THE MISMEASURE OF MAN 80 (1981) (noting that race, sex, and class have all been invoked in claims that certain subgroups of human beings are inherently irrational and thus inferior).

530. The September 2000 issue of the ABA Journal contained two quotations from distinguished American judges that encourage optimism about legal change as a source of progress. See Terry Carter, Paths Need Paving, ABA J., Sept. 2000, at 34, 35 (quoting Judith Kaye, chief justice of the New York Court of Appeals, on feminist progress: “Equal pay has become a right, sexual harassment a wrong and domestic violence a crime”). Justice Anthony Kennedy of the U.S. Supreme Court has offered a somewhat more conservative paean. See The Meaning of Ritual, A.B.A. J., Sept. 2000, at 103, 103 (quoting Justice Kennedy: Law “links the past, liberates the present, looks to the future. The law in our tradition is a liberator. It helps people plan, to rely on expectations, to dare to hope, to dream. It is a story, the story of our moral progress.”).

531. See supra Part IV.B–C.
should partake of law-based language to question and condemn technocentric expansionism.

I have noted pragmatics: the strategy calls for resources that theoretician-authors seldom possess. To the extent that this countertechnology needs money—to finance lawsuits, for instance, that would beget public discussion about legal principles—two sources of support come to mind. One is the cohort of lawyers who have triumphed in recent years in behalf of plaintiffs. The second consists of information technology entrepreneurs, who as a group remain wealthy and powerful despite the fluctuations of their businesses. While successful plaintiffs' attorneys are suited to fight technocentric expansionism because of their politics and their stated belief that law is a source of social change, this group is suited to the cause because of its understanding of where the power of technocentric expansionism originates. Vast sums are destined to change hands as a celebrated generation contemplates its mortality; many members of this cohort have started to direct their wealth toward societal improvement.

532. See generally Dan Zegart, Civil Warriors: The Legal Siege on the Tobacco Industry (2000) (surveying the shift from losing every case to winning large settlements). How much tobacco litigators, for example, can expect to receive for their work is still uncounted, but the February 2000 estimate is $12 to $15 billion for a small number of private attorneys. See Don Evans, The Changing Face of Tort Litigation, 8 Metropolitan Corp. Couns. 37 (2000) (calculated before a Florida jury issued its July 2000 verdict of $145 billion in punitive damages); Michael Bradford, Tobacco Firms Set Strategy for Appeal, Bus. Ins., July 24, 2000, at 1 (noting size of award and its uncertain status), should be readily surpassed. Many of these litigators come from less-than-privileged origins, and “view themselves as latter-day Davids righting wrongs committed by Goliaths.” Marianne Lavelle, The Reign of the Tort Kings, U.S. News & World Rep., Nov. 1, 1999, at 36, 36; see also id. at 36–38 (appending brief biographical descriptions of lawyers, including “Sold shoes to get through school,” “Put himself through school by working in his father’s tavern,” and “Mother died from emphysema”).

Several of these lawyers have also announced their donations to charity, as well as inclinations to give their money away philanthropically in the future. See Mark Hansen, Buy Any Other Name, ABA J., June 1999, at 26 (noting $10 million gift of Fredric Levin to the University of Florida College of Law); Noreen Marcus, Tobacco Agrees to Settle, Augusta Chron., Oct. 11, 1997, at A1 (reporting that Stanley and Susan Rosenblatt pledged to give twenty-five percent of their $46 million fee to charity). The effort against technocentric expansionism would be a good recipient of their largesse. It fits within the stance that the plaintiffs’ bar has taken against mysterious and unaccountable privilege, obfuscation in the name of science, and inhumane cost-benefit calculations.


534. See Karl Taro Greenfield, A New Way of Giving, Time, July 24, 2000, at 49. The Time cover story sorted high-tech billionaires into three categories: a small number (led by Lawrence Ellison, founder of Oracle and one of the richest people in the world) that scorn charity as naïve and ineffective, see id. at 56–57; a larger group, including the principals and founders of eBay, Amazon, Yahoo, and Dell, who have kept silent on the
Several of the new philanthropists support causes that they can link to the products they have sold. Children in poor communities now use computers that their school districts were otherwise unable to afford. Scholarships pay for basic and advanced training in information technology. Activists have long used the phrase "digital divide" to describe a gulf between those who enjoy benefits and those who are excluded; philanthropy has started to bridge the gulf. All of these projects identify information technology as a source of concern as well as pride.

This Article has suggested that the empire-builders of information technology face a bigger challenge than classroom deprivation or tuition obstacles—a problem just as large as, and more ancient than, the social need for technological advancement that these entrepreneurs have fulfilled. Information technology—indeed all machinery—must be freed from the reins of segregationist individuals and political forces that are using it as a means to keep persons separated, excluded, deprived and disparaged. Leaders of the information technology sector have started to deplore this injustice. It is time for them to apply their pragmatic, results-focused philanthropic approaches to the problem.

question of charity, see id. at 56–57; and those who have started to use high-tech wealth to achieve social aims: Bill and Melinda Gates led the list that enumerates donations either given or pledged, with $22 billion, see id. at 50. For accounts of philanthropy that took place soon after the high-tech stock market drop of mid-2000, see Peter Schnitzler, Charity Targets Digital Divide, INDIANAPOLIS BUS. J., Dec. 11, 2000, at A1; James Steinberg, Waitt Grant Will Assist Community Leaders in Developing Their Skills, SAN DIEGO UNION-TRIB., Feb. 9, 2001, at B2. When mortality provides an inadequate impetus, entrepreneurial needs come into play: principals of high-tech enterprises have recognized that without a healthy society they would have neither customers nor employees nor shareholders. See Greenfield, supra, at 51 (noting the slogan “You gotta give it away to keep it.”).


536. See Shane Harris, Bridging the Divide, GOVERNING, Sept. 2000, at 36, 36.


539. See Geewax, supra note 50 (pointing out the element of self-interest in this conclusion: if women participated in information technology as much as men, the supply of labor would increase).

540. For summaries of this philanthropic approach, see Koerner, supra note 535 (criticizing the strategy as too conservative); Greenfield, supra note 534, at 50–51 (“This new breed of philanthropist scrutinizes each charitable cause like a potential business investment, seeking maximum return in terms of social impact.”).
With or without such financial support, the triumph over technocentric expansionism would reclaim the true value of technology. Innovation can render beneficial social change, but the benefits remain inchoate until they are widely and evenly distributed. Science and technology—conjoined and in partnership—have shown their capacity to create health, wealth, knowledge, reversals of pathologies and pollution, and even optimism. They have also showered destruction and devastation. Law and legal principles can encourage beneficent tendencies to overcome the dangers by striving toward distributive justice and the recognition that only persons create, consume, and justify technology. Only a sense of shared humanity—the condition held in common by persons at both ends of a fetal monitor, computer keyboard, speculum, educational module, or bibliographic utility—directs technology toward progress.