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S. Lochlann Jain

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*S. Lochlann Jain**

Originally recognized as having reached crisis proportions in Australia in the 1980s, keyboard- and mouse-induced repetitive strain injury (RSI) has now attained the semi-official status of an "epidemic" among computer users in Europe, Canada and the United States. Given the fact that RSI is often avoidable, the statistics are truly staggering. Approximately one-third of the estimated yearly 2.7 million cases of RSI are attributed to computer use, a tenfold increase over the last decade.[1] The costs incurred by worker's compensation and health insurance providers are astronomical; each case averages $29,000 in health care costs and lost wages[2] and

*Ph.D. candidate, University of California at Santa Cruz (History of Conciousness), M.Phil., Glasgow University (Economic Development), B.A., McGill University (Philosophy). Many thanks to Angela Y. Davis, Carla Freccero, Janet Halley, Donna Haraway, Samara Marion, Catherine Newman, Maureen O'Malley, Jefferey Schnapp, Vivian Sobchack and Ann Weinstone. The author is also grateful for the able and generous editorial assistance of Adam Arms.

1. In the US alone, there are an estimated 230,000 carpal tunnel surgery operations a year, each with a 54% to 56% success rate and a minimum of two to six months loss of hand use. *See* Kate Montgomery, *The Body is Not a Robot,* 57 MASSAGE 58 (1995). RSI accounted for 56% of the illnesses reported to OSHA (double the amount reported in 1984). *Id.* It is estimated that by the year 2000 RSI will account for fifty cents of every dollar employees spend on medical care. *Id.* The American Academy of Orthopaedic Surgeons estimates that RSI costs $27 billion annually in medical treatment and lost income. *Id.* 3.2 million cases of RSI in 1989 were serious enough to take time away from jobs, adding up to 57 million lost workdays. *Id.* These statistics do not, of course, include writers and students who are not considered as laborers, nor does it include people who, due to the nature of the injury and labor relations, do not report it.

The difficulties of collecting injury data are reported in A. Olenick J.D., M.D. et al., *Current Methods of Estimating Severity for Occupational Injuries and Illnesses: Data for the 1986 Michigan Comprehensive Compensable Injury and Illness Database*, 13 AM. J. INDUS. MED. 23 (1993). The authors estimate that the present federal and state systems for estimating occupational injury underestimate the problem by as much as a factor of eight. I use medical establishment in this essay as an umbrella term that includes doctors, physical therapists, nurses and other practitioners of medicine.

2. *See* Denis Paul Judge et al., *Cumulative Trauma Disorders—'The Disease of the 90's': An Interdisciplinary Analysis*, 55 LA. L. REV. 895, 895-96 (1995); Kimberly Patch, *Worker's Decompensation: Benefits Evaporate for Repetitive Stress Sufferers*, 209

yet only covers a fraction of the total expenses. Nor are the personal costs of this disabling injury trivial. Yet spending hours per day at the keyboard is necessary for an increasing number of jobs in the United States.[3] Despite a causal relationship between typing and RSI, hundreds of products liability suits against keyboard manufacturers have been unsuccessful.[4] Part of the reason for this failure lies in the inability of courts to explore the highly gendered cultural constructions of the bodies and objects in question. Not only has gender played a role in how the medical establishment recognizes and treats RSI,[5] but the history of clerical labor in the Nineteenth and Twentieth centuries, the development of the typewriter and the recognition of RSI, taken together, establish that gender is also pivotal to the design of the keyboard in its incarnations as typewriter and computer-input device.

The success of a products liability plaintiff depends largely on her ability to convince a jury both that the defendant manufactured an object that unreasonably caused her injury and that her body deserves compensation corresponding to the injury suffered. This latter point is implicit, rather than explicit, in tort law and one that for women has been particularly troubling. In the first tort suits involving women's injuries, awards were made to men whose honor had been harmed—women had no standing to sue.[6] Furthermore, some of the recent products liability battles have been over the literal worth of women's bodies.[7] Women have had to dem-

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DOLLARS & SENSE 12 (1977).

3. This increase in keyboard use is documented in several occupations in BARBARA GARSON, THE ELECTRONIC SWEATSHOP (1988). *See also* J. Gregory & K. Nussbaum, *Race Against Time: Automation of the Office*, 1 OFFICE: TECH. & PEOPLE 197 (1982).

4. *See* Theresa A. Cortese, *Cumulative Trauma Disorders: A Hidden Downside to Technological Advancement*, 11 J. CONTEMP. HEALTH L. & POL'Y 479 (1995); Russell Leibson & Danny Wan, *Statutes of Limitations and Repetitive Strain Injuries: Winning Strategies*, 61 DEF. COUNS. J. 399 (1994); J. Stratton Shartel, *Defense Litigators Should Not Relax After Early Wins in Computer Keyboard Trials*, 8 INSIDE LITIG. 2 (1994); Lawrence Chesler, *Repetitive Motion Injury and Cumulative Trauma Disorder: Can the Impending Wave of Products Liability Litigation be Averted?*, 64. N. Y. ST. B. J. 30 (1992).

5. *See* N. Khilji & S. Smithson, *Repetitive Strain Injury in the UK: Soft Tissues and Hard Issues,* INT'L J. INFO. MGMT. 14 (1994); H. Jacubowicz & Andrew Meekosha, *Repetition Strain Injury: The Rise and Fall of an 'Australian' Disease,* 1 CRITICAL SOC. POL'Y 11 (1991); A. Hopkins, *The Social Construction of Repetitive Strain Injury*, 25 AUSTL. & N. Z. J. SOC. 239 (1989).

6. *See* Thomas Koenig & Michael Rustad, *His and Her Tort Reform: Gender Injustice in Disguise*, 70 WASH. L. REV. 1, 12 (1995). Thus injured women did not receive compensation for harms that they suffered; compensation was awarded to the man who was perceived to own the woman. He was awarded compensation for "damaged goods."

7. Many of the major mass torts relating to women have been with regard to reproductive medications and implants. It has also been noted that the compensation for women's injury compared to men's injury of reproductive organs is less by about 10%. Kerith Cohen, *Truth & Beauty, Deception & Disfigurement: A Feminist Analysis of Breast Implant Litigation,* 1 WM. & MARY J. WOMEN & L. 149, 153 (1990). The medical establishment has generally acknowledged that drugs are usually tested on men, and that therefore female patients can be in effect "marketplace guinea pigs." Malcolm Gladwell, *Women's Health Research to be New*

onstrate—and have often failed to do so in the face of "neutral" laws—that their lives are as valuable as those of males.[8] The moralism that surrounds issues of women's bodies makes us particularly susceptible to these puritanical challenges; which bodies are, finally, "deserving" of compensation? For these reasons, tort law can reveal much about the literal cultural valuation of women's bodies.

At every level of tort reform debate, "common sense" has been a key rhetoric and has been strategically and successfully adopted by pro-industry right-wing politicians and lobbyists.[9] Michael Cerussi, a New York attorney who has successfully defended IBM against many products liability suits, has used every media opportunity to stress the role of common sense in the courtroom.[10] He argues that the computer industry continues to win the cases because "every case we've tried, we've tried in front of intelligent jurors who understand the law and more important, apply their common sense to these claims."[11]

The ostensible function of the jury is to reflect the values and morals of the community; in its ideal form, it "democratizes" the American legal system. In the computer keyboard products liability cases the strategy of disseminating exaggerated tales about frivolous cases seems to have been particularly effective. One can fathom the difficulty of convincing a jury that such a hyper-normalized[12] product as the keyboard can be "unreasonably dangerous," and more so a jury that is *en garde* against the greedy plaintiff seeking a huge windfall.

Common sense rhetoric seeks to naturalize[13] an initial premise from which argument can be made; but natural as it may appear, common sense is itself always derived from structures of history and social forces. The

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Priority at NIH, WASH. POST, Sept. 11, 1990, at A17, *quoted in id.* at 153-54.

8. *See* Eleanor D. Kinney et al., *Indiana's Medical Malpractice Act: Results of a Three-Year Study*, 24 IND. L. REV. 1275 (1991). This article demonstrates that women are less likely to show that their bodies are as valuable as men's bodies.

9. *See* JEAN STEFANCIC & RICHARD DELGADO, NO MERCY: HOW CONSERVATIVE THINK TANKS AND FOUNDATIONS CHANGED AMERICA'S SOCIAL AGENDA (1996).

10. Phil Waga, *The Threat of Repetitive Stress—Keyboard Injuries are a Legal Time Bomb*, SEATTLE TIMES, May 3, 1995, at D1; Steve Lohr, *Vigorous Defense Stalls Injury Claims on Repetitive Strain*, N. Y. TIMES, May 29, 1995, at 37.

11. Tom Jackman, *IBM Not Responsible for Injuries, Jury Says,* KAN. CITY STAR, Oct. 24, 1996, at C1. The basic content of this statement has been repeated by Cerussi time and time again in newspaper articles on RSI products liability litigation. For an example of the way that "common sense" shapes tort reform rhetoric, see PHILIP K. HOWARD, THE DEATH OF COMMON SENSE: HOW LAW IS SUFFOCATING AMERICA (1994).

12. By the term "hyper-normalized" I mean to emphasize that the keyboard has become a tool that is, in mainstream American culture, completely normal—it is accepted without question. Yet I also mean to draw attention to, through this term and in the essay, the fact that an enormous effort has stabilized such normalcy.

13. "Naturalize" here refers to a process by which an axiom is taken as an assumed (and "natural") first point, although it may be arbitrary or strategic. Whether advertent or inadvertent, this process always serves some interests over others.

notion of common sense avoids the questions of material-social construction altogether.[14] But the neutrality and objectivity implied by common sense rhetoric have often been the guises by which women's bodies, work and labor have been undervalued.[15] In this paper I outline a genealogy of events and social forces that have materialized the keyboard both as a sign and as a product. Furthermore, I rehistoricize the notion of the neutral tool as it has been such a powerful mechanism in the erasure of the danger of keyboards.

I argue that in the discourses of personal injury law, structural social relations are obscured, and the categories of analysis allowable in court are insufficient to deconstruct—let alone adjudicate—the power relations that configure human/technology interfaces. Products liability law is a semiotic system concerned implicitly with the nature of the commodity form and the social-material distinctions between bodies. Theorists in Critical Legal Studies and Critical Race Theory have produced powerful analytical foundations for demonstrating the ways in which law is a domain of struggle and constitutes its own objects of attention.[16] These theorists argue that law can not be a neutral arbiter because "law" is constituted by the very categories it produces.[17] Recent conservative shifts in law[18] and in popular culture,[19] therefore, may be particularly consequential for the ways in which law has veiled its categories in a mantle of common sense. Thus,

14. "Material-social construction" is a succinct way of indicating the ways in which objects are constructed by both material and social concerns. Material concerns might include what technologies and materials are available and social questions would regard such issues as who is to be be using certain technologies or how engineers are socialized to consider certain social concerns important in designing products. See DONNA HARAWAY, MODEST_WITNESS@SECOND_MILLENIUM.FEMALEMAN©_MEETS_ONCOMOUSE™ (1997), for more on material-social construction.

15. We witness this in the ways in which scientific discourses have been stabilized to "prove" that women are not as intelligent or as strong as men. For an outline and critique of such arguments, see BARBARA EHRENREICH & DEIRDRE ENGLISH, WITCHES, MIDWIVES, AND NURSES: A HISTORY OF WOMEN HEALERS (1977).

16. *See* CRITICAL RACE THEORY: THE KEY WRITINGS THAT FORMED THE MOVEMENT (Kimberle Crenshaw et al. eds., 1995) [hereinafter CRITICAL RACE THEORY].

17. Law does not impartially judge a set of predetermined categories, it establishes sets of events or objects as categories and only then arbitrates them based on a set of judgments that are already implicit to the logic that takes these categories for granted. In this sense, the categories are essential to the way the legal system mediates. For examples of such arguments, see JUDITH BUTLER, EXCITABLE SPEECH: A POLITICS OF THE PERFORMATIVE (1997); CRITICAL RACE THEORY, *supra* note 16.

18. For a sample of the vast literature on the ways in which products liability law has been shifting to the right since the mid-seventies, see PETER A. BELL & JEFFREY O'CONNELL, ACCIDENTAL JUSTICE: THE DILEMMAS OF TORT LAW (1997); Richard L. Cupp Jr., *Defining the Boundaries of 'Alternative Design' Under the Restatement (Third) of Torts: The Nature and Role of Substitute Products in Design Defect Analysis*, 63 TENN. L. REV. 329 (1996).

19. For a discussion of censorship, see JUDITH BUTLER, BODIES THAT MATTER: ON THE DISCOURSIVE LIMITS OF "SEX" (1993). The discourses in favor of censorship tend to fall back on a common sense notion of the "family" in order to justify themselves.

increasingly sophisticated literatures in legal studies, design history and science and technology studies[20] can be used to examine the taken-for-granted tenets of "common sense" products liability law.[21]

This paper offers a material-social analysis; I argue that not only are there cultural circumstances circumscribing the legal and medical recognition of RSI, but that the very design of the keyboard itself, over the one hundred odd years since its inception, is ineluctably entwined with these categorical histories. The design of this product has not been guided by mechanical or ergonomic improvements. The producers of the machine, the people for whom it was designed and its users had and have distinct and situated interests that have come in and out of convergence at different points in the century.

Four sections follow. The first, in which I trace the typewriter's development and design history, demonstrates how the machine was contiguously linked to women's entry to the workforce. In the second section I examine how the popular culture of the early Twentieth century reveals, through advertisements, jokes and other media, that men suffered anxiety about working women and how this anxiety manifested itself in various narrative and functional defenses. But while sexualized jokes, cartoons, postcards and editorials triangulated the boss-secretary relationship with the typewriter, the marketing of the typewriter conflated the secretary's body and labor into the office equipment itself. A 1935 advertisement for the "New Easy-Writing Royal," for example, promised that "[t]he shortest distance between the thought and the perfectly typewritten letter is the New Easy-Writing Royal Typewriter," illustrating a woman's hands operating the machine horizontally sandwiched between an illustration of a man having a thought and another of him signing a typed letter.[22] The illustration suggests that when one owns the Royal Typewriter the document magically appears, derived solely by the thinking of it. This persistent notion has carried over to the marketing of the computer. The marketing of the typewriter keyboard in its most recent rendition as a computer input device has been accompanied by a striking "regendering"—or a masculinization—of the human-keyboard interface. The way in which RSI has emerged in public consciousness as an "epidemic" cannot be properly understood without this background history.

20. For an example of this literature, see HARAWAY, *supra* note 14; ELLEN LUPTON, MECHANICAL BRIDES: WOMEN AND MACHINES FROM HOME TO OFFICE (1993); Latour, Bruno, *Mixing Humans and Non-Humans Together: The Sociology of a Door Closer*, 35 SOC. PROBS. 298-310 (1988); BRUNO LATOUR & STEVE WOOLGAR, LABORATORY LIFE: THE CONSTRUCTION OF SCIENTIFIC FACTS (1986).

21. For a radical Marxist critique of products liability law, see Richard L. Abel, *The Real Tort Crisis—Too Few Claims*, 48 OHIO L. J. 443 (1987); Richard L. Abel, *A Critique of Torts*, 37 UCLA L. REV. 785 (1990).

22. Pictured in LUPTON, *supra* note 20, at 42.

In the third section, I track RSI's history in the Twentieth century, suggesting that although typing injuries were by no means uncommon, they were not perceived as a serious health issue until the introduction of the computer, when for the first time male, white collar workers—in addition to pink collar workers—were susceptible to RSI. Thus, the very category of what counted as an injury, of that which was culturally legible as unjust, compensable or avoidable is shown to be not only contentious, but literally illegible—medically, legally and socially—for much of the century. Each of these histories is crucial to the emergence of a common sense rhetoric that has successfully obliterated the body-machine interface and hence the social comprehension of computer keyboard related injuries.

In the final section, I examine one way in which the seeming obviousness, or common sense nature, of the keyboard has prevented a number of products liability cases from coming to trial. The case I use here, *Blanco v. American Telephone and Telegraph Co., et al.*,[23] addresses a main difficulty that has emerged in RSI litigation—namely the statutes of limitation, which limit the time in which a plaintiff can bring suit against a defendant. For injuries that have a long "incubation" period, or in cases in which it has been difficult for the injured party to link the injury to a specific cause, statutes of limitation may bar legitimate causes of action.[24] *Blanco* illustrates one court's struggle with the issue of the computer keyboard as a "self-evident" object.[25] In short, this example demonstrates one way in which a plain axiomatic product is stabilized as such, and the rhetorical struggles instigated by plaintiffs with repetitive strain injuries to have their injuries compensated.

I. HYBRID FANTASIES: THE TYPE WRITER AND THE TYPEWRITER

Between 1829 and 1873, some twenty inventors in the United States, England, France and Germany worked to develop an operational typewriter.[26] Shortly thereafter, literally hundreds of writing machines, chiro-

23. Blanco v. American Telephone and Telegraph Co., et al. (Unpublished decision and order of the Supreme Court of New York, Appellate Division, First Department, August 1, 1996) (on file with author) [hereinafter *Blanco*].

24. This problem was the impetus behind the introduction of "toxic torts," which extended the statutes of limitations for certain chemical injuries for which the injury was not evident until long after the statute of limitation had passed. *See* Note, *Latent Harms and Risk-Based Damages,* 111 HARV. L. REV. 1505 (1998).

25. The OXFORD ENCYCLOPEDIC ENGLISH DICTIONARY (Joyce M. Hawkins & Robert Allen eds., 1991) defines "self-evident" as "obvious; without the need of evidence or further explanation." *Id.* at 1316. This is precisely what the keyboard has become, a tool that is so common, so obvious, as to be without need of demonstration.

26. *See* MICHAEL H. ADLER, THE WRITING MACHINE (1973); GEORGE CARL MARES, THE HISTORY OF THE TYPEWRITER: BEING AN ILLUSTRATED ACCOUNT OF THE ORIGIN, RISE, AND DEVELOPMENT OF THE WRITING MACHINE (1909).

graphs, typographs, keyframes, parlographs, writing balls and printing devices with a vast array of type mechanisms, inking systems, shapes and key layout designs littered the market.[27]

In 1865, after the Civil War, the U.S. government canceled the Remington Company's arms contract.[28] Consistent with the vicissitudes of war production and mass production, the company turned its foundry into a factory and sought mass-produceable items.[29] When approached by inventor Christopher Latham Sholes in 1873, the Remington brothers signed a contract to be the first mass producer of his typewriter, and after a rickety start became the foremost typewriter manufacturer.[30] Between July and December 1874, 400 Remington typewriters were sold; by 1886, 50,000 machines were sold; and by 1888, Remington Standard Typewriter Company (under new management) was producing 1500 machines a month.[31]

Mainstream typewriter histories credit the invention of the typewriter with giving women the ability to earn a living. An 1875 Remington typewriter advertisement paraded:

> And the benevolent can, by the gift of a 'Type-Writer' to a poor, deserving young woman, put her at once in the way of earning a good living as a copyist or corresponding clerk. No invention has opened for women so broad and easy an avenue to profitable and suitable employment . . . .[32]

Indeed, the typewriter's introduction into the hitherto all male office space served as the symbolic pivot around which the feminization of secretarial labor took place. Women, it was widely claimed, do "more and better work for $900 per annum than many male clerks who were paid double that amount."[33] In the space of thirty years, women came to comprise 95% of the clerical and secretarial labor force.[34]

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27. *See* ADLER, *supra* note 26.

28. *See* TERRY ABRAHAM, *Charles Thurber: Typewriter Inventor*, 21 TECH. & CULTURE 431 (1980).

29. Similarly, Charles Thurber and his brother-in-law Ethan Allen, also early typewriter inventors, manufactured firearms. "Because of the mechanical skills and techniques involved, many firearms firms became involved in the manufacture of precision machined devices." *Id.* at 431.

30. *See id.*

31. *See* George Nichols Engler, The Typewriter Industry: The Impact of a Significant Technological Innovation (1969) (unpublished Ph.D. dissertation, University of California (Los Angeles)) (on file with the UCLA main library).

32. MARGERY W. DAVIES, A WOMAN'S PLACE IS AT THE TYPEWRITER: OFFICE WORK AND OFFICE WORKERS 1870-1930, at 54 (1982).

33. *Id.* (quoting statement made by U.S Treasurer General Francis Elias Spinner in 1869).

34. In 1870, women accounted for 4.5% of the 154 people employed as stenographers and typists; by 1900, they accounted for 76.7% of 112,699 and by 1930, 95.6% of 811,200. Margery Davies, *A Woman's Place is at the Typewriter: The Feminization of the Clerical Labor Force,* 8 RADICAL AM. 10 (1974). In 1968, 40% of women in the workforce were

Sholes reportedly said at the end of his life that, "I do feel I have done something for the women who have always had to work so hard. It will enable them to earn a living."[35] But historian Margery Davies notes that it was not the typewriter *per se* that allowed women into the workplace—women have always worked for a lower wage than men, and there is nothing about the typewriter that makes it easier or more efficient for a woman rather than a man to operate.[36] Rather, the structural changes in capitalism at the time of the typewriter's invention "underlay [its] successful manufacture . . . [and the] usefulness of a writing machine became self-evident."[37] The rise of the industrial complex and consequent increase in statistics and census gathering, accounting and record keeping marked a structural shift in the scale of the U.S. economy.[38] The increased demand for clerical labor was met by a ready pool of women workers.[39] One historian goes further, insisting that the popularity of typewriters was due to the fact that women operated them.[40] He cites a 1904 secretarial employment agency manager who noted that 90% of callers asked specifically for a female typist, usually in terms such as, "[h]ave you got a pretty blond?"[41]

Although typing was almost immediately identified as a woman's vocation, the machine was far from easy to use. Jack London had perhaps the most famous bouts with the typewriter:

> And then there was the matter of typewriting. That machine was a wonder. . . . I'll swear that machine never did the same thing the same way twice. . . . The keys of the machine have to be hit so hard that to one outside the house it sounded like a distant thunder or someone breaking up furniture. I had to hit the keys so hard that I strained my first fingers to the elbows, while the ends of my fingers were blisters burst and blistered again. Had it been my ma-

employed as clerical and sales workers. For important histories of this shift in the gender of clerical workers, see THE WHITE-BLOUSE REVOLUTION: FEMALE OFFICE WORKERS SINCE 1870 (Gregory Anderson ed., 1988); HARRY BRAVERMAN, LABOR AND MONOPOLY CAPITAL (1974); LISA M. FINE, THE SOULS OF THE SKYSCRAPER: FEMALE CLERICAL WORKERS IN CHICAGO, 1870-1930 (1990); ROSEMARY PRINGLE, SECRETARIES TALK: SEXUALITY, POWER, AND WORK (1988). Clerical work at the turn of the century was a white woman's vocation.

35. Margery Davies, *Women Clerical Workers and the Typewriter: The Writing Machine*, *in* TECHNOLOGY AND WOMEN'S VOICES: KEEPING IN TOUCH 29 (Cheris Kramarae ed., 1988); BRUCE BLIVEN JR., THE WONDERFUL WRITING MACHINE 15 (1954). Davies' was the first feminist work on the typewriter; previous histories are misogynist indeed—either tangentially discussing the enabling facets of the typewriter for women, praising the wonderful and profitable lives of secretaries or eliding gender altogether.

36. *See* Davies, *supra* note 35, at 28.

37. *Id.* at 29.

38. *See id.*

39. The main prerequisite for clerical work was literacy, and in the last decades of the Nineteenth century the number of women high school graduates significantly exceeded that of men. *See* Davies, *supra* note 35, at 56.

40. *See* BLIVEN, *supra* note 35, at 13.

41. *Id.*

chine I'd have operated it with a carpenter's hammer . . . .[42]

Not only did the stiff early mechanisms render typewriter use tremendously taxing, but the key layout required awkward finger gymnastics. The initial impetus for the QWERTY[43] key layout remains contested, although the usual explanation is that Sholes developed the layout to overcome type-bar clash in early machines by placing the most frequently used type-bars as far away from each other as possible.[44] Others claim that the letters for the word 'typewriter' all appear on the top row to facilitate the demonstrator's work in marketing.[45] Regardless of the reason for the QWERTY design, its mass production by Remington guaranteed its formal acceptance as the standard in 1905 despite the literally hundreds of patented layouts, shapes and sizes.

Despite these controversies, historians agree on the major debacle of the design. Typewriter historian Wilfred Beeching wrote that the sale of the QWERTY keyboard

> was probably one of the biggest confidence tricks of all time—namely the idea that this arrangement of the keyboard was scientific and added speed and efficiency. This, of course, was true of his particular machine, but the idea that so-called 'scientific arrangement' of the keys was designed to give the minimum movement of the hands was, in fact, completely false! To write almost any word in the English language, a maximum distance has to be covered by the fingers.[46]

The QWERTY keyboard was designed for use with two fingers and ten finger typing was not commonly recognized until 1889, when the term "touch typing" was introduced.[47] The keyboard layout did not change with the new ten-finger method and the design was severely criticized at the turn of the century for being worse than an arbitrary arrangement of keys, severely overloading the left hand[48] and certain fingers, causing excessive

42. London writes also in that book: "sitting at my machine, in the stifling, shut in air, repeating, endlessly repeating, at top speed, my series of mechanical motions." MARK SELTZER, BODIES AND MACHINES 15 (1992) *quoting* JACK LONDON, JOHN BARLEYCORN (1913).

43. QWERTY is the standard key layout. The letters QWERTY appear as the first five keys on the top left row.

44. *See* Jan Noyes, *The QWERTY Keyboard: A Review*, 14 INT'L J. MAN-MACHINE STUD. 18 (1983). This explanation is also commonly given in the vast literature on RSI in popular magazines.

45. *See id.* (discussing various explanations and a detailed bibliography of the keyboard ergonomic literature throughout the century).

46. WILFRED A. BEECHING, CENTURY OF THE TYPEWRITER 41 (1974).

47. *See* R.C. CASSINGHAM, THE DVORAK KEYBOARD: THE ERGONOMICALLY DESIGNED TYPEWRITER KEYBOARD, NOW AN AMERICAN STANDARD 24 (1986)

48. Dvorak found, for example, that from a sample of 3000 words, 300 were typed by

row hopping and requiring exorbitant finger travel.[49]

Until the last quarter of the nineteenth century, male clerks had enjoyed a high status in terms of respectability, and their work was skilled and varied although they rarely earned enough to live up to the standards of the middle class.[50] As women entered the workforce, both wages and status decreased for male and female clerical workers and, with increased office sizes, even the distinction between superior and inferior clerks eroded.[51] As clerical wages dwindled, factory wages increased; indeed, by the early Twentieth century the American office came to resemble a factory.[52] The introduction of the time clock[53] and the application of scientific management techniques subjected each clerk's work to surveillance and control.[54] The development of the dictation machine in the 1910s further deskilled clerical laborers by rendering redundant one of their two skills, shorthand, and thus shifted even more of the physical labor of clerical work to typing. Adrian Forty writes of scientific management that

> truly amazing results were promised: correspondents who had previously managed with difficulty to handle 20 letters per hour through the day found themselves able without strain to deal with 60 per hour, while the rate of opening letters was increased from 100 to 300 per hour when the process had been analyzed and the correct method taught to the clerk.[55]

The first office ergonomic systems appeared along with the early century's infatuation with scientific management.[56] Designs for desks and chairs, as well as moveable walls made workers conform to fixed systems of management—to give at least the impression of efficiency.[57] These early ergonomists similarly paid close attention to typewriters.[58] Stroke

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right hand alone, and 2700 by the left. *See* Noyes, *supra* note 44, at 267, 270-272.

49. *See id.*

50. *See* ADRIAN FORTY, OBJECTS OF DESIRE (1986).

51. *See id.*

52. *See id.* (also noting that by the 1950s factory wages were above clerical wages).

53. *See id.*

54. Frederick Taylor, author of THE PRINCIPLES OF SCIENTIFIC MANAGEMENT (1911), is considered to be the main proponent of the popularization of scientific management. Taylorism is typically understood to mean the "rationalization through the analysis of work (time and motion studies to eliminate wasteful motions) and the 'scientific selection' of workmen for prescribed tasks." DAVID A. HOUNSHELL, FROM THE AMERICAN SYSTEM TO MASS PRODUCTION 1800-1932: THE DEVELOPMENT OF MANUFACTURING TECHNOLOGY IN THE UNITED STATES 249 (1984). Hounshell discusses Taylor's influence on the development of factories during the turn of the century.

55. FORTY, *supra* note 50, at 123 (citing W. H. LEFFINGWELL, SCIENTIFIC OFFICE MANAGEMENT (1917)).

56. *See* FORTY, *supra* note 50, at 122-139.

57. *See id.*

58. *See* LEFFINGWELL, *supra* note 55; L. GALLOWAY, OFFICE MANAGEMENT, ITS PRINCIPLES AND PRACTICE (1919).

character recorders counted each character typed and standardized dictating times were established.[59]

The development, testing and patenting, throughout the Twentieth century, of alternative typewriter designs led to concern regarding the physical harm caused by the design of the typewriter.[60] A split and laterally angled keyboard,[61] for example, was found to significantly reduce "aches and pains" even with the QWERTY key layout.[62] Eberhard Kroemer summarizes the German literature on alternative keyboard designs and key layouts of the 1950s, 60s and 70s that specifically addressed documented syndromes of the hand-wrist, spine and shoulder.[63]

In the early 1930s, Dr. August Dvorak, a professor of education and psychology at the University of Washington, and a team of industrial engineers, tested 250 keyboards.[64] From these tests they developed the Dvorak Simplified Keyboard (DSK) that reduced the number of miles travelled in an eight-hour typing day from sixteen to one, while maintaining other essential design features of the keyboard.[65] The DSK design was specifically designed to be inexpensive, altering the manufacturing process as little as

59. *See* FORTY, *supra* note 50, at 122-39.

60. Ergonomics was developed in order to facilitate the coding and manipulation of body and machine design in order to splice and exact an elegant cybernetic loop. Donna Haraway writes:

> Ergonomics is . . . rigorously directed to studying labor in terms of technical systems design, especially attending to the operational breakdown of any factor under stress. Ergonomics seeks answers to questions like: What information does an operator need? What are the most efficient channels for getting information to the receiver-operator? What communication loads are tolerable for each component? Stress, [and engineering,] psychiatric and medical concept crucial to post-war ideology and practice, is intimately linked to these communications theoretic questions about system potential and design limits.

Donna Haraway, *The High Cost of Information in Post-World War II Evolutionary Biology: Ergonomics, Semiotics, and the Sociobiology of Communication Systems*, 13 PHIL. FORUM 250 (1982). Ergonomics in contemporary computer use hygiene literature, for example, is precisely about locating stress breakdown in the human components of the man-machine system. What exercises should the office worker do? How many breaks are necessary? What type of chair maintains correct posture?

61. Kroemer keyboard, studied in 1972 but based on a 1926 keyboard design.

62. K.H. Eberhard Kroemer, *Human Engineering the Keyboard,* 1 HUM. FACTORS 14 (1972).

63. *See id.;* David G Alden et al., *Keyboard Design and Operation*, 4 HUM. FACTORS 14 (1972). For other work of keyboard design and injury, see J. Buesen, *Product Development of an Ergonomic Keyboard*, 4 BEHAV. & INFO. TECH. 3 (1984); Joan Duncan & D. Ferguson, *Keyboard Operating Posture and Symptoms in Operating*, 5 ERGONOMICS 17 (1974); D. Ferguson & Joan Duncan, *Keyboard Design and Operating Posture*, 6 ERGONOMICS 17 (1974); Stephen K. Jones et al., *An Ergonomic Evaluation of the Kinesis Ergonomic Computer Keyboard*, 10 ERGONOMICS 37 (1994); Elaine Serina et al., *A System for Evaluating the Effect of Keyboard Design on Force, Posture, Comfort, and Productivity,* 10 ERGONOMICS 37 (1994).

64. *See* CASSINGHAM, *supra* note 47, at 43-45.

65. *See id.*

possible.[66] The DSK design simplified the stroking of common letter sequences, alternated strokes as much as possible between hands and factored in the structure of the hand to increase speed while reducing errors and fatigue.[67] The DSK design was intensely investigated by the U.S. Navy in 1944 and the Australian Post Office in 1953.[68] Both investigations found that the DSK decreased fatigue and improved accuracy and speed[69] and would probably result in a "very substantial increase in efficiency of typists."[70] "Efficiency" here is an ergonomic term, a term that describes wasted energy and useless gestures.[71]

There is more to the story of the ongoing mass production of inscription injuries,[72] such as RSI, than is supposed by past and present models of efficiency and ergonomics.[73] After all, once the ergonomic research and designs existed and the injuries were documented, why did the keyboard remain unchanged even with the introduction of computer input devices? Studies demonstrate that typing injuries are related to inefficiency, to the poor ergonomic design of the keyboard and other office equipment that result in awkward physiological positioning and asymmetrical use—as well as plain and simple overuse. But injury also results from definitions of efficiency that factor out ergonomics and human wounding, and also factor human injury out of ergonomics. "Wasted energy" and "useless gestures" are terms used by efficiency experts and scientific managers who have no particular concern with the health of easily replaceable office workers. As evidenced by the ongoing use of the demonstrated hazardous QWERTY keyboard, office managers were hesitant to 'jam up a system' that already worked *well enough* by introducing equipment that in the short run would require practice time, retraining and financial outlay for unskilled and easily replaced workers.

The massive influx of women into clerical positions, the mass production of the standardized typewriter, the drastically increased demand for cheap clerical labor and the drive for efficiency in the workplace were all inextricably linked through the structural needs of capitalism. Moreover, the belittling of women's labor, both through the faulty but 'good-enough'

66. *See id.*
67. *See id.*
68. *See id.*
69. *See id.* at 41-47.
70. Noyes, *supra* note 44, at 267, 270-72; CASSINGHAM, *supra* note 47 at 19, 41-47 (noting that a U.S. report entitled, "A Practical Experiment in Simplified Keyboard Retraining" (July, 1944), was classified for several years after its production for no apparent reason).
71. *See* Haraway, *supra* note 60.
72. By using the term "mass production of injuries" I simply mean to draw attention to the fact that the mass production of faulty products also corroborates in the mass production of certain injuries.
73. *See supra* notes 56-71.

design of the typewriter, as well as through the massive decrease in pay and the deskilling of clerical labor initiated by the feminization of clerical work, figures a crucial history in the analysis of women's typing injuries.

II. INSCRIPTION FANTASIES

The rise of the working woman was no quiet revolution—indeed, an enormous cultural investment was made in the typewriter-type writer duo. By the 1920s the female clerical worker had become an identifiable figure in short-stories.[74] It was not rare for employers to marry their type writers, and Vaudeville jokes, films and novels characteristically played on these liaisons and the "mingling of the sexes and different classes."[75] Before that, however, the woman in the office was a character of not insignificant cultural ambivalence. While clerical labor held the promise of a limited freedom for young women, these women were not easily absorbed into the office as neutral workers—rather the expectations of patriarchal heterosexuality mingled oddly with trepidation over the feminization of a previously male vocation. In order to foreground these ambivalences, I discuss two narratives that raise central issues of consent and erotisization of women and writing technologies. The first is a short incident taken from a 1913 screenplay,[76] and the second is taken from Emile Zola's novel, *La Bete Humaine.*[77] Although the novel was written in 1889, and is from an earlier time period, I use it here because it clearly draws out the imperative issues of writing technologies, gender and violence.

Fantasies of writing since the Renaissance have turned on an increasing separation of the body from the act of inscription, as well as a linkage between poetic inspiration and continuity of thought.[78] After a close reading of the texts above, I analyze how this detachment between thought and act has been exploited in computer marketing and the effect it has had in the regendering of writing work. I discuss the ways in which the acts of inscription are erased in the apotheosis of thought in marketing writing products, from pens to dictation software.

74. *See* FINE, *supra* note 34. She analyzes films such as THE STENOG (1918), HIS SECRETARY (1925), SUMMER BACHELORS (1926), THE TRESPASSER (1929), and THE OFFICE WIFE (1930). Novels addressing clerical work include: BOOTH TARKINGTON, ALICE ADAMS (1921); SINCLAIR LEWIS, THE JOB (1917); JOHN DOS PASSOS, U.S.A. (1937); CHRISTOPHER MORLEY, KITTY FOYLE (1937); CHRISTOPHER MORLEY, HUMAN BEINGS (1935); RUTH SUCKOW, CORA (1929). For some of the cartoons of the era, see LUPTON, *supra* note 20.

75. FINE, *supra* note 34, at 140.

76. *The Lyre and the Typewriter* (1913), *cited in* FRIEDRICH A. KITTLER, DISCOURSE NETWORKS 1800/1900, at 359 (1990).

77. EMILE ZOLA, LA BETE HUMAINE (Penguin, 1977).

78. *See* JONATHAN GOLDBERG, WRITING MATTER: FROM THE HANDS OF THE ENGLISH RENAISSANCE (1990).

* * *

Fredrich Kittler recites the following story from a 1913 screenplay, *The Lyre and the Typewriter*.[79] A free-lance typist sits down to take dictation from a young man, upon which he blurts: "Miss, I love you." She types his message and bills him.[80]

There are many facets to this humorous tale, which turns on the automation and commodification of the labor of writing. The woman cannot hear the message of the young man's message—it is not within the purview of her role as a capitalist producer. She is there not to comprehend, but to transcribe—she is the medium of the change of medium, voice to text. The joke is, ironically, that she is doing her job. In his analysis of this story, Kittler argues that through typewriting and the commodification of the word, "messages containing meaning or love do not arrive. Money, the most annihilating signifier of all, standardizes them."[81] For Kittler, the exchange value of words evacuates meaning and deflates them to units of economic exchange.[82]

More is at stake here, though, than the arrival of a message. The heterosexual love message in this tale is funny insofar as it plays on male *anxiety* about woman as commodifier. The core of his heterosexual male trepidation is the fact that the woman is able to ignore him by the very nature of her job; standardizing [his] letters and words for circulation in the marketplace. In joining that marketplace through her labor, this woman demonstrates through her literal transcription of his message that her body is no longer on the heterosexual marketplace in quite the same way. As the one who standardizes meanings into words, she is able to excuse herself from receiving meanings. Although women typically stayed in secretarial jobs for only two or three years,[83] this quip plays on the male anxiety about women's independence from him even as she is tapped as a source of cheap labor.

I use the word *anxiety* here very purposefully, after Homi Bhabha.[84] Bhabha argues that anxiety can take on the characteristic of a social identity with its own agency of affect[85] (in the psychoanalytic sense).[86] Bhabha

79. KITTLER, *supra* note 76, at 359.
80. *Id.*
81. *Id.*
82. *See id.*
83. *See* Davies, *supra* note 35.
84. Homi Bhabha expressed his views on anxiety at a presentation given at the American Association of Anthropologists, San Francisco, November 1996.
85. "Affect" is defined in psychoanalytic terms as an "expression or instigation of a general mood," a "psychical energy attached to an idea or group of ideas." JEAN LAPLANCHE & J-B. PONTALIS, THE LANGUAGE OF PSYCHO-ANALYSIS (Donald Nicholson-Smith trans., Norton 1973).
86. Bhabha, *supra* note 84.

argues that anxiety emerges in a subject when the ego harnesses the potential to change an uncomfortable situation.[87] Anxiety in the context of the woman-machine coupling has several nuances, as the above joke illustrates. The joke hinges on the ambiguity of the woman's role—as "woman" and as worker—and the woman's obvious preference of roles in the face of the man's confusion between the two. This anxiety over the indeterminate place of heterosexual relationships in the office drenched office politics and popular culture at the turn of the century,[88] and apprehension concerning women's new roles and the heterosexualization of office work was certainly a significant impetus behind such joking strategies.

Consider, for comparison, the following passage from Emile Zola's *La Bete Humaine.*[89]

> Then, without another word he took her hand, a frail little child's hand, and squeezed it to breaking-point in an iron grip with the continuous pressure of a vice. It was his will entering into her very flesh with the pain. She screamed, and everything in her broke down and was his. The ignorant girl she had remained could do nothing but obey. Instrument of love, instrument of death. Write, write. She wrote painfully, with her poor, hurt, hand. 'That's right, now you're behaving nicely,' he said when he had the letter. 'Now just tidy up here a bit and get everything ready . . . .'[90]

This passage demonstrates the sheer absence of female desire—indeed, the demolition of female desire as Raubaud's will literally enters "her very flesh with the pain."[91] The erotic "instrument" is not the writing instrument itself, but the pen and the woman that together form the male fantasy of sexualized instrument of love and death. The anxiety in this scenario is piqued by Raubaud's jealousy and his attempt to undo her previous sexual acts through revenge. This scene is, importantly, different from the *Lyre and Typewriter* episode, in that here the structure of dictation was not that of client-clerical worker, but rather of lover-woman.

Important points emerge that have to do with the gendering of and fantasies about writing. For example, in an interesting disavowal of the implicit historical gendering of writing technologies, Mark Seltzer writes of Zola's novel.[92] He argues that the above passage

87. *See id.*

88. For examples, see notes 74-75.

89. ZOLA, *supra* note 77 (The novel opens with the character Raubaud brutally beating his wife upon speculation that she had been sexual with, perhaps raped by, a male caretaker. Raubaud decides to kill this man, and so as to implicate her in the plan, he forces her to write a letter against her will.).

90. *Id.* at 51.

91. *Id.*

92. SELTZER, *supra* note 42, at 20.

> holds steadily in view and in taut relation the lethal 'instrument' of writing and the 'apparatus' of desire, transfixed by the erotics of the bruised body that painfully and mechanically writes: 'instrument of love, instrument of death. Write, write. She wrote painfully, with her poor, hurt, hand.'[93]

This passage confounds the obliteration of women's minds and bodies with an "erotics of writing"[94]—all conduits of male desire. "The erotics,"[95] "the bruised body,"[96] and "the apparatus of desire"[97] are all profoundly gendered terms which describe who has what kind of relationship to bodies and machines, and yet as I note with this example, it is one that theorists, including Seltzer, have not heeded.[98]

Both of these anecdotes play on gendered terms of consent, and ultimately, gendered terms of capitulation and resistance. As Wendy Brown notes, consent is a response to power; consent adds or withdraws legitimacy "but it is not a mode of enacting or sharing power."[99] In the first scenario, the proposal—"Miss, I love you"—is one akin to a marriage suit; that is, an admission of desire that implicitly necessitates a capitulation. Consent withheld is pivotal to the humor of the situation. In the second scenario the girl "finally broke down and was his."[100] In the "Miss" scene, the woman is able to sanction her own withdrawal from the fellow's request for legitimation through another channel of male authority, through her absorption into a communications network of capitalist exchange. If consent were illegitimately withheld, the story would not be uneasily funny to the masculinist popular culture of the early century—it would have been frustrating or infuriating, but it would not, in itself, provoke anxiety. The

93. *Id.*
94. *Id.*
95. *Id.*
96. *Id.*
97. *Id.*
98. Wendy Brown argues that women are constitutionally excluded from the erotisization of power through violence. WENDY BROWN, STATES OF INJURY: POWER AND FREEDOM IN LATE MODERNITY (1995). Brown discusses the warrior in terms of Weber's "prestige of domination." She writes:

> The problem . . . is one most feminists can recite in their sleep. Historically, women have been culturally constructed and positioned as the creatures to whom this pursuit of power and glory for its own sake stand in contrast: women preserve life while men risk it; women tend the mundane and the necessary while men and the state pursue larger than life concerns . . . . The distinction between daily existence preserved by women and the male pursuit of power or prestige through organized violence simultaneously gives a predatory, rapacious, conquering ethos to prerogative power and disenfranchises women from this kind of power.

Id. at 190. I argue here that it is not only power from which women are disenfranchised, but the way of erotisizing control and power as evident in this quote of Seltzer's.
99. *Id.* at 163.
100. ZOLA, *supra* note 77 at 51.

scenario invoked by Zola describes a forced consent that is finally given over in a conflation of sexual dominance and his desire for her to write.

* * *

Whether with pen, typewriter, or word processor, one *writes* a letter by virtue of having signed a letter.[101] Jonathan Goldberg explains in his history of Renaissance writing that the secretary—etymologically the "guardian of the lord's secrets"[102]—is the necessary absence (or absorption onto the writing medium) through which the master has a presence.[103] The secretary functions as the attached-detached hand of the master and his very body is regulated by the signing hand.

> The signature is not imagined as the same hand as that which writes the letter, because it will be written by a secretary and in secretary's hand. Not part of the letter, the signature's authenticity derives from elsewhere—from the system of the re-marking of the writer within the privileges of the italic hand.[104]

The material practice of writing in the Renaissance turns on a fascinating genealogy of the hand, the "relationships between the hand writing and handwriting."[105] Goldberg traces this history through the use of writing instruments and the proper training of the hand until finally the hand is considered to be the sole instrument of script, detached from a body that can only be an impediment to a writer.[106] I suggest here that in the early Twentieth century, as a part of this genealogy of writing, the instrument of script—the woman and typewriter—was similarly detached from the thinking, or active, masculinized body. This point has crucial repercussions for the marketing of computers and consequently for the cultural recognition of RSI.

In a regime of print culture, especially since the advent of the typewriter, the meaning of "hand" has itself changed. The hand-written note or letter gestures toward the personal and the informal—the positive sense of eccentricity. Both handwriting and the symbolic investment of the signature signal personal speech rather than mechanical repetition and production. Conversely, the type writer's inscriptions dent a standardized gridded page in which the very design and mechanics of the machine mandates the bodily posture and discipline of the user as it erases the signifiers of the body from the resulting text. The gap in the production of writing (or the juncture between the body typing and the type writing) is thus materially

101. *See* GOLDBERG, *supra* note 78, at 236.
102. *Id.* at 131.
103. *Id.* at 236.
104. *Id.*
105. *Id.* at 24.
106. *See id.* at 233-318.

widened as it is metaphorically erased. If the typewriter formed the catalyst for women's hands' entrance to scriptive domains, typewriters coded the instrumentalization and expunging of any trace of those bodies.

The flow of thought from brain to technology to paper has been a continuing theme in the poetics of writing technology. Consider the moment at which the continuous flow pen was introduced:

> Quill pen or steel pen, there could be no doubt that one of the great disadvantages of either was the need to constantly replenish the nib with a fresh supply of ink. This inevitably broke the flow of writing which the writing master's recommended to their pupils as being a desirable acquirement. Equally inconvenient was the break in thought which might occur as the pen made its way from paper to ink pot and back again.[107]

This concern with the necessary continuity of poetic thought erupted again with the introduction of the dictation machine. It was advertised—with limited success—to allow for closer concentration and guaranteed privacy: "Men who formerly dictated stilted letters . . . have been taught by the dictating machine to express themselves lucidly."[108] Likewise, IBM touts its voice dictation software thus:

> Gavin just finished his epic poem, 'The Iceberg, the Walrus and the Fisherman's Elbow.' It took nineteen years to complete. His publisher said, 'You are brilliant. You are profound. But you've got to get faster on the keyboard.' [and then in smaller font] You'd rather be a poet than a typist.[109]

The software—the mode of communication, it is supposed—is what would allow Gavin—illustrated in a close-up double-spread black and

107. J. I. WHALLEY, WRITING IMPLEMENTS AND ACCESSORIES 60 (1975).

108. FORTY, *supra* note 50, at 137 (quoting W. H. LEFFINGWELL, THE OFFICE APPLIANCE MANUAL 344 (1926)). With this analysis of advertisements I do not mean to imply that users immediately accepted marketing rhetoric as "truth." On the contrary, much of the facade and aesthetisization was, and remains, an attempt to displace anxieties over new technologies. In some cases this is all too obvious. An ad for Fujitsu ("built for humans") illustrates a huge skeletal hand beside which it claims "the human HAND also known as: the 'CRUSHER' Able to inflict massive amounts of damage when confronted with a poorly designed notebook. In extreme cases, it is quite capable of putting a hole in the wall." The "design" of the notebook is not considered in terms of hardware at all—indeed, the notebook is very conventional in its shape and size. The Fujitsu advertisement appears in WIRED, Jan. 1997, at 28-29 and WIRED, Feb. 1997, at 42-43. An integrated communications software program (FocalPoint) advertisement takes a full page spread to claim: "We've changed the dreaded, backbreaking, mind-numbing, painful task of communicating through your computer." Again, the silhouette of a fellow seated with his hands on his lap, facing a computer screen only implies a change to the physical aspects of computing. WIRED, May 1996, at 106-07.

109. WIRED, Dec. 1995, at 18-19.

white photograph as a weather-beaten old fisherman full of tales and adventures[110]—to blossom fully as a poet; never mind the act of typing, which stultifies his mind and trips his fingers. If typing is an act of labor, speaking is apparently a natural expression of one's inner, true and poetic self.

The marketing apparatus supporting the steel-nibbed pen, dictating machine and voice recognition computer software erases bodies in a manner that renders invisible computer-caused RSI as well as a variety of voice overuse syndromes.[111] Just as the piano-typewriter juxtaposition was a genre of typewriter advertisements in the early Twentieth century that played on the female secretary's joyful experience in transcribing the boss's ideas into legible script (as well as drawing attention to her dexterous fingers),[112] so this voice system promises to render potent the latent poet in all of us—all of us who belong to the masculinized club of computer users.

This most recent development in computer input devices also evidences the relationships of gendered bodies to machines and seems to indicate a phobia of illustrating men typing. Of the fourteen computer ads that appear in four arbitrarily chosen issues of *Wired Magazine*, seven show images of bodies juxtaposed with the machines.[113] Seven of those bodies are male,[114] three are female[115] and three are children.[116] All except two are white.[117] None of the bodies are actually using the machines. Indeed, most are not even depicted on the same scale as the machines; they are shown doing another activity altogether, or in the background.[118] Additionally, an advertisement for the Microsoft "Natural" ergonomic keyboard shows a man's casually crossed arms with an overlaid graphic line stylishly joining one hand to a miniaturized image of the keyboard in the bottom corner— "made for each other."[119] Not only was it typical for type-

110. *Id.*

111. On voice overuse, see EDWARD TENNER, WHY THINGS BITE BACK (1997).

112. See LUPTON, *supra* note 20, for a number of these early advertisements. Women were posed at typewriters as if they were playing pianos and musical notes appeared to emanate from their dancing hands.

113. WIRED, Jan. 1996, at 2-3, 36-37; WIRED, Mar. 1996, at 27, 34-35; WIRED, May 1996, at 38-39, 75; WIRED, Apr. 1997, at 74-75. I am not including here ads for computer components or software which are even less likely to show people at the keyboard.

114. *See* WIRED, Jan. 1996, at 2-3, 36-37; WIRED, Mar. 1996, at 27, 34-35; WIRED, May 1996, at 38-39, 75; WIRED, Apr. 1997, at 74-75.

115. *See* WIRED, May 1996, at 38-39.

116. *See id.*

117. *See* WIRED, May 1996, at 38; WIRED, May 1996 at 75. The one image of a Black man is accompanied by text that claims, "I marched on Washington and never left home." WIRED, May 1996, at 75. The copy continues, by saying that the Acer computer allows one not just to "talk change and betterment" but to "make it happen." *Id.*

118. *See supra* notes 113-17.

119. Microsoft Ergonomic Keyboard advertisement (on file with author).

writer advertisements to show women in the act of typing,[120] but even the early room-size computing devices were advertised with female bodies—not typing at them, but posed in front of them as part of the display.[121] The new Microsoft "natural" keyboard, designed precisely to guard against RSI, both merges the man and the machine with the sexual overtones of its slogan as it spatially and cognitively divorces the man from the feminized act of typing.[122] Whereas in typewriter advertisements the woman's hands *at the typewriter* are symbolically for sale with the machine, in the Microsoft "Natural" keyboard ads the product simply *is* both the woman and the typewriter. Thus a combination of fear of women's work and a symbolic condensation of the woman and machine combine to erase, even as they foreground, the ergonomics of the machine.

The gender shift that has taken place between the typewriter and the computer keyboard indicates the figurative absorption of the woman's body into the machine itself. More often than not in the typewriter advertisements of the first half of the Twentieth century, women were shown actually using the typewriter or passing typed pages to a male boss.[123] Work was being done; the type writers worked. Computers, on the other hand, are, in the economy of the signifier, not about typing, repetition or work but are about personality, signature and agency.[124] The male body is not a part of the work act, but still the thought—his thought—is magically inscribed. Earlier it was the sexualized female body that did the work. Now, it is the fetishized computer. Thus the history of body-machine interface is erased in a fantasy that slips between thought, paper and power—the middle point, be it the woman-machine or the [assumed male consumer] body at the machine, is consistently under erasure.

As the physical effort of typing decreased, so did the [secretary's] body's apparent involvement with the production of letters. Finally the computer's electronic current appears to require only the tap of a finger to transmit intention to hard drive to printer. Posture and bodily discipline are not determined by the design of the machine—the mark is made through a series of electric currents. If the body attends to the correct formation of each letter in handwriting and the hand and arms in typewriting, the finger is presumed to be the sole executor of the touch-typed letter on the computer.

120. See LUPTON, *supra* note 20, for examples.

121. The first computers were marketed more like cars, with heterosexually available looking young women standing suggestively beside them. See illustrations in EMERSON W. PUGH, BUILDING IBM 276, 315 (1995).

122. *See supra* note 119.

123. See LUPTON, *supra* note 20, for examples.

124. By "economy of the signifier" I mean to call attention to the ways in which commodities circulate in social contexts. *See* JEAN BAUDRILLARD, FOR A CRITIQUE OF THE POLITICAL ECONOMY OF THE SIGN 141-63 (Charles Levin trans., Telos Press 1981).

Even the finger, however, is lost in the cybernetic computer fantasies of marketing. IBM peddles their ThinkPad thus:

> The evolution of thought. Crying equals food. Four plus seventeen, carry the one, twenty-one. Conjunctive adverbs. Deductive reasoning. You are already in possession of the most amazing computer on the planet. Now you need its companion: a machine capable of capturing and communicating your thoughts with unparalleled precision. When a spark jumps from one neuron to the next and a message goes from your brain down to your fingertips and into a keyboard, you should have in front of you the most thoughtfully designed, intelligently built machine possible. A computer that reflects all of the thinking and ardor and insight of the human mind. ThinkPad. A better place to think.[125]

The isolation of body parts in the configuration of thinking's relationship to the machinic computer assumes that the substance of thinking itself—the traversal of the spark from neuron to fingertip to keyboard—is contained in that very loop. This "thinking" is a curious sort of spirit—an immaterial activity wholly caught up in mind-body severance. The ad implies a relationship of machine-human/thought-communication whereby both computer and human are transformed.

If it is just a fingertip that operates the computer, and really the interface is between two highly sophisticated brains, then of course keyboard design hardly matters. The 1935 Royal Typewriter advertisement ("The shortest distance between the thought and the perfectly typewriter letter . . . .")[126] presages the idea of a causal relationship between thought and production. Whereas 1930s-era typewriter advertising concretized thought with long, slender, royal looking fingers and the overtones of sexy legs and bodies, the bodies of ThinkPad advertisements are placed within the imaginative space of three computer screens illustrated along the margins of the page.[127] These bodies relax in the green hues of nature (two children),[128] or peruse the golds of the art gallery (a young, wealthy woman of color).[129] Bodies are being sold in each of these images. If in 1935 the typewriter symbolically included the woman operator, in 1997 the bodies are offered as synechdoches of leisure, wealth, youth and beauty.

Or very possibly, the 1997 bodies are *also* being offered for possession. Abigail Solomon-Godeau demonstrates how femininity has become, in the Twentieth century, a "supplementary emblem of the

125. This advertisement has appeared in several journals. *See* WIRED, May 1996, at 38-39.
126. *See supra* note 22.
127. *See* WIRED, May 1996, at 38-39.
128. *See id.*
129. *See id.*

> commodity itself."[130] The "coupling of eros and commodity,"[131] or the use of the feminine-as-spectacle in order to sell products, from cars to cigars, is so ubiquitous as to have become cliché.[132] I have demonstrated in this section of the paper the multiple relationships between the possession of women's work and bodies through eroticism, anxiety, violence and the downplaying of the value of women's lives. The shift towards personal computing is marked by the demise of the personal secretary and the marketing of the machine to men for their own use. This has required a significant regendering of the act of typing. The signifying of the computer as an eroticized commodity, as equally possessable as the woman and the typewriter, has shifted the relays between possession, femininity and commodity. Whereas women had been displayed using and adorning typewriters to sell (materially and semiotically) the product to male employers, the actual feminized work practice has been disavowed with the introduction of the computer. This disavowal resulted in the erasure of the hands and bodies at work, and the reconfiguration of the computer commodity. The magnitude as well as the continued erasure of RSI in the public consciousness demonstrates the misogyny that has structured the material-social-semiotic relations that have been at the core of the coupling of woman and commodity—the design of the typing keyboard and the erasure of the labor of typing.

And so the constructed notion of "common sense" that structures the neutrality of the keyboard crumbles. Not only is the keyboard a device that has undergone an enormous amount of research in terms of its efficiency but it is exceedingly inscribed with cultural meaning and disavowal. Gender relations continue to be informed by, and materialized in, the figures of the typewriter and computer keyboard. In the early joking strategies that brooked heterosexual anxiety and fantasies of writing technologies that sexualized writing instruments and power, women's bodies were simultaneously instrumentalized and erased. The introduction of computers completed this erasure of the female body as marketers attempted to masculinize the computer keyboard and wholly sever it from the feminized practice of typing. "Common sense" rhetoric reads the keyboard as a transparent object, a tool or instrument like any other—like a "hammer" or a "pencil," in the words of IBM's defense attorney.[133] But, labor practices and lack of choice in labor conditions aside, the keyboard is clearly not a

130. Abigail Solomon-Godeau, *The Other Side of Venus: The Visual Economy of Feminine Display, in* THE SEX OF THINGS: GENDER AND CONSUMPTION IN HISTORICAL PERSPECTIVE 113 (Victoria De Grazia & Ellen Furlough eds., 1996).

131. *Id.*

132. *See id.*

133. Lohr, *supra* note 10.

tool like any other. It developed over the century as a gendered and class-coded tool, and it has undergone specific and peculiar shifts and reidentifications in the last decade. It is the specificity of this material-social history that has resulted both in the design of the keyboard as we know it and the ideologies that inscribe it within cultures of writing, authorship, power, femininity and insignificance. The discourses and practice of products liability law have been unable to discern the heterogeneous ways in which gender structures human-technology interfaces, let alone the ways in which gender is produced by these very categories.

III. THROBBING HISTORIES

The recalcitrance of management to embrace ergonomic keyboards and work-stations despite overwhelming evidence of injury has had major repercussions among computer users, workers' compensation schemes and medical infrastructures.[134] Keyboard instigated injury, which discursively emerged from what was commonly known as the epidemic of the eighties, proliferated as the epidemic of the nineties.[135] Typical histories of these injuries mark the early 1980s as the starting point of the RSI outbreak.[136] Popular newspapers and computer journals mainstreamed the history of RSI as an epidemic that first afflicted keyboard operators in Australia before "migrating" to the UK and North America.[137] Its sudden emergence is explained by the typing styles necessitated by the computer keyboard, the introduction of the mouse and the increased speed allowed by the computer.[138] However, more rigorous research on the topic reveals that injuries sustained through repetitive motions of the hands and wrists have been reported for centuries and symptoms have increased since the industrial revolution.[139] RSI was recorded in 1713 by the surgeon Ramazzini as a disease of scribes and notaries,[140] and by 1911 telegraphist's cramp had become such a serious issue in the UK that a substantial departmental committee report was published on the subject.[141] Throughout this century RSI has erupted in rampant proportions amongst punch card operators and data entry staff.[142]

134. *See supra* note 2.
135. *See supra* note 2.
136. *See supra* note 2.
137. *See supra* note 5.
138. *See supra* note 5.
139. *See* ALLARD DEMBE, OCCUPATION AND DISEASE: HOW SOCIAL FACTORS AFFECT THE CONCEPTION OF WORK-RELATED DISORDERS (1996).
140. *See* BERNARDINI RAMAZZINI, DE MORBIS ARTIFICUM 420-25 (Wilmer Cave Wright trans., University of Chicago Press 1940).
141. Departmental Committee on Telegraphists' Cramp, Report of the Departmental Committee on Telegraphists' Cramp (London: His Majesty's Stationary Office, 1911) [hereinafter Committee on Telegraphists' Cramp].
142. *See* Diana Brahms, *Medicine and the Law: Keyboard Operator's Repetitive Strain*

In the Middle Ages inscription injuries were well known to scribes. A Twelfth century manuscript epilogue reads: "I can't feel my hand, my head's a whirl, I'd swap my pen for a beautiful girl."[143] Repetitive strain injuries erupted in major proportions at the end of the Nineteenth century with writers' cramp and in the early Twentieth century with telegraphers' cramp.[144] By the early Twentieth century there were at least forty documented varieties of occupational hand disorders, all named after the jobs in which they occurred: milkers' cramp, pianists' cramp, sewing spasm, silk-winders' dermatosis, to name just a few.[145] Although differently named, the medical establishment recognized that the ailments shared common symptoms and gradually etiological studies became more anatomically based.[146]

Symptoms of writers' cramp, also known as scriveners' palsy, reported from 1820 and increasingly through the 1880s, included the same symptoms as computer-related RSIs—intense pain, prickling, stiffness, eventually anesthesia and paralysis.[147] The condition overwhelmingly affected males of prime working age.[148] Reasons given for this outbreak were the prevalence of poor penmanship, the introduction of the steel nib and the rise of a clerical class.[149] One contemporary commentator blamed "the increased speed and recklessness with which [the pen] is driven in our modern struggle for existence."[150] Amongst treatments, the switch from handwriting to typewriting was recommended.[151]

The first medical case study of telegraphers' cramp was reported in 1875.[152] In 1908 Great Britain recognized telegraphers' cramp as a com-

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Injury, 339 LANCET 237 (1992). The founder of the company that later became IBM made his first major breakthrough in the development of a punchcard machine that would collate census data in the 1890s.

> A critical flaw in the equipment was painfully revealed to Hollerith during the tests in Baltimore. To punch holes in the cards, he had used a small hand held punch of the type employed by trade conductors. Although the conductors' punch was satisfactory for intermittent use, it was not suitable for punching thousands of holes in cards. Hollerith's hand and arm became nearly paralyzed after spending a day continually punching holes in cards.

PUGH, *supra* note 121, at 10.

143. JOHN LARNER, CULTURE AND SOCIETY IN ITALY 1290-1420 (1971).

144. *See* DEMBE, *supra* note 139, at 31-40.

145. *See id.*

146. *See id.* at 35-43.

147. *See id.* at 29-35.

148. *See id.* at 31.

149. *See id.* at 32-33.

150. JAMES H. LLOYD, THE DISEASES OF OCCUPATIONS 45 (1895), *quoted in* DEMBE, *supra* note 139, at 32; *see also* Stephen Tyrer, *Repetitive Strain Injury*, 38 J. PSYCHOSOMATIC RES. 493 (1994).

151. *See* DEMBE, *supra* note 139, at 33.

152. By 1907 there were nearly 16,000 telegraphic systems in use in Great Britain. *See id* at 36.

pensable disorder under worker's compensation laws.[153] A 1911 study found some 64% of 8,153 telegraphers were affected and 9% were medically diagnosed with telegraphers' cramp[154]—statistics stunningly similar to contemporary computer users' incidence of RSI.[155] In his well researched history of the social recognition of cumulative trauma disorders, Allarde Dembe compares the compensation of telegraphers' cramp to the lack of compensation for a very similar injury known as "twisters' cramp."[156] Remarkably unremarkable, "twisters' cramp" affected a relatively small group of older women lace makers while telegraphers' cramp afflicted a well organized group of white collar men who were able to garner media attention and initiate public discussion about compensation.[157]

By the 1910s and 20s, a gradual shift occurred away from physiological and toward psychological explanations of repetitive strain injuries.[158] The 1911 British Departmental Report on Telegraphists' Cramp,[159] for example, gave equal weight to two causal explanations of telegraphers' cramp: a nervous instability on the part of the operator and fatigue caused by repeated hand movements when operating the Morse key.[160] Pre-Freud, occupational neuroses had indicated nervous disorders of unknown etiology.[161] Freud was one of the first to introduce the notion that mental disorders might by caused solely by psychological factors and he distinguished between diseases that had psychological origins and those that originated in organic disorders.[162] However, the Freudian distinction be-

153. *See id.* at 41.

154. *See* DEMBE, *supra* note 139, at 39.

155. A 1984 Australian study found that 56% of keyboard users had symptoms of keyboard injuries, 8% serious enough to contact health care professionals. *See* Winn L. Rosch, *Does Your PC—or How You Use It—Cause Health Problems?,* 10 PC MAG. 491, 493 (1991). The hand positioning necessary to use the mouse is almost exactly the same as that required to use a telegraph machine.

156. DEMBE, *supra* note 139, at 35-43.

157. *See id.* at 35-43.

158. *See id.* at 43-52.

159. Committee on Telegraphists' Cramp, *supra* note 141.

160. The opinion of this Committee was:

> the nervous breakdown known as telegraphists' cramp is due to a combination of two factors, one a nervous instability on the part of the operator, and the other repeated fatigue during the complicated movements required for sending messages by hand on a telegraph instrument . . . . A person of average health can suffer fatigue again and again indefinitely without becoming affected with cramp; but if a nervous instability exists, fatigue cannot be prolonged beyond a certain point without causing cramp. This point depends on the nervous constitution of the subject, and varies not only in different persons but in the same person at different times according as the nervous "tone" is affected by general health or other conditions.

Id. at 9.

161. *See* DEMBE, *supra* note 139, at 46-47

162. *See* S. FREUD & J. BRUER, STUDIES IN HYSTERIA (A. A. Brill trans., Beacon Press 1961).

tween physiological and psychological neuroses was lost on the public. Dembe observes that "[d]espite the fact that the original descriptions of chronic hand and wrist disorders as occupational neuroses did not imply any psychoneurosis in the Freudian sense, they were nevertheless typically conceived as possessing an underlying psychological component."[163]

This confusion resulted in the relegation of cumulative trauma disorders to psychological rather than physiological origin, and the particular attribution of such "nervous disorders" to women, Jews and immigrants.[164] In his history of cumulative trauma disorders of the hands and wrists Dembe writes:

> Between 1900 and 1930 white-collar employment in the United States rose by almost 800 percent, . . . more than two-thirds of whom were women. After 1900, occupational neuroses of the hands and wrists increasingly came to be interpreted by physicians as forms of neurasthenia, psychoneurosis, and other psychological abnormalities. At the same time, physicians continued to allege that women, Jews, and immigrants were especially susceptible to these types of psychological disorders. Physicians' linkage of such groups with psychological abnormality was part of a broader social reaction to the unprecedented entry of large numbers of these individuals into the modern workplace.[165]

Thus, physicians adopted discourses of hysteria that had been used to dismiss women's complaints and began applying them to occupational disorders.[166] The lack of compensation and treatment left women with little choice but to leave jobs and evidence suggests "that many women during the 1920s either decided to leave their employment or were forced to leave because of sickness, exhaustion or injury."[167] Due to saturation of the job market and the depression, employers cut wages in the 1920s and 1930s by as much as half and employment was extremely low amongst clerical

163. *Id.* at 47.
164. *See id.* at 50-54.
165. *Id.* at 52.
166. *See* DEMBE, *supra* note 139, at 52-54.
167. *Id.* at 53. See *id.* at pages 64-66 for more information on low reportage. Dembe concludes his section of low reportage by stating:

> [A] major increase in cases did not take place until the mid-1980s. At that point, in the course of a few years, a new surge of public, legal, and medical attention was directed at occupationally-induced hand and wrist disorders. The reported incidence of these disorders began to rise and has increased substantially each year since. During this period, new medical terms—*cumulative trauma disorders* and *repetitive stress injuries*—became part of the common lexicon of occupational safety and health.

Id. at 66. It is this medical and legal attention that materializes, or brings into being, the injury in the social consciousness.

workers.[168] RSI sufferers' lack of credibility is likely a significant factor in low reportage rates of RSI in the early century. In contrast to the American denial, in 1958 so many Japanese punchcard perforators, typists, and keyboard operators had crevicobrachial disorders that the Japanese government introduced a work maximum of five hours per day with no more than 40,000 keystrokes.[169]

Between 1950 and 1980 carpal tunnel syndrome remained unrecognized under worker's compensation in the U.S.;[170] it was understood to be a disease of middle-aged women attributable to hormonal changes.[171] Despite some doctors' careful scrutiny of the problem, the opinion of one Chicago surgeon, Dr. George Phalen, remained enormously influential.[172] Although he recognized that cumulative trauma disorders were aggravated by use of the hands, his premise, before, during and after his studies, was that women do not, by definition, do "manual" work and therefore their hand and wrist problems cannot be occupationally caused.[173] This assumption spared him from the more intensive research in which his lesser known colleagues were engaged: documenting the specificities of hand and wrist motions in rigorous attempts to link the disease to specific causes.[174] Despite Phalen's surgical interventions into the wrists of 40% of his female patients he maintained, even in retirement, that "it's in their minds, not their wrists."[175]

The stunning disavowals and displacements that undergird RSI cluster around the cultural and material construction of the keyboard—an object that has been understood as merely a tool needing to be approached with common sense. But one can now see how the keyboard as a material device, or as an engineered mechanism, is drenched with social understandings of gender and class. Indeed, the very design of the keyboard has such preconceptions built into it. The scope and severity of this avoidable injury points to a mode of violence that is structured as much through the absences of research and recognition of pain as through purposeful effort. These erasures, brought about by the objectification of women's bodies

168. *See* FORTY, *supra* note 50, at 133.
169. *See* Brahms, *supra* note 142, at 237.
170. *See* DEMBE, *supra* note 139, at 76.
171. *See id.*
172. George Phalen recognized the physiological etiology of carpal tunnel syndrome and developed the surgical techniques to partially remedy it. *See id.* at 69-77.
173. *See* DEMBE, *supra* note 139, at 74-76.
174. *See id.* at 74. Dembe notes that although inattention to the details of discrete job risk factors was not rare, other physician did conduct careful studies of hand and arm use in occupations. For example, Radford C. Tanzer organized studies in the 1950s that involved collecting occupational histories and details about manual activities required during daily work. *See id.*
175. Interviews by Allard Dembe with Dr. George Phalen (Sept. 29, 1993 and July 18, 1994) *quoted in* DEMBE, *supra* note 139, at 74.

into office equipment, the erotisization of working women's bodies and of writing materials, and finally the obliteration of the body altogether in computer advertising, eased the way for the historical, medical and legal erasure of inscription injuries.[176]

With one notable exception[177] product liability suits, brought against keyboard manufacturers for design flaws and failure to warn of the potential for injury, have been decided in favor of the defense.[178] The underlying but explicit argument of this paper is that keyboard manufacturers built and distributed keyboards with serious design flaws about which they could have known incipiently and could not have remained ignorant of once litigation began in Australia in the early eighties.[179] The cornerstone of products liability law in the U.S. was, until recently, that a "manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury for a human being."[180] It was posited that placing an item on the market meant representing "that it would safely do the jobs for which it was built."[181] This paper reveals that literature, although sparse, has been available since the early 1920s that details the injuries resulting from overuse of the keyboard.[182]

176. Additionally, of course, there is the desire to sell the computer. It is for that reason that the typewriter was adopted as the computer input device (so as not to "scare" customers) and it is for this reason that, even fifteen years after RSI has become extremely common, warnings rarely appear on computers.

177. In a recent case against Digital Equipment Corporation (DEC), a secretary was awarded damages for the manufacturer's failure to warn of the risks of using the keyboard. Plaintiff was able to show that OSHA inspected DEC in 1989 and cited it for its high rates of RSI. As a result, DEC trained its workers and reduced the incidents of RSI while omitting to label its consumer products. This case is still undergoing appeal. *See Jury Awards $5.3 Million to Carpal Tunnel Plaintiff; First Time Keyboard Maker Liable in RSI Case,* WASH. POST, Dec. 10, 1996, at D1; Katia Hetter, *Closing Arguments in $6-million RSI Suit,* NEWSDAY, June 12, 1998, at A71. It has been reported that Apple Computer may be guilty of similar behavior. Since 1990, Apple produced a video responding to employee complaints about RSI. This video was destroyed in 1991 because of the legal department's concern over RSI-related litigation. *See* Reynolds Holding, *RSI Suits May Finally Catch up with Apple*, S. F. CHRON., January 19, 1997, at 6/Z1.

178. *See supra* notes 4, 177.

179. For more on Australia, see DEMBE, *supra* note 139, at 91-94; Andrew Hopkins, *The Social Recognition of Repetitive Strain Injuries: An Australian/American Comparison*, 30 SOC. SCI. MED. 365 (1990).

180. Greenman v. Yuba Power Products, Inc., 59 Cal. 2d 57 (1963). This is the case that is typically referred to for the key articulation of strict liability. *See* MARSHALL SHAPO, PRODUCTS LIABILITY AND THE SEARCH FOR JUSTICE 23-24 (1993); ROBERT A. RABIN & MARC A. FRANKLIN, TORT LAW AND ALTERNATIVES: CASES AND MATERIALS (5th ed. 1992). Rabin and Franklin point out that "strict liability" has been slowly eroding in products liability case law since the late 1980s.

181. *Greenman*, 59 Cal. 2d at 64.

182. *See* DEMBE, *supra* note 139, at 35-101. There is abundant literature discussing early Twentieth century designs intended to avoid the pain associated with typing. *See* K.H. Eberhard Kroemer, *Human Engineering the Keyboard*, 1 HUM. FACTORS 14 (1972); David

Ironically, the masculinization of the computer keyboard and its segregation from the typewriter in marketing may have the corollary affect of making typing injuries more difficult to acknowledge. First, RSI is emphatically not a "macho injury." RSI can be extremely painful, but there is little "objective" evidence of this pain—no one accident, no blood, no high-speed chase, no cast, no stitches.[183] If women have historically been constructed as beings who preserve the household and tend to commonplace daily living while men pursue "power or prestige through organized violence,"[184] and the typewriter has been the mechanistic fulcrum around which women as housekeepers of the office have been constructed, then the injuries sustained as a result of the task of typing may be additionally humiliating for men who contract the injury.

Two key streams of the reinscription of gender in both task and tool that I have been tracing with the computer include first, the removal of the hand from the keyboard in computer advertising and thus the erasure of the labor itself, and second, the fantasy of purity that the computer assists *thinking* not writing or typing. These developments are evident extensions from the typewriter ads, aimed at male employers, that illustrate more efficient ways for men to work.[185] Additionally, despite the fact that gender undoubtedly affects the quality of attention given to the treatment and compensation for the injury, as I pointed out in my comparison of telegraphers' cramp and lacemakers' twist,[186] computer-instigated RSI may be differently socially situated from those injuries due to the popularity of the tort reform rhetoric of "common sense" and "personal responsibility."[187] I would suggest that these factors are among those, such as well-founded fear of job loss,[188] that influence under-reportage.

IV. KEYBOARDS IN COURT: DEFINITIVE LEAKS

This article demonstrates how writing as a practice, as an art and as a

G. Alden et al., *Keyboard Design and Operation,* 14 HUM. FACTORS 14 (1972); Noyes, *supra* note 44.

183. See AUDRE LORDE, THE CANCER JOURNALS (1980), for an account of how injuries tend to be marked differently for men than for women in terms of the uses of prosthesis, patches and other ways of marking and erasing injuries. *See also* Sarah S. Jain, *The Prosthetic Imagination: Enabling and Disabling the Prosthesis Trope*, 24 SCI. TECH. & HUM. VALUES (forthcoming).

184. BROWN, *supra* note 98, at 190.

185. *See supra* note 22 and accompanying text.

186. *See supra* notes 156, 157 and accompanying text.

187. STEFANCIC & DELGADO, *supra* note 9.

188. In a series of interviews I did as another part of this research on RSI, I spoke to a number of people who lost jobs because of their struggles with the injury and who were unable, once injured, to switch to other work. *See also* the publication of the Association for Repetitive Motion Syndromes (P.O. Box 47193, Aurora, CO 80047-1973); Kristin Barendsen, *The Light at the End of the (Carpal) Tunnel*, 125 YOGA J. 25 (1995) (describing personal story of a woman who lost her job due to RSI).

vocation has been integrally bound with both gender and with the technologies of writing and how injuries accompanying the practice have been recognized or erased depending on the means by which the injuries materialize. In the U.S., with its notoriously weak regulatory agencies[189] and expensive medical system, products liability law is a main forum by which injuries draw attention and through which a modicum of public health is ensured.[190] Products liability law was the mechanism through which the dangers of Agent Orange,[191] asbestos,[192] DES,[193] the Dalkon Shield[194] and silicone breast implants[195] were made public. Yet despite the magnitude of RSI—it is predicted that "thousands or tens of thousands" of products liability claims may be made[196]—there has been, at the date of this writing, little success for plaintiffs.[197] There are many plausible reasons for the failure of such litigation: repetitive strain injuries are invisible; proximate cause is extremely difficult to prove;[198] a precedent would likely cause a landslide of claims due to the sheer number of RSI sufferers; and the seeming innocuousness of the keyboard has meant that even those who suffer from RSI did not realize it until much later, thus posing a statute of limitations problem in many states.

In this section of the paper I conclude my analysis of the material-cultural construction and mediation of keyboards and injured bodies by examining a recent class action suit in New York[199] concerning the statute of limitations in RSI litigation. Statutes of limitations have been a major barrier to RSI plaintiffs and demonstrate not only the legal system's inflexibility and inability to address the nature of RSI, but its ignorance of

189. *See* JAMES A. WILSON, THE POLITICS OF REGULATION (1980).

190. *See* Richard L. Cupp Jr., *Sharing Accountability for Breast Implants: Strict Products Liability and Medical Professionals Engaged in Hybrid Sales/Service Cosmetic Product Transactions,* 21 FLA. ST. U. L. REV. 873, 874 (1994).

191. *See From Jungles to Court to Congress,* USA TODAY, July 28, 1993, at 8A.

192. *See A History of Asbestos and the Manville Trust Fund,* WASH. POST, Nov. 20, 1990, at D7.

193. *See DES May Affect Third Generation,* J. COMMERCE, June 10, 1987, at 11A.

194. *See* Sandra Torry, *High Court Asked to End Delay in Appeal of Dalkon Shield Case,* WASH. POST, Nov. 23, 1994, at B3.

195. *See* Cupp, *supra* note 190.

196. Theresa Cortese, *Cumulative Trauma Disorders: A Hidden Downside to Technological Advancement,* 11 J. CONTEMP. HEALTH L. & POL'Y 479, 496 (1995). Hetter, *supra* note 177, reports that there are, at present, over 1000 RSI suits pending.

197. *See supra* notes 4, 177.

198. Proximate cause, in an RSI case, would be evidence that directly linked keyboard and/or mouse use to the injury. I spoke to one sufferer in Toronto who was told repeatedly by her doctor that her RSI was computer keyboard induced, yet when she asked him to testify on her behalf in court he refused.

199. *Blanco, supra* note 23. Numerous plaintiffs with different or multiple kinds of RSIs brought suit, accusing AT&T, IBM, Apple, and various other computer companies of producing keyboards that caused their injuries. The suits against all but AT&T were dismissed on statute of limitation grounds. The issue before the *Blanco* court was the determination of the applicable statute of limitations for RSIs.

(or refusal to address) the mutating status of seemingly self-evident objects.

In a 1996 class action appellate decision of the New York Supreme Court,[200] the keyboard was properly found to be a "product" rather than a "substance."[201] Although this definitional distinction may seem trivial, the stakes and consequences are not at all small. Defendants, in this case, had argued that the lower court had properly applied New York Civil Practice Law and Rules (CPLR) section 214(c),[202] which states that an action for injury

> caused by the latent effects of exposure to any substance . . . upon or within the body or upon or within property must be commenced [within three years,] computed from the date of discovery of the injury by the plaintiff or from the date when through the exercise of reasonable diligence such injury should have been discovered by the plaintiff, whichever is earlier.[203]

Plaintiffs urged that another statute should apply, one that would solidify the beginning of the three year period as the date of the discovery of the injury.[204] The statute for which the plaintiffs argued, referred to as the "toxic tort" or "toxic substance"[205] statute, defines exposure as "direct or indirect exposure by absorption, contact, ingestion, inhalation, implantation or injection."[206] The plaintiffs' argument is a creative way to circumvent statute of limitations barriers that are posed to injured people unable to immediately link their injuries to typing.

Nevertheless, the court found that the keyboard was not a "substance in any form." The judge found that,

> simply put, the keyboard is not a substance, toxic or otherwise. Plaintiff's injuries were allegedly incurred by direct contact with a tangible object, not a substance, and the term "substance" was no more meant to encompass a piece of office equipment than it was meant to include any other ordinary product.[207]

Although in this instance the keyboard was found to be a plain, ordinary product rather than a substance, the more difficult question remains as

200. *Id.*
201. *Id.* at 7-8.
202. In 1986 the Legislature enacted CPLR 214 (C) to create "a discovery rule for contact with a substance, or its absorption, ingestion, inhalation or injection." Later implants were also included. *See* Robert A. Barker, *Liability for Repetitive Stress*, N. Y. L. J. 3 , Feb 5, 1997, at 3.
203. N.Y. C.P.L.R. 214(c) (1997).
204. *Blanco*, *supra* note 23.
205. *Id.*
206. *Id.* at 6.
207. *Id.* at 7-8.

to when the cause of action accrued. In non-toxic tort cases, "[i]njury . . . occurs and is 'complete' when the offending substance is inhaled or otherwise first 'introduced' into the body, *not* when the disease manifests itself. The disease is not the injury, but the consequence of the injury."[208]

Blanco illustrates one court's approach to marking the first exposure to a substance— or in this case a product—as the point at which the statute of limitations is measured, even though an individual may be unaware of an injury until the manifestation of a disease.[209] This meant that the plaintiff's first use of a keyboard connoted, to the *Blanco* court, the beginning of the injury as the first manifestation of the injurious process.[210] Amazingly, the *Blanco* court ruled that RSI is similar to asbestos in that repeated, prolonged exposure is necessary before the injury will manifest itself, but is unlike asbestos in that the keyboard is a product.[211] It wrote: "each plaintiff's cause of action accrued upon the commencement of their use of the allegedly defective keyboard, regardless of when their symptoms first manifested themselves."[212] Thus, this court ruled that this case was time-barred. But according to the court's own comments on the asbestos analogy,[213] it follows that RSI should have been handled as a toxic torts matter. The problem here is a definitional one whereby this court seems to have foreclosed the possibility of the keyboard as being anything but, "simply put," a tangible product.

"Substance" implies something quintessential, elemental, that can enter and will react with the body, thus causing an objectively understandable change in the composition of the body. Substances leak and bleed; they cannot be held onto, separated from one's body, used or played with in clean everyday ways. A "product" can, by definition, never enter the body in the same way. A product—a thing produced, manufactured, made—remains external to the body. Objects and products are objective, seen, perceived, understood and owned, they are clearly distinct from other objects in the world—one takes on a property relationship with one's objects. It is the keyboard's "thingness" that makes it a "product" rather than a "substance." Products hurt humans from the outside in ways that can be seen. Substances change the consistency of bodies. But, a slow-

208. *Id.*

209. This is not always the case. For example, the Ninth Circuit held that "under the California delayed discovery rule, 'the accrual date of a cause of action is delayed until the plaintiff is aware of her injury and its negligent cause.'" Ward v. Westinghouse Canada, Inc., 32 F.3d 1405, 1407 (9th Cir. 1994) (citation omitted). The question was whether "a reasonable person in his position, knowing or suspecting that using a keyboard was the source of his trouble, would have been on inquiry notice of 'wrongdoing'. . . ." *Id.* at 1407-08.

210. *Blanco*, *supra* note 23, at 7-8.

211. *Id.*

212. *Id.* at 13.

213. *Id.* at 7-8.

developing, unknowable, body-altering injury caused over a long period of time may be uncompensable in courts due to the premises embodied in the terms "substance" and "product"; RSI falls into the interstices of the terms that were available for use in *Blanco*.[214]

Michael Cerussi, an attorney for IBM, has claimed to the press that, "[t]hese are keyboards we're talking about, not asbestos, not lead. Just keyboards."[215] We may be talking about "just keyboards," but we are not talking about "just" RSI. Consider this testimony:

> Typing with my new [ergonomic] setup, felt like plugging my arms into wall sockets . . . I watched my hands in disbelief as I tried clumsily to grip and turn the pages of a book, as they labored to lift a coffee mug. Soon . . . I was laid off . . . wondering how I would support myself . . . . "Rest" meant avoiding every object that caused pain: my car, my bicycle, my violin; the key in the lock, the quarter in the vending machine, the cap on the Calistoga bottle; clapping hands, shaking hands, holding hands. It stripped me of my independence and self-esteem. I became an observer, walking through the world, but unable to touch it . . . .[216]

Products liability law ostensibly operates as a signaling mechanism that draws attention to injuries and diseases caused by dangerous products and factors the costs of those injuries into the product prices.[217] Yet, the logic of the *Blanco* case precludes a way of understanding RSI as an injury. In the absences of perceived injury then, let alone damage awards, there is very little incentive for companies to shift product design or add product warnings. This is one reason why many sufferers of these crippling and common injuries protest that they never even knew about the possibility of the injury until they got it.[218] In spite of the work of several activist RSI groups,[219] warnings about RSI are virtually nonexistent on any part of computers or in the general areas of computer equipment in libraries, universities, work places and other public and private institutions.

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214. *See* Gary Spencer, *Filing of Keyboard Claims Limited; Statute of Limitations Middle Ground Taken,* N. Y. L. J., Nov. 26, 1997, at 1 (describing the middle ground taken by the next court in the *Blanco* case. Judge Richard C. Wesley ruled that accrual date for action against a manufacturer is at the onset of symptoms or at the last use of the manufactuer's keyboard, whichever is earlier.)

215. Waga, *supra* note 10.

216. Barendsen, *supra* note 188, at 41-42.

217. *See* RABIN & FRANKLIN, *supra* note 180.

218. This complaint is made time and time again, for example, on the "sorehand" email list, <http://www.ucsf.edu/sorehand/>, shared by hundreds of RSI sufferers.

219. There are local and national chapters of organizations for RSI sufferers that offer support and information as well as lobby on their behalf. For a list, see EMIL PASCARELLI, M.D. & DEBORAH QUILTER, REPETITIVE STRAIN INJURY: A COMPUTER USER'S GUIDE 205-09 (1994).

Although repetitive strain injuries have existed for centuries, the legal framework is severely limited in that it can not incorporate the ways in which common objects can affect, change, "enter" and injure bodies over time in ways that have not been objectively visible. Thus, one crucial factor in bringing RSI into public discourse has been effectively sterile.

CONCLUSION

"Many Scientists Believe That It Will Be Possible To Develop Telepathic Powers as a Practical Tool Of Communication."[220]

In an advertisement that appeared in *Wired* magazine in the summer of 1996, this message is inscribed over a black and white image of a white-suited, sixty-ish man with his crown pressing against a brick wall.[221] As the wall recedes into the distance, a ridge of barbed wire curves to keep whatever is "inside" the wall, inside.[222] The solitary man is ambiguously banging his head, resting his head in despair and willing his head to go through the wall—a wall reminiscent of those at Auschwitz or Berlin—divisive walls, walls that blocked people's agency and imagination, walls concealing murder, walls saturated with symbolic capital, firmly embedded in a common set of culturally recognizable images.

But the reader of the image is whisked away from these horrific connotations as the copy breaks through the 1940s style brown and white photograph:

> In the Meantime, We Offer This Alternative. To communicate well is a virtue. It's also what you've got to do to make things happen. Whether you do this through sweet reason or imperial dictate, you must transmit thoughts—often over vast distances. The precise point of Mobilized Computing, and the new Hitachi Notebooks. Powerful instruments for effective persuasion. Since tweaking computers isn't your priority . . . . Your ideas, boldly advanced, can move the world. But, you must get them to your audience. After all, they aren't mind readers.[223]

Here, the computer is more than an instrument of communication. It promises the consumer more effective communication and persuasion; it promises people listening and things happening; it promises control and power simultaneously as it promises an end to walls and oppression; and this promise is extended to all, regardless of whether one convinces using "sweet reason" or "imperial dictate." This rhetoric exemplifies the ena-

220. WIRED, July 1996, at 2.
221. *Id.* at 2-3.
222. *Id.*
223. *Id.* at 3.

bling ability of technology-as-prosthesis in its highest form, fantastically doing battle, just your technology and you.

The aura and erotisization of control and power evident here are fundamentally embedded in gendered formulas of human-technology interfaces. The historical gendering of these fantasies links writing to agency and to power and has had lasting consequences. The erasure of the body-machine interface, first through the channel of the female body-machine writing complex and then through marketing strategies such as this Hitachi advertisement has been a key factor in the development of a common sense that has propagated the invisibility of RSI in courts, national statistics and worker's compensation. Until courts are able to grasp the social-material genealogies that gender products, women and men will continue to find themselves painfully out of luck in products liability suits.