"Technological Modernization and the Social Role of Women"

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Whereas many have undertaken to explain the modern social freedoms and economic opportunities of women in terms of the essentially political process of throwing off the patriarchal bondage of men (as represented by restrictive laws and oppressive social attitudes), in this paper I suggest that the *necessary precondition* for the experience of unprecedented social, economic, and political liberties by women in the twentieth and twenty-first centuries rests squarely on the development of modern technologies and the marketing of products that have freed women from the ancestral burdens of womanhood. In other words, unlike the vast majority of introductory American history textbooks and writings on women that leap immediately from accounts of unrequited female toil and masculine domination to political explanations for the emancipation of women from such ancestral obligations, I suggest that modernizing inventions and free markets have provided the primary basis upon which women have come to enjoy vastly greater opportunities and personal liberties than they could possibly have had prior to industrialization. In other words, women's "liberation" is at root a scientific and economic phenomenon as opposed to a political one--although political pressures certainly hastened some advances--as, for example, the women's suffrage movement did in promoting the adoption of women's voting rights amendments on the state and national levels.

In 1999, Stephen Hawking, the famous physicist and cosmologist, made a comment that corroborates my thesis with regard to women when he made the observation that "[t]he world has changed far more in the past 100 years than in any other century in history. The reason is not political or economic but technological--technologies that flowed directly from advances in basic science." And Elizabeth Cady Stanton, the pioneering feminist, had it right over a century ago

GROWTH OF USE OF ELECTRICAL MOTORS IN HOUSEHOLD MACHINERY, 1900-1928

1900

Two bicycles	$70
Wringer and washboard	$5
Brushes and brooms	$5
Mechanical sewing machine	$25
Total	$105

1928

Automobile	$700
Radio	$75
Phonograph	$50
Washing machine	$150
Vacuum cleaner	$50
Electric sewing machine	$60
Other electrical equipment	$25
Telephone (per year)	$35
Total	$1,145

From Paul Carter, *Another Part of the Twenties*, New York, Columbia University Press, 1977.

when she said, "Is it . . . consistent to hold the developed woman of this day within the same narrow political limits as the dame with the spinning wheel and knitting needle occupied in the past? No, no! *Machinery has taken the labors of woman as well as man on its tireless shoulders; the loom and the spinning wheel are but dreams of the past; the pen, the brush, the easel, the chisel, have taken their places, while the hopes and ambitions of women are essentially changed."* Stanton clearly saw the essential role of technological modernization in laying the basis for the considerable freedoms and opportunities that women have come to enjoy in twentieth and twenty-first centuries.[1]

Consider the following. Before the Industrial Revolution of the late eighteenth and nineteenth centuries, the vast majority of women would have had *of necessity* to do the following tasks:

(1) manufacture at home most of the cloth and clothing worn by her family;

(2) help to garden to raise food for her family; (3) prepare all food in her home *from scratch* (there were no such things as mixes, or prepackaged, frozen, or canned food), *or* shop daily for food in city markets in addition to manual preparation; (4) conceive children, if fertile, from the onset of sexual relations--usually within marriage--until menopause, death of husband or herself, or other intervening disruption of sexual relations; (5) bear all children vaginally and risk death in childbirth--serious complications arise in about one in one hundred births;[2] (6) experience the death of one or more of her children from common childhood and other illnesses (such as colds, flu, diphtheria, pertussis, smallpox, yellow fever, typhoid, and pneumonia); (7) do all household cleaning and preparation by hand; (8) do all washing of clothes, dishes, and household items by

[1] Steven Hawkings, "A Brief History of Relativity, *Time*, December, 31, 1999; Elizabeth Cady Stanton, "The Solitude of Self," *American Heritage*, November, 1999 (emphasis in original).

[2] My wife Nancy Derr's comment based on over twenty-five years of prenatal, nursery, and pediatric nursing experience.

hand; (9) supervise the training of all of her daughters until marriage and her sons to about seven years of age, and do most of the so-called "early childhood education" the family might see fit to do; and (10) be dependent on her husband for material support beyond food and goods that she and the family manufactured for themselves. Thus, by her efforts a woman in the preindustrial and premodern world made extremely valuable contributions to the material, personal, and social wellbeing of her family.

By the early 1800s and as a result of industrialization, which began in England in the 1760s and in the United States shortly after its inception, changes in women's material relations began in earnest. As Andrew Sinclair put it in his book *The Emancipation of the American Woman:* "The accumulation of money and the use of servants allowed the growth of a new class of leisured women . . . ." This relatively small group of Northeastern upper middle-class women, blessed with Irish servants, "the wealth of husbands or fathers," and sufficient free time from the burdens of the household became those women most involved in the temperance, anti-slavery, and other reform movements active prior to the Civil War. These same women also involved themselves increasingly in the women's rights activities which took shape in the late 1840s and beyond. Yet it is important to note that it was *the wealth produced by industrialization* and trade that increasingly allowed these women to pursue activities outside the home.[3]

Such accumulation of wealth as well as increasing interest in the education of women led by the 1830s to fledgling opportunities for college education of women. For example, several colleges, including Oberlin College in Ohio, offered a coeducational curriculum and the first all female college, Georgia Female College (now Wesleyan College in Macon, Georgia),

[3] Andrew Sinclair, *The Emancipation of the American Woman* (New York: Harper and Row Publishers, 1965), xi, xix.

opened its doors in 1836. By 1900, over 140,000 young women were receiving college educations, constituting 39.6 percent of all college students enrolled.[4]

Within social orders lower than the middle classes, unmarried women as early as 1807 entered the cash economy by virtue of drawing wages as workers in the new cotton spinning mills that sprung up in New England as a result of the American embargo on British goods leading up to the War of 1812. Although at the time these wages were controlled to a great extent by these girls' fathers prior to their marriages, the precedent--and freedom--of women drawing cash wages was set.

Over the course of the nineteenth century, birthrates also dropped. Whereas the mythical average American woman in 1800 experienced 7.04 live births during her lifetime, by 1900 the average of live births per woman had dropped to 3.56, a decrease to roughly a half of the birthrate just a century before. And, of course, an increasingly individualistic and egalitarian understanding of politics and social relations since the 1820s encouraged these women to pursue greater political rights and participation. An independent legal position for women was also beginning to be recognized in that by 1848 seventeen of the thirty states had passed statutes giving women legal capacities independent of their husbands.[5]

However, during the nineteenth century most women in the United States and Europe remained *of necessity and by preference* in predominantly domestic roles--i.e., they worked at home and raised children--and held social and political status distinctly subordinate to the public positions of their husbands, who, in Britain and the United States in particular, had fully gained the right to vote and had achieved general equality before the law.

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[4] Marrin, *et al*., *Liberty, Equality, Power: A History of the American People*. Concise Second Edition (New York: Harcourt College Publishing, 2001), 552; Samuel Luttrell Akers, *The First Hundred Years of Wesleyan College, 1836-1936* (Macon, Ga.: The Beehive Press, 1976), 3-14.

Important changes in technology in the early twentieth century, however, lay the basis for great changes in the social roles of women for the remainder of the twentieth century. A critical set of technological changes coalesced around the turn of the past century to set the stage for the realization of a vastly different social role for women in the twentieth century and beyond.

First, the automobile appeared. In 1903 Henry Ford sold his first motor car. Because of the expense of producing the early automobiles, he raised his prices in subsequent years only to find that sales dropped. In 1907 he experimented with lowering his price, and sales and revenues rose. Thus, Ford learned an important and abiding truth about a modern economy: a smaller unit profit on a large number of sales means larger revenues--and, consequently, a larger market share. Ford thereafter vowed, "I am going to democratize the automobile[.] When I'm through everybody will be able to afford one, and about everyone will have one." Following the example of meatpackers who used an overhead trolley to move animal carcasses from one station to the next, Ford devised an assembly line at his factory in Highland Park, Michigan, in order to manufacture cars. By 1925 his plant was turning out one new automobile for every ten seconds of the working day! During the 1920s the number of automobiles owned by Americans trebled from eight million to twenty-three million. (Now automobile registrations in the United States top 131 million!) The point of all this is that the personal mobility which we all take for granted and depend upon in the twenty-first century is a direct outgrowth of these technological and economic innovations. Limitations on travel and on freedom of movement would particularly

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[5] Birthrates are from my class notes, probably taken from Norton, Katzman, et al., *A People and A Nation: A History of the United States* (Boston: Houghton Mifflin Company, 1986); Paul Johnson, *Birth of the Modern:* (New York: HarperCollins Publishers, 1991), 474-477.

affect women in the absence of the automobile powered by the internal combustion engine. They remained at home.[6]

The second great liberator of women from ancestral labors and obligations was electricity and the electric motor. Again, Andrew Sinclair makes the point that the electric motor has "given to women the strength, through electrical power, that their bodies have not been trained to have. In this way, the machine has given the women something of the strength of the man, and the man something of the leisure of the woman." Electricity became commercially available in American cities beginning in the 1870s and, based on the electrical experimentation of Michael Faraday carried on in the 1820s, the electrical motor became a ubiquitous, practical tool of everyday life by the 1920s.[7]

The revolutionary implications of the electrical motor for women is best seen in an illustration taken from an article that appeared in a 1928 edition of *Survey* magazine. In the article, the author, Eunice Fuller Barnard, contrasts manufactured goods that a typical American family owned in 1900 with what a similar family owned by 1928. [*Refer to overhead*] In 1900, an average family claimed ownership of two bicycles worth $70, a wringer and washboard purchased for $5, brushes and brooms valued at $5, and a mechanical sewing machine worth $25, for a total of manufactured household tools of $105. Less than thirty years later, by 1928, a typical middle-class family lay claim to an automobile of $700 in value, a radio costing $75, a phonograph valued at $50, an electrical washing machine purchased for $150, a vacuum cleaner for $50, an electric sewing machine for $60, a telephone costing $35 (per year), and other electrical equipment valued at $25, for a total cost of $1145. Note that in 1928, seven of the

[6] The story of Henry Ford, including the quotation, I have paraphrased from class lecture notes taken from an anonymous American History textbook which I have since thrown away. Statistics on automobile registration are taken from "Trade and Transportation, Cars Registered in the U.S., 1900-98," in *World Almanac and Book of Facts, 2001*, Primedia Reference Company, 2001 (on the web in Lexis-Nexis Academic Universe).

eight categories of manufactured equipment used in the household were powered by electricity and four were explicitly operated by the use of electric motors. Increasingly, muscle labor, that hallmark of premodern work, was replaced with labor by machinery in the home, thus easing the muscle labor of women working at home. Two of the eight categories of electrical equipment, radio and telephone, directly provided communication outside the home, broadening women's access to news and information. The electrical marvels of phonograph and radio also acquainted women increasingly with the wider worlds of culture, entertainment, and news, changing and enlarging their understanding of the outside world. Earlier in the 1890s, the penny press, which produced newspapers at a penny per copy, had also helped to open these same worlds to working class men and women.[8]

The final and perhaps the most pivotal technological alteration in the lives of women that was becoming available by the 1920s was birth control. Although women for millennia had experimented with various forms of contraception, efficient modern forms appeared just before World War I. For example, as early as 1880 rubber condoms appeared, soon to be followed by flexible diaphragms and cervical caps. By the turn of the last century, male and female sterilization (in the forms of vasectomy for males and tying of the Fallopian tubes in women) first became available. By the 1920s birth control pioneers like Margaret Sanger in the United States and Marie Stopes in Great Britain opened birth control clinics to advertise and dispense birth control information and paraphernalia. Though often controversial, birth control methods quickly were adopted by increasing numbers of women. (Parenthetically, hormonal regulation of

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[7] Sinclair, *Emancipation*, 363-4 (quotation); Johnson, *Birth of the Modern*, 554-5.
[8] Illustration taken from class notes, which itself is derived from Paul Carter, *Another Part of the Twenties* (New York: Columbia University Press, 1977)

human fertility in the form of various types of birth control pills were introduced only after 1960.)[9]

The implications of modern methods of birth control were profound. For the first time in history, men and women could reliably predict and plan the arrival of their children. This, combined with continually dropping birth rates, allowed women much more freedom and leisure to engage in pursuits outside the home and allowed families to focus their resources, as Gary Becker's studies of birthrates indicate, on the quality of their fewer children as opposed to spreading their time and scarce resources over larger numbers of offspring. Access to birth control technologies allowed women to plan, control, and limit the primary and most time- and energy-consuming aspect of female life: the bearing and raising of children. Only after advances in birth control came the possibility of significant political, social, and economic change for women.[10]

Let me insert some caveats at this point. My paper obviously oversimplifies the vast complex of technological and social changes that women have experienced over the last two centuries and fails to deal with other aspects of modernization and industrialization that have had profound effects on the social roles, perceptions, and behaviors of women. However, I have carefully chosen my main lines of argument, for it seems impossible to me that the great changes in the roles of women over the past century would have been possible without technological modernization in the three critical areas of electrification and the electric motor, the internal combustion engine, and birth control. Without these innovations, household work would necessarily be done in the home by muscle labor of women who were required by childbirth and

[9] "History of Contraception," at www.mariestopes.org.uk/history_of_contraception; Sinclair, *Emancipation*, xxviii; "Birth Control" in *Encyclopedia Americana* , Volume 4 (Danbury, Conn.: Grolier Publishing, 1991), 4.

its attendant responsibilities to remain at home. These women, furthermore, would generally have larger numbers of children who needed their care and attention, thus restricting women to the domestic sphere for the majority of their adult lifetimes. In addition, the lack of reliable, fast transportation provided by the internal combustion engine would insure that women stayed at home. Women would thus be required to produce more household products at home because of greatly hindered access to manufactured goods and conveniences. In the absence of technological innovation and industrialization--not to mention the wealth and convenience produced by both--arguments for greater economic and political rights and social and personal opportunities for women would receive scant hearing by either men or women---however attractive those arguments might be in abstract terms.

In chapter XXI of his *magnum opus*, *Human Action*, Ludwig von Mises made the same case indirectly and more generally when he said: "The factory system inaugurated a new mode of marketing as well as production. Its characteristic feature was that the manufactures were not designed for the consumption of the well-to-do only, but for the consumption of those who had hitherto played but a negligible role as consumers. Cheap things for the many, was the objective of the factory system." *The many*, prominently including women, became participants in the modern economic, social, and political order in ways unimaginable two centuries ago. One result of this industrialization and mass marketing of new labor-saving devices was the release of women from the ancestral burdens which they for millennia have borne with perseverance and at considerable sacrifice. We ought to be thankful to such women for their labors. And we ought

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[10] For Gary Becker's intriguing economic studies of the relation of birth rates to parents' investment in children see Becker, *A Treatise on the Family*, Revised Edition (Chicago: University of Chicago Press, 1993), pages; the last sentence is a paraphrase of Sinclair, *Emancipation*, xxxviii.

also to thank the inventors, industrialists, and entrepreneurs who removed much of mankind, including women, from the primordial grip of poverty.[11]

All of this argumentation is not meant to suggest that women have not experienced discrimination in the past; they have. But the historical realities argue that women could not even begin to enjoy the freedoms and privileges they now fall heir to without the scientific and technological advancements described here and the marketing of those advancements within the free markets of free nations.

[11] Ludwig von Mises, *Human Action* (Online edition) , 620, www..mises.org/humanaction (quotation).