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DISSENTING VOICES: NEW REPRODUCTIVE TECHNOLOGY AND FEMINIST ANALYSES

by

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Bachelor of Arts, Simon Fraser University, 1986

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ABSTRACT

New reproductive technologies (NRT's) have extended dramatically the scope of human control over, and intervention in, the process of reproduction. Occurring in the wake of longstanding controversies about access to abortion and the status of the fetus, the widespread clinical application of techniques, such as *in vitro* fertilization, has generated vigorous debate.

The dominant view is that NRT's represent beneficial medical advances in the treatment of infertility. In contrast, liberal, radical, and socialist feminists argue to varying degrees that, in the hands of a male-dominated medical profession, these techniques threaten women's reproductive health and autonomy. Drawing upon a cross-section of prominent feminist writings, originating primarily in Canada, the U.S. and Great Britain, this thesis examines the underlying theoretical and ideological assumptions which inform these divergent feminist positions.

While a critique of patriarchy and/or capitalism is central to most feminist theorizing about the meaning of NRT's for women, an equally critical analysis of technology is lacking. Reliance upon oversimplified views of technology — as triumph, threat or neutral tool — obscures the complex relationship between technological and social change. In contrast, this thesis argues that technology needs to be understood as an inherently political phenomenon which is biased toward the production and reproduction of existing power relations. Women's increased control over the use of NRT's is therefore a necessary, but insufficient, condition for reproductive autonomy; women must also be involved in decision-making about what kinds of technologies will be developed and how they will be designed.

This thesis examines four feminist responses to NRT's with respect to the role of technology and the extent to which feminists believe NRT's should intervene in the reproductive process. The four feminist positions are: pro, moderate, non and anti-interventionism. The thesis finds that those radical and socialist feminists who adopt an anti-interventionist position come closest to articulating the "technology as politics" perspective. Further, the thesis concludes that anti-interventionist opposition to NRT's is a crucial strategy for the present which allows for the longterm re-shaping of the methods, projects, and aims of science and technology.

DEDICATION

In memory of Margaret Lowe Benston (1937 - 1991)

Maggie enabled her students to think critically about science, technology and society. This approach, however, never impeded her ability to share a fascination and love for the workings of science — from the genetics of calico cats to the practice of using scientific knowledge and skills in socially responsible ways. For her inspiration, uncommon wisdom, friendship, and special encouragement to women, this thesis is dedicated to Maggie.

ACKNOWLEDGEMENTS

This thesis began as a conversation with Maggie Benston. Having just read Margaret Atwood's novel, The Handmaid's Tale, I was chilled by the possibility of such a dystopian future and Maggie agreed that I need look no further for a thesis topic. For her unfailing encouragement I am endebted to Maggie.

As this thesis progressed from an amorphous idea to an all but consuming endeavour, many people offered assistance and support. In particular, I wish to thank my supervisory committee. Arlene McLaren was exceedingly patient with my doldrums and unexpected turns in thinking, and also deserves special mention for her steady guidance in the art as well as the mechanics of writing. Ellen Gee read numerous drafts with a careful, critical and always sympathetic eye. Also, for his fresh appraisal and enthusiastic interest in this work, I thank my external examiner, Brian Burtch.

During the research and writing of this thesis, I have been warmed by the expansive interest and enthusiasm of many other people at Simon Fraser University. Amongst these people, two in particular have given more than I know how to express. For listening as I rambled, for reading, commenting, encouraging in every possible way and offering a synthesis of what I was sometimes unable to articulate, I wish to give special thanks to Laurine Harrison. For his thoughtful reading of the entire thesis, as well as his delightful messages from cyberspace, I thank Nick Witheford. Also, for discussing at length an early draft of Chapter Three, I thank Corlann Bush. For her generous lending of obscure articles and papers, and for introducing me to Corlann Bush, I thank Ellen Balka. Further, students and friends too numerous to list, have been a responsive and engaging audience on the several occasions in which I was invited to give guest lectures.

Within the Department of Sociology and Anthropology, there are several others who deserve special mention; Chris Ward for her generous support both as Graduate Secretary and friend; Hamish Dickie-Clark for his lively observations of feminist theory; Gladys Durksen for clipping a veritable mountain of newspaper articles about new reproductive technologies; Jean Jordan for her uncanny ability to know when I needed more money in my computer account; and Linda Elliott for her ever helpful presence in the general office. In addition, I wish to thank Gary Teeple, Marilyn Gates and Noel Dyck who have given time and attention to the often thankless task of chairing the departmental Graduate Studies Committee. Elsewhere, I am truly grateful to the Duty Consultants who answer the trouble line in Computing Services and to Margaret Sharon for her invaluable support with the otherwise unsupported "textform". Further, I wish to thank Charles Watts and the staff of the interlibrary loans office.

During my graduate program, I also worked with the Graduate Issues Committee (Simon Fraser Student Society) and thus, I have had the benefit of a collective analysis of the particular rewards and frustrations of graduate study — my thanks to all past and present members of the committee. Also, for his steady stewardship as Dean of Graduate Studies, I thank Bruce Clayman. Further, I would like to acknowledge the financial support I have received through the Simon Fraser University Graduate Fellowship program.

Although this thesis is primarily a theoretical work, the ideas contained within it find their roots in the the everyday lives of those most closely affected by the development and use of new reproductive technologies. Working with and observing two community-based groups has allowed me to place this thesis in the real world. Hence, I would like to express my gratitude to members of the Vancouver Infertility Peer Support Group for their extended invitation to meetings and discussions. Also, I wish to thank the members of the Vancouver Women's Reproductive Technologies Coalition; together many of us prepared and presented briefs to the Canadian Royal Commission on New Reproductive Technologies.

Finally, an extended family on both coasts has done much to inspire and sustain me throughout my graduate studies. Offering uncluttered wisdom as well as a regular place at her dinner table was Margaret Harrison — to her, I owe a very special thanks. Also, I thank my parents, Margaret and Albert Cox, for unflagging support and faith in their sometimes wayward and stubborn daughter; my grandfather, Douglas Dobson, for giving real meaning to the notion of life-long learning; my sister Kim for many a quiet retreat in Saanich; and, my niece Tia for delightfully reminding me why it is that children are so important.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION: DISSENTING VOICES

> He wants to interfere with his instruments, while I struggle with nature, with myself, with my child and with the meaning I put into it all, with my desire to give and to hold, to keep and to lose, to live and to die. (Anais Nin, "Birth", *Under a Glass Bell*)

Recent advances in new reproductive technology have dramatically increased the scope of human control over, and intervention in, the process of reproduction. From cryopreservation of eggs, sperm and embryos to *in vitro* fertilization and embryo transfer, the biological processes involved in fertilization and conception are no longer the unalterable facts of life. New reproductive technology and genetic engineering are rapidly changing the way in which we are conceived and enter the world. Indeed, new reproductive technologies provide the instruments with which we fashion the demise of one thing all of humanity has always had in common: conception within a woman's body.

No longer awed by the "gee whizzery" of "test-tube babies",[1] the tide of mainstream public opinion has turned from fear of a brave new world to the somewhat casual acceptance of external fertilization. The early stages of exploratory research, earmarked by the race to achieve the world's first successful *in vitro* fertilization pregnancy,[2] have passed and the practice of *in vitro* fertilization has become consolidated through widespread clinical application. Now, like "an opening accordion", basic *in vitro* fertilization is being expanded to incorporate options such as cryopreservation and embryo donation into existing programs and private clinics (Bonnicksen 1989).

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[1] The term "test-tube baby" is commonly used by the popular media to describe babies created through the assistance of in vitro fertilization techniques. This term is, however, objectionable to many feminist writers as it obscures women's agency (McNeil 1990) and may unduly stigmatize children (Bonnicksen 1989).

[2] Louise Brown, the world's first *in vitro* fertilization baby, was born in 1978 in Great Britain. Known as pioneers of the *in vitro* fertilization procedure, Robert Edwards and Patrick Steptoe (Louise's laboratory "fathers") were responsible for refining techniques in implantation, the last and most problematic stage of *in vitro* fertilization.

1.1 Opposing Viewpoints and Public Debate

In a world where biology[3] no longer defines the limits to reproduction, we are faced with questions of enormous social, legal, political and moral significance. With *in vitro* fertilization, a child could have as many as five different parents.[4] Which are the "real" ones? Do all people have an inalienable right to reproduce and, if so, does the state have an obligation to provide universal access to new reproductive technologies in order to assist those unable to have children by more traditional means? Are eggs and sperm property and should we allow scientific research to be carried out on embryos? These questions intrude into the most intimate and personal areas of life, sparking intense emotion and challenging firmly entrenched normative values concerning the creation and existence of life. Further, occurring in the wake of longstanding controversies around access to abortion and the status of the fetus, these questions also signify the public and political nature of reproductive decision-making. Thus, in Canada and elsewhere, rapid advances in, and increasingly widespread use of, new reproductive technology have prompted vigorous debate amongst a wide audience.[5]

In the view of Dr. Steptoe and many other practitioners of *in vitro* fertilization, it is unfair to deny the infertile the opportunity to reproduce; and thus, modern science should facilitate the development and use of techniques in assisted reproduction. Arguing that there

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[3] Biology is used here to mean the physiological state of being, although biology is also commonly recognized as a scientific discipline. As McNeil notes, "the double significance of the term can be confusing and it often deters us from thinking about the social construction of biological knowledge" (1990:13).

[4] That is, a genetic mother and father, a gestational mother and two social parents.

[5] Due to report in the fall of 1991, the Canadian Royal Commission on New Reproductive Technologies has a mandate to examine all viewpoints and issues surrounding the "high-technology reproduction of human life: artificial insemination, *in vitro* fertilization, embryo transfer and surrogate parenthood" (Globe and Mail April 4, 1989). Given the magnitude of this mandate, it is highly likely that the Royal Commission will not complete its report until sometime in 1992.

is a moral imperative to use technology for the betterment of the human race. Steptoe believed that our humanness is ultimately dependent upon our ability to intervene in and control nature; not to do so is immoral (CBC Radio, July 30, 1987).[6] Nonetheless, there are also a number of physicians who are critical of the current use and development of new reproductive technology. Some have been outspoken about this and others, such as Dr. Jacques Testard have called a halt to research projects instrumental to future development and application of new reproductive technology and genetic engineering (Conseil du Statut de la Femme 1988).

In contrast to the view that new reproductive technologies represent beneficial advances in the treatment of infertility, techniques such as *in vitro* fertilization are now at the vortex of growing religious opposition to actions perceived as a threat to the sanctity of human life, from conception onward.[7] Similarly uncomfortable with the advent of new reproductive technologies, the anti-abortion movement has spoken out against embryo freezing, the use of embryos for research purposes and the selective termination of fetuses based upon sex or other genetic characteristics. Ethicists and theologians, such as Leon Kass (1985), articulate concerns about the scientific domination of nature and the need for a "more natural science" capable of harmonizing with natural processes such as reproduction.[8] Trade union activists voice fears about the potential abuses of genetic information as a form of social control (B.C. Federation of Labour 1990). Lawyers and legal scholars debate reproductive rights issues, question whether or not gametes and embryos are property and attempt to define what will serve the best interests of the child. Further, some of the public objects to governmental

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[6] Dr. Steptoe passed away in 1988, only a few months before Louise Brown's tenth birthday.

[7] For instance, in 1987, the Vatican released "Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation - Replies to Certain Questions of the Day". This document denounces fertilization involving the use of third parties and condemns the use of *in vitro* fertilization because it is "immoral to produce human embryos destined to be exploited as disposable biological material" (The Vancouver Sun March 4, 1987).

[8] This theme also resonates within feminist thought. See, in particular, the work of Carolyn Merchant (1980).

measures which commodify and commercialize reproductive products and services.[9]

In summary, advances in our technical ability to control reproduction have been criticized from a number of perspectives. However, it has only been feminists and reproductive rights activists who have focused attention on what these technologies may mean for women and the social institution of motherhood. In general, these recent feminist responses to developments in reproductive technology have been negative, "ranging all the way from a generalized sense of unease to out-and-out active opposition" (Williams 1986b:3). Stressing that we must move beyond the dominant therapeutic paradigm, in which new reproductive technologies are primarily seen as beneficial and medically necessary interventions, feminists share the view that the current practice of *in vitro* fertilization has corresponding, and gender-specific, social implications which must be brought to the forefront of debate. Beyond the level of describing some of these concerns, however, feminists diverge in their analyses of how new reproductive technologies may be liberatory or oppressive for women and what strategies ought to be adopted in attempting to mitigate potential harm and/or facilitate possible benefits.

Fearing that the expanding use of these techniques will facilitate the increasing medicalization of reproduction, some feminists argue that *in vitro* fertilization and related techniques of cryopreservation and embryo transfer will allow doctors and the state to expropriate women's reproductive autonomy. In a worst case scenario, women will have little remaining control over the process of reproduction. Technological expertise, in the hands of a male-dominated medical profession, will usurp women's ability to define the terms and experience of reproduction. Other feminists, more confident in our abilities to manage the new reproductive technologies in beneficial ways, seek a regulatory framework which ensures equitable access to these techniques and secures women's reproductive autonomy.

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[9] As The Vancouver Sun reports, Canadians are now being charged GST on donated sperm (February 8, 1991).

In response to these concerns, this thesis departs from mainstream medical, legal and ethical perspectives to focus on the emergence and development of a spectrum of feminist views on *in vitro* fertilization and related conceptive techniques. As a starting point for this analysis, I build upon the traditional categories of liberal, radical, and socialist feminism in order to locate and describe some of the most significant theoretical and ideological assumptions underlying divergent feminist perspectives. Central to liberal, radical, and socialist feminist theorizing about the meaning of new reproductive technologies for women is a critique of patriarchy and/or capitalism. An equally critical analysis of technology, however, is lacking. Reliance upon oversimplified views of technology — as triumph, threat or neutral tool — obscures the complex relationship between technological and social change.

Drawing upon the sociology of technology, I stress that popular and feminist views of technological change are both embedded in, and reflective of, broader assumptions about the nature of human agency and our limited ability to intervene in and alter the projects of science and technology. Hence, in rejecting popular views that technology is either a threat, a triumph or a neutral tool, I seek a more comprehensive and nuanced theoretical perspective on technological change. Through this fourth way of thinking about technology, as an inherently political phenomenon, it is possible to question how knowledge and values are given a material existence through technology such that technological artifacts and processes are inherently biased toward the production and reproduction of existing social inequities.

As a rather crude typology, the traditional categories of liberal, radical and socialist feminism prove to be limited in their usefulness when it comes to examining ways of thinking about technology. Hence, based upon the work of Donchin (1986), this thesis develops a more comprehensive framework. In particular, this framework allows us to examine four feminist responses to new reproductive technologies with respect to the role of technology and the extent to which feminists believe that new reproductive technologies should intervene in the reproductive process. These four positions are: pro, moderate, non and

anti-interventionism. In short, this thesis finds that those radical and socialist feminists who adopt an anti-interventionist position come closest to articulating the technology as politics perspective. Anti-interventionism, rather than being an unrealistic anti-technology stance, provides the most viable analysis for feminists concerned about new reproductive technologies.

Who will benefit from the use of new reproductive technologies such as *in vitro* fertilization? Will they in the long run exacerbate women's oppression or will they provide women with a new source of reproductive choice? This work does not pretend to provide a definitive answer. Few, if any, new technologies could be described as being entirely good or bad. Further, as McNeil (1990) argues, technological change is future-oriented and predictions about the future are, at best, well-informed hunches. As a consequence, this work will be restricted to looking at only those techniques in artificially assisted conception which are currently in use or on the immediate horizon.

Many of the newest forms of technological intervention in reproduction are highly complex. Some are designed to assist in conception; others enable physicians to monitor and influence the development of the fetus. The following section of this chapter provides an overview of recent developments in reproductive technology; describing in some detail the techniques of *in vitro* fertilization and embryo transfer and the social and medical context in which they are used. Subsequent sections in this chapter set out the basic tenets of liberal, radical, and socialist feminist perspectives and begin to outline the contours of feminist debate about new reproductive technologies. This chapter, therefore, lays the basic groundwork for subsequent chapters which examine how various feminist perspectives on new reproductive technologies differ in their analyses of the relationship between technological and social change.

1.2 Categories of Reproductive Technology

The term **reproductive technology** encompasses a broad spectrum of pharmaceutical, surgical and other interventions in the process of reproduction. While recognizing that the links between all reproductive technologies are important, it is, however, useful to distinguish between the wide array of techniques used to inhibit, assist, monitor, modify and/or control the creation and development of new life.[10] Broadly grouped into five categories, the first and most familiar category of reproductive technology is **contraceptive technology**, that is, technologies designed to prevent the development of new life (e.g., contraception, abortion and sterilization). A second category, **birthing technology**, is concerned with the "management" of labour and childbirth (e.g., techniques to induce labour, use of the fetal monitor and forceps). A third and rapidly growing category, **fetal technology**, includes obstetric technologies which trace or modify fetal development (e.g., ultrasound, amniocentesis, and surgery conducted on the fetus in utero). Coupled with developments in a fourth group of reproductive technology, **genetic engineering**,[11] these technologies focus increasing attention on the elimination of inheritable defects and the potential for selection of "desirable" traits. Although not yet widely practiced with humans, techniques in genetic engineering and pre-conceptive sex selection may become increasingly attractive to those seeking to create "custom-made" children.

The final category of **conceptive technology** encompasses a variety of techniques in artificial (or assisted) reproduction, commonly employed as a means of assisting conception among the infecund and subfecund population.[12] Conceptive technologies range from relatively

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[10] Stanworth (1987b) argues that it is important to specify exactly which type of reproductive technology is being discussed; otherwise we run the risk of overgeneralizing. However McNeil (1990), Achilles (1988) and numerous other feminists stress that we must not lose sight of the links between all forms of reproductive technology.

[11] This category could be included with the third (above), although it is distinctive in that any modification or selection of gametes and/or embryos occurs prior to implantation in the mother.

[12] These terms are used in order to distinguish between those who suffer from reduced

simple procedures which require little or no medical intervention (such as artificial insemination)[13] to highly sophisticated medical procedures (such as *in vitro* fertilization, gamete intrafallopian transfer and embryo transfer).

Commonly referred to in popular and feminist literature as the **new reproductive technologies**, this last category of conceptive technology has, more than other categories of reproductive technology, generated intense interest and debate. Thus, it is important to point out that although new conceptive technologies have garnered the limelight, this category of reproductive technology is routinely used in conjunction with one or many others. For example, a woman pregnant through *in vitro* fertilization is likely to undergo ultrasound and, in many cases, a caesarian section. Similarly, some types of contraceptive technology, such as the IUD (intrauterine device) or the birth control pill, may cause difficulties resulting in the inability to conceive (Office of Technology Assessment 1988) and, hence, create the need for some form of assisted conception. Further, as many feminists and other concerned social critics have argued, the conceptive technologies provide researchers with increased access to eggs, sperm and embryos — a crucial factor in the development of techniques in genetic engineering.

1.3 In Vitro Fertilization and Related Techniques

Briefly, *in vitro* fertilization involves the surgical collection of multiple eggs produced under the influence of powerful fertility drugs which hyperstimulate the ovaries. These eggs

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[12](cont'd) fertility (the subfecund) and those who are, without artificial intervention, unable to reproduce. The term "infertility" is commonly used to mean both subfecundity and infecundity.

[13] One could take exception to the inclusion of artificial insemination within the spectrum of new reproductive technologies as it need not really be a medical practice at all and the technology utilized may be as simple as a turkey baster. However, as the medical profession currently controls the practice of artificial insemination and artificial insemination is often used in conjunction with embryo transfer, I have chosen to leave it within this category.

are then combined with sperm in a petrie dish and any or all resulting embryos are placed in the woman's uterus. This technology was originally used as a method of by-passing dysfunctional fallopian tubes although it is now much more widely applied in the treatment of other causes of infertility (such as endometriosis or low sperm density). **Gamete intrafallopian transfer** is a related technique in which the surgically collected eggs are combined with sperm and immediately placed in the woman's fallopian tubes, the natural site for fertilization. Both techniques may involve egg or sperm donation by a known or anonymous donor, and *in vitro* fertilization may be used in conjunction with **cryopreservation** (freezing) of embryos for future use or donation.

A third technique, known as **embryo transfer**, involves placing the fertilized egg of one woman into the uterus of another. This usually occurs after artificial insemination of the woman who is donating her egg and thus embryo transfer is quite different from *in vitro* fertilization in that fertilization is **in vivo** (in the woman's body) as opposed to **in vitro** (in glass). The embryo transfer is achieved by lavage (or flushing of the embryo from the egg donor's womb) and subsequent implantation in the infertile woman's womb. A variation of this, **surrogate embryo transfer**, allows a woman who is able to conceive but unable to bear a child, to have her embryo transferred to the uterus of a host or gestational mother (also known as a surrogate mother).[14]

Recent advances in the field of genetics have provided the basis for diagnosis of many inheritable diseases and new techniques in embryo vivisection allow clinicians access to chromosomal material at a very early stage in embryonic development. Thus, at the pre-implantation stage of *in vitro* fertilization, the embryo may be screened for such characteristics as sex or the presence or absence of certain known indicators of disease.

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[14] The term "surrogate mother" is actually a misnomer. It is commonly applied to mean that a woman has agreed by contract to bear a child for an infertile couple. The "surrogate" contributes her own ova and is inseminated with sperm from the father-to-be. She carries the pregnancy to term and thus unlike the surrogate embryo transfer gestational mother, she is the biological and gestational mother.

Coupled with the use of cryobanking, the technology of *in vitro* fertilization might also be employed as a technological solution to the dilemma of the woman who wants her own biological children but who cannot afford time away from a demanding job or career. This increased flexibility in life-planning might be further facilitated by the use of a "surrogate mother", should such contracts be considered legal.[15]

The advent of new conceptive techniques such as *in vitro* fertilization has dramatically changed the clinical treatment of infertility[16] both for physicians and for patients (Jones 1986). Once an area of low prestige, the treatment of infertility is now at the forefront of a highly lucrative, challenging and specialized field. Further, while adoption was once the only available alternative to involuntary childlessness, infertile couples may now utilize an unprecedented array of diagnostic and treatment-oriented procedures which promise the potential for production of their own biological offspring.[17]

At present, there appears to be great demand for access to new conceptive technologies such as *in vitro* fertilization. Aral and Cates (1983) suggest a number of factors which help to account for this situation. First, most statistics suggest that although the overall incidence

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[15] At present Canada has no law concerning pre-conceptive contracts for the production of children. The Ontario Law Reform Commission, in its Report on Human Artificial Reproduction and Related Matters (1985), has however recommended that such contracts be legal and that payment to the "surrogate mother" be subject to the approval of the courts. In Germany, Great Britian and Australia, legislation has been introduced to ban and criminalize the commercial practice of surrogate motherhood.

[16] Infertility is medically defined as the inability to conceive amongst non-surgically sterile couples who have had unprotected intercourse for a period of at least one year. However, fifteen percent of normal fertile women take more than one year to conceive and thus may be mistakenly categorized as infertile. Further, it is often assumed, in the absence of a complete diagnosis, that infertility is due to a female as opposed to a male problem (Pfeffer and Woolett 1983).

[17] Approximately eighty-five to ninety percent of U.S. couples seeking infertility treatment are treated with conventional medical and surgical therapy which ranges from relatively simple procedures (such as pinpointing ovulation) to highly complex and sophisticated techniques (such as the delicate microsurgical repair of scarred fallopian tubes). Of the remaining ten to fifteen percent of infertile couples who could not be successfully treated by conventional means, a large number are now turning to the use of *in vitro* fertilization and gamete intrafallopian transfer (Office of Technology Assessment 1988).

of infertility has been relatively stable over that last two decades primary infertility, or childlessness, has increased and secondary infertility (in which individuals who have at least one biological child experience a later onset of infertility) has decreased.[18] The increase in primary infertility is largely attributable to delayed conception (due to prior use of contraceptives, exposure to sexually transmitted diseases or adverse environmental effects) coupled with delayed childbearing (as people experience age-related declines in fertility). Second, demand for new conceptive technologies is mounting because fewer healthy newborns are now available for adoption (due to improved access to abortion and increased social acceptance of single mothers).[19] Third, changed expectations concerning the amount of time it should take to conceive have resulted in more couples seeking early treatment of suspected infertility and, of those couples with diagnosed or unexplainable infertility, a greater proportion are financially able to undertake costly treatment.[20]

Finally, there are an increasing number of physicians providing infertility services in a more conducive social milieu. In Canada and the U.S., there has been growing demand from from a broad clientele for infertility services. At present, there are at least twelve clinics in Canada offering *in vitro* fertilization and/or gamete intrafallopian transfer and a number of

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[18] Infertility rates are widely disputed in the literature. Current estimates of the incidence of infertility vary dramatically according to individual populations. Recent American studies indicate that approximately eight and one-half percent of non-surgically sterilized couples (aged 15 - 44 years) experience infertility (Mosher 1987). Other sources (Gold 1985, Pfeffer and Woolett 1983) indicate that ten to fifteen percent of all couples in Western countries experience infertility. These higher estimates are often accompanied by the assertion that the overall incidence of infertility has dramatically increased in the last few decades. While this may be true, it must be recognized that we are now better equipped to seek medical solutions to infertility and thus are more prepared to recognize and discuss the problem. Hence, an overall increase in the incidence of reported infertility may simply reflect a population more anxious to acquire treatment.

[19] In B.C., couples who once waited less than two years now wait an average of four to five years for a Ministry of Human Resources adoption. Private adoptions, while on the increase, offer no guarantees and may occur almost overnight or never (Adoptive Parents Association 1987).

[20] In Canada the average cycle of treatment costs $3,500. With the exception of Ontario, this cost is not covered by medical insurance. In the U.S., *in vitro* fertilization may cost as much as $10,000 per cycle (1989 U.S. dollars).

these also offer, or plan to offer, embryo freezing (Brodribb 1988). Approximately 3,500 women have tried *in vitro* fertilization in Canada, resulting in 365 babies (Pappert 1988). Waiting lists are long and treatment cycles are often limited to two or three attempts. In the U.S., there are at least 169 sites offering *in vitro* fertilization and gamete intrafallopian transfer (Office of Technology Assessment 1988). Success rates for clinics vary widely; however, a recent survey conducted by The Globe and Mail found that of the twelve clinics in Canada offering *in vitro* fertilization, the most "successful" one had sent only thirteen per cent of all treated women home with a baby (Pappert 1988).

1.4 Feminist Perspectives

As participants in a highly public and increasingly controversial debate, those concerned with the impact of new reproductive technologies acknowledge that the cultural significance of these technologies is mediated by the popular media. Influencing and informing public opinion, the popular media has generated considerable interest in, and excitement about, the development of *in vitro* fertilization. However, as feminists and other social critics have pointed out, most of this coverage has focused upon medical and scientific "breakthroughs" with little corresponding attention given to the social meanings of these technologies (McNeil 1990). Noteworthy as a piece of critical journalism, the 1988 Globe and Mail survey (cited above) broke with an established pattern of popular media coverage of new reproductive technologies. Highlighting the low success rates of *in vitro* fertilization programs and indicating some of the potential risks to women's health, Pappert was acclaimed by women's health advocates for prompting the public to look beyond the dramatic newspaper headlines of miraculous advances in therapeutic treatments, special babies and their heroic white-coated laboratory "fathers".[21]

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[21] Some examples of popular media coverage include The Vancouver Sun, "Test-tube Twins a Thrill" (August 9, 1986) and "Frozen in Time: Putting Human Embryos on Ice Offers Second Chance of Baby" (May 6, 1989); New Woman "To Bear a Child: A Special

Initiating a broad campaign of research, publication and activism, feminists have focused public attention on the potential health risks, problems and social biases of *in vitro* fertilization.[22] Recognizing that recent developments in reproductive and genetic engineering have a profound social, political and economic significance for women, in particular, feminist contributions to the developing debate on new reproductive technologies have emerged as a strong, although diverse, critique of traditional medical, legal and ethical perspectives.

Historically, feminist struggle has been united by the attempt to secure women's full rights to bodily autonomy, including the right to prevent (through birth control or abortion) or to allow conception and childbirth (Ehrenreich and English 1978). Indeed, this fundamental concern has long been an important aspect of a vibrant and well-organized women's health movement. In general, this movement strives for a more holistic, woman-centred approach to health than is commonly practiced within traditional Western medicine. This broad vision incorporates the need to reclaim women's central and traditional roles as healers and midwives, participating directly in the design and implementation of health care strategies and reproductive support services. Emphasizing that women must have access to the knowledge and skills necessary for a greater degree of self-determination in health care, the women's health movement has challenged accepted norms for physician-patient relationships, and rejected the unnecessary medicalization of many aspects of life, including reproduction.[23]

Infertility and involuntary childlessness are, however, relative newcomers as topics of feminist analysis. Feminists have "largely focused on the consequences of using technologies developed to remedy infertility, rather than on the infertility experience itself" (Sandelowski

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[21](cont'd) Pregnancy" (February 1987); Science "The Baby Makers" (April 1985).

[22] Reproductive and Genetic Engineering is an international journal of feminist analysis recently established to examine topics surrounding recent developments in reproductive technology and genetic engineering.

[23] A central contribution to this goal, the Boston Women's Health Collective self-help manual Our Bodies, Our Selves was originally published in 1969 and updated in 1984.

1990:39). As a consequence, Sandelowski argues that "there is little to acknowledge the suffering of infertile women" and "there is little in their [feminist] discussions about reproductive technology or infertility that suggests real empathy with infertile women". Longstanding concern with the right to choose **not** to have a child has overshadowed what some consider to be the equivalent right or expectation: the right to have a child by assisted or artificial means when it might not otherwise be possible. Thus, feminists who endorse a pro-choice position on abortion appear to some to be inconsistent when they refuse to accept women's decisions to employ techniques such as *in vitro* fertilization. Reproductive freedom, as it is popularly understood, implies that a woman has the right to engage in, or refrain from, bearing children. In the words of one infertile woman (cited in Bailey 1989:128), "if you believe in pro-choice for abortion, I think one has to believe in pro-choice for embryo freezing." These tensions between some feminists and infertile women create a sense of "imperiled sisterhood" (Sandelowski 1990) and call attention to the need for revisions to feminist theorizing about individual women's agency in relation to this technology (Franklin and McNeil 1988).

Amongst feminists and infertile women, there is little consensus on what the expanding use and development of new reproductive technologies will mean for women and for the social institution of motherhood. Situated at the crossroads of technological and social change, the meaning of reproductive choice has become increasingly nebulous. On the one hand, infertile women seeking to use new reproductive technologies share with liberal feminists the faith that these techniques will ultimately enhance women's reproductive choice and freedom. On the other hand, some radical feminists predict that the "choices" offered by new reproductive technologies portend women's reproductive slavery. These two extreme positions situate the feminist debate on new reproductive technologies in the theoretical terrain of a familiar sociological question. To what degree are we able to exercise choice in rational decision-making and to what extent are we limited by the material and ideological conditions

imposed upon us? This question of social theory is crucial for understanding the implications of increased technological intervention in reproduction; further, it is central to all campaigns for women's liberation, whether reformist or revolutionary in nature.

Adequate social theory must retain the ability of human agents to act but only within a set of produced and reproduced circumstances. For feminists, this clearly invokes an appreciation of the sex, class, and race inequities which permeate social structures and practices, values, norms, and beliefs. At the level of individual action, feminists have described many ways in which men may circumscribe women's agency. Collectively, feminists have encountered obstacles which stymie efforts to alter fundamentally these gender-based inequities. Historically, women have not, however, been universally passive conduits for male dominance. Thus, at the outset, the notion of limited agency is essential, and, it is argued that this must be placed against the backdrop of existing and pervasive social inequities which act as constraints upon women's reproductive choices and options. As Gerson (1985:37) argues "[a] complete theory of women's behaviour must include how women themselves, as actors who respond to the social conditions they inherit, construct their lives out of the available raw materials."

Based upon a critique of patriarchy, feminists recognize to varying degrees that existing social conditions place constraints upon women's agency. Some feminists, however, have located the primary source of women's oppression in the biologically-based sexual division of labour. For instance, radical feminist Shulamith Firestone (1971:202) concluded that "the full development of artificial reproduction would provide an alternative to the oppressions of the biological family". Thus, nearly a decade before the first successful attempt to produce an *in vitro* fertilization baby, Firestone argued that reproductive technology held the key to women's liberation. Some years later, other radical feminists such as Corea (1985), Klein (1989), Rowland (1985), and Spallone and Steinberg (1987) argue that new reproductive technology perpetuates and exacerbates women's exploitation. Far from removing the biological basis for

the sexual division of labour, new reproductive technologies permit men, the medical profession and the state an unprecedented level of control over reproduction and motherhood. In contrast, U.S. lawyer and liberal feminist Lori B. Andrews (1989) has argued that biology is not destiny and that women are fully capable of exercising their reproductive rights and bodily autonomy by choosing to participate in surrogate motherhood arrangements and *in vitro* fertilization.

The dilemma stands: enhanced freedom of choice in reproductive decision-making, or increased monopolization of the terms and conditions of reproduction? Reflecting the existence of significant ideological differences concerning the nature of technological change and women's limited ability to intervene in and alter the methods and projects of science, feminist debate about new reproductive technologies also raises a number of questions central to recent theoretical developments in the sociology of technology.

Feminist responses to new reproductive technologies contain a number of implicit assumptions about the role of technological change as an important variable shaping women's lives. While the development of theories of technological change has received recent scholarly attention, feminist approaches to the analysis of new reproductive technologies have only just begun to make substantive use of this work.[24] Hence, the two bodies of literature have remained if not discrete, then only partially integrated; knitting them together is the task at hand. Noting the ways in which ideological perspectives on the technology and social change relationship have coalesced within liberal, radical and socialist feminist perspectives on new reproductive technology, this thesis incorporates the sociology and political philosophy of technology as an essential, but hitherto latent, theoretical aspect of the analysis of new reproductive technologies.

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[24] McNeil (1990) notes that the sociology of technology, likewise, has much to learn from feminist analyses of new reproductive technologies.

Given that recent feminist literature on new reproductive technologies has proliferated almost as quickly as the technologies themselves, there is no shortage of material for this project. Indeed, it is now becoming very difficult to keep up with feminist writing in this area. This thesis focuses primarily upon feminist writings originating in Canada, the U.S. and Great Britain.[25] Other international sources constitute a secondary emphasis, which is pertinent because of the Feminist International Network of Resistance to Reproductive and Genetic Engineering, the only world-wide organization of feminists expressing opposition to new reproductive technologies. Further, all sources represent a widely recognized (and cited) contribution to the feminist debate on new reproductive technologies; and second, each source illustrates an identifiable and distinct perspective on issues central to this thesis (i.e., views of technology, the role of reproduction in women's oppression, the probable consequences of increased technological intervention in reproduction).

There are many possible frameworks which might be employed to structure this thesis although none are unproblematic. For instance, the division of feminist responses into traditional liberal, radical, and socialist feminist categories creates difficulties associated with identifying and labelling commentators who endorse positions straddling more than one category. Similarly, as subsequent chapters reveal, no single feminist perspective can be accurately described as homogeneous or self-contained. Feminist theory is not a static body of thought; the boundaries of any such categories are unstable and fluid. Thus, I view the project as an effort to analyse and place individual feminist views and arguments within groupings which may be most usefully viewed as ideal types. In short, my interest in this thesis lies in mapping the theoretical and ideological basis for various feminist ways of thinking about technological intervention in reproduction.

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[25] Although entirely based upon the written works of numerous feminist commentators, the thesis is also informed by informal conversations with infertile women and couples, attendance at the Vancouver Infertility Support Group meetings, and other investigative fieldwork conducted in Vancouver, B.C. during the course of the research.

Further, while the traditional categories of liberal, radical and socialist feminism (briefly described below) represent commonly recognized strands of feminist thought and provide the most readily identifiable groupings within the literature on new reproductive technologies, they by no means exhaust the diversity found in feminist thinking.[26] Nor are these categories, in the end, adequate to the task of examining the diversity of feminist thinking about new reproductive technologies. Hence, adapting the work of philosopher Anne Donchin (1986), I locate liberal, radical, and socialist feminist perspectives within a more useful typology of four positions on technological intervention in reproduction — pro, non, moderate and anti-interventionism.

1.4.1 Liberal Feminist Theory

Briefly, liberal feminist theory derives from classic liberalism the central tenet of equality — that all persons should have an equal right to pursue individually-determined values and goals. The role of the state is to facilitate this ideal by mediating the relationships between competing interests and thereby assuring that the rights of the individual are preserved wherever possible. In general, liberal feminists do not feel that it is necessary to offer a far-reaching critique of capitalism or patriarchy,[27] nor do they seek to overturn the existing social order. Progressive social change is to occur gradually through reform of existing legislation and revision of widely held views of women as less rational (and therefore less fully human) than men (Jaggar 1983). Women's role in reproduction is not the primary source of women's oppression, although liberal feminists do view it as one area in which women's rights are impinged upon. Women should have the right to control their bodies and thus should have access to any existing technology which facilitates this.

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[26] For a comprehensive discussion of feminist thought see Tong (1989) and Jaggar (1983).

[27] Patriarchy is used to mean a system of male dominance and is not intended to invoke the historically-specific and anthropologically-based meaning of "rule of the fathers".

1.4.2 Radical Feminist Theory

Perhaps the most valuable insight that radical feminist theory has had to offer is the maxim "the personal is political". In examining the domestic and interpersonal context of women's lives, radical feminism has focused on the political nature of gender relations and women's oppression within the private sphere. Postulating a universal system of male dominance, radical feminism often cites women's reproductive capacity as both a source of oppression and as a source of unique power (Rich 1976). In stressing that universal male control of women's sexual and procreative capacities is the primary source of oppression, radical feminists have traditionally paid far less attention to racial and class oppression. Because radical feminists have in the past relied heavily upon biological explanations for male domination (e.g. male aggression as a hormonally determined trait) they have been accused of being ahistorical. Recent radical feminist theory or "cultural feminism", however, tends to eschew this type of explanation and instead draws upon social constructionist theory which emphasizes the role of social institutions and socialization in perpetuating male dominance. The radical feminist agenda for change frequently involves a degree of separatist sentiment; this may be exhibited in the celebration of women's culture in a distinct women's community or it may involve more radical calls for social change through separatism. Women must, however, reclaim control of their own bodies by defining their own sexuality and reproductive experience.

1.4.3 Socialist Feminist Theory

Informed by the Marxist tradition, socialist feminism is unique in that it attempts to account for class, gender and racial oppression. Without digressing into a discussion of the primacy of sex or class oppression, it is safe to say that virtually all socialist feminists would argue for the necessity of fundamental change to the existing capitalist and patriarchal order. Jaggar and McBride (1985) argue that women's oppression is largely derived from the social

and material relations of reproduction. Historically, women have had to focus their everyday lives on reproduction and childcare; thus, they have been largely excluded from the wage-earning productive sphere. Unlike earlier Marxist scholars, Jaggar and McBride argue that the biological process of reproduction is susceptible to historical change and that it may motor social change as does any other creative or productive endeavour. By placing reproduction squarely in the political realm socialist feminists believe that women also make their own history, but not always in conditions of their own choosing. Recent advances in new reproductive technology serve to confirm the critical role which women's reproductive activity plays in the process of social change.

1.5 Patriarchy, Capitalism and Technology

The foregoing outline of liberal, radical and socialist feminist theory indicates that whatever their ideological stripe, feminists acknowledge the significance of patriarchy. Capitalism, while of fundamental importance to socialist feminism, plays a lesser role in liberal and radical feminist analyses. Most central to this thesis, however, is the recognition that all three feminist perspectives lack a significant understanding of the role of technology in the perpetuation of existing social inequities.

Not surprisingly, feminists have been strongly critical of the patriarchal values embodied in the design, development and use of new reproductive technologies. Objecting to the dominant therapeutic paradigm in which these technologies are considered as "infertility treatments", Corea (1985), Rowland (1987), Klein (1989), Crowe (1985) and Williams (1986a, 1986b) have focused attention on the health risks, problems and social implications of *in vitro* fertilization and related techniques. Questioning the motivation for women's participation in *in vitro* fertilization, these and other feminists argue that the patriarchal ideology of motherhood

as the primary female role "shapes", "determines", or "coerces"[28] infertile women's desperation and, hence, contributes to their compliance with the use of these techniques. Coupling the profits accruing to private physicians, pharmaceutical companies and research laboratories with the widespread clinical application of *in vitro* fertilization, socialist feminists are also critical of the capitalist tendency to create an expanding market for the lucrative application of reproductive and genetic engineering. Further, many feminist commentators have drawn upon existing theories of "medicalization" and social control in order to examine specifically how it is that "reproductive technology makes the marriage of capitalism and patriarchy fecund" (O'Brien 1985:63). However, without diminishing the importance of the existing critique of patriarchy and capitalism, Rothman (1989) stresses that feminists have not yet adequately developed and incorporated a critique of technological society as it is embedded within capitalist patriarchy. In agreement with Rothman and Bush,[29] I believe this to be a significant omission from feminist discussion on new reproductive technologies.

1.5.1 Summary of Chapters

The need to locate a critical framework for thinking about the relationship between technological and social change becomes apparent in Chapter Two. Providing a descriptive review of the health risks, problems and social biases of *in vitro* fertilization and related techniques, this chapter looks beyond the dominant therapeutic paradigm in which conceptive technologies are viewed as miraculous advances in the treatment of infertility. Drawing upon the critique of medicine as social control, the chapter reveals that while reproductive technology may have in some instances improved women's reproductive health and choice, it has also equipped a growing medical and scientific elite with the tools necessary to wrest control of the reproductive experience away from women.

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[28] The choice of words is, in this instance, highly controversial.

[29] Personal conversation, 1990.

Liberal, radical and socialist feminists express diverse views about the nature and probable impact of this increased medical intervention in reproduction. Drawing upon Rushing and Onorato's (1987) analysis of these divergent feminist perspectives on new reproductive technologies, Chapter Two also compares and contrasts the underlying theoretical and ideological assumptions of each perspective. In short, this analysis reveals that although feminists are well armed with a critique of patriarchy and/or capitalism, an equally essential understanding of technology is lacking. At best, popular views of technological change are overly optimistic or pessimistic with little to moderate other than the notion that technology itself is completely neutral (Bush 1983). These polemics do little to alleviate the lack of credibility attached to feminists and other social critics who are often dismissed as being anti-technology.

Implicit in much of the feminist discussion on new reproductive technologies are assumptions about the relationship between technological and social change. Specifically, feminists have been concerned to articulate the relationship between the development of new technologies and the continuation or exacerbation of existing gender inequities. As Bush (1983) argues, this requires that we rethink popular assumptions about technology, unravelling the way in which they oversimplify women's relationship to technology. Drawing from the diverse literature on technology and social change, Chapter Three reviews popular beliefs about technology and examines several possible models for thinking about technology. Turning to the work of Benston (1989, 1987) Bush (1983), Leiss (1990), Noble (1977), Pacey (1983), Winner (1980, 1977) and others, the chapter critically reviews several of the most widely recognized approaches to defining what technology is, how it influences and is influenced by social change and how we can best manage the effects and processes related to its use. Rejecting the deterministic view that technology is an inextricable part of an exploitative system, this chapter concludes in concurrance with Gay (1986:70) that an adequate feminist model must encourage constructive thinking and strategic response for those seeking a "better

accommodation with the technical world".

Having established this essential theoretical framework for the discussion of technological and social change, Chapter Four builds upon the work of feminist philosopher Anne Donchin (1986) to compare and contrast various feminist perspectives on new reproductive technologies. Adapting and enlarging upon her framework, I locate liberal, radical and socialist feminist viewpoints along a spectrum of four positions on technological intervention in reproduction — pro, non, moderate and anti-interventionism. This spectrum portrays varying degrees of feminist endorsement of and opposition to these interventions in reproduction. Providing a description of the central views of each feminist perspective on the role which reproductive technologies may play in the enhancement or undermining of women's reproductive autonomy, the chapter highlights existing tensions between and among liberal, radical, and socialist feminist analyses; first, explicating how each view is informed by an underlying ideological orientation toward technology and, second, locating how this orientation translates into apparently discrete and opposing feminist responses to what is to be done about new reproductive technologies. Based upon this analysis, I conclude that those radical and socialist feminists who adopt an anti-interventionist position come closest to articulating the technology-as-politics perspective. This I argue, provides the most viable and useful basis for assessing and responding to new reproductive technologies.

How can feminist activists and scholars work most effectively to re-shape science and technology in the interests of better serving women's needs? Negotiating a position of strength for women, amidst the shifting politics of reproductive "choice", hinges upon women's collective abilities to intervene in and influence the projects of science and technology. As Rothman (1989) argues, there can be no individual solutions to collective problems.

Chapter Five concludes the thesis by asking how the production of feminist knowledge can be used to unite, rather than divide women deeply concerned about similar issues. In

particular, I argue that although various feminists appear to have adopted conflicting strategies in response to new reproductive technologies, these strategies are in the longterm compatible. In the short term, however, anti-interventionist opposition to new reproductive technologies provides a crucial "strategy for the present" (Noble 1983a, 1983b, 1983c).

Given that the Canadian Royal Commission on New Reproductive Technologies has stated that the area of "women's reproductive health and well-being ... is one of the most important aspects of its mandate" and that "this is the first time that a major examination of new reproductive technologies has approached the subject from this [a woman oriented] perspective", the timely nature of this thesis lends an important context in which to discuss the implications of increasing technological intervention in reproduction.[30]

[30] From A Guide to Public Participation in the Work of the Royal Commission, May 1990.

CHAPTER 2

DECONSTRUCTING THE DOMINANT THERAPEUTIC PARADIGM: FEMINIST CONCERNS ABOUT NEW REPRODUCTIVE TECHNOLOGIES

> New conceptions are rounded techniques with social and psychological implications pushed, too often, into the square pegs of a medical world. (Bonnicksen 1989:36)

As an interesting parallel to mainstream perspectives, feminist viewpoints on new reproductive technologies have shifted remarkably over the last two decades. Against the 1970's backdrop of public fixation with images of Huxley's dystopian Brave New World, radical feminist Shulamith Firestone (1971) claimed that reproductive technology would alleviate the biologically-based division of labour and hence "held the key to women's liberation". Marge Piercy (1976) wrote Woman On the Edge of Time, a utopian novel in which ectogenesis (or the artificial womb) promoted sexual equality and encouraged men's ability to nurture and, equally revolutionary from the standpoint of prevailing views about the sanctity of the traditional family, the creation of women's alternative insemination networks allowed women non-medically regulated access to anonymously donated sperm.[1] Further, the development of the birth control pill, in particular, seemed to herald an era of expanded reproductive freedom for women.[2] As Currie (1986:1) notes, "optimists claimed that the separation of sex and reproduction heralded not only sexual but social liberation, for women's economic dependency through compulsory motherhood could now be ended".

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[1] When medically regulated, eligibility for artificial insemination may be restricted to "stable" heterosexual couples, however, the practice of artificial insemination is often kept secret in order to preserve the notion that the social father is also the biological father. Doctors often record the social father's name on the birth certificate and the child may never know the truth (Achilles 1986). Women have, however, established alternative insemination networks in Canada and the U.S., although the medical profession is highly critical of these self-help groups which "take medicine out of the hands of physicians" (Brodribb 1988).

[2] In Canada, birth control was not legalized until 1969. However, the "Canadian birth rate had, of course, been falling for most of the twentieth century - even in advance of a birth control movement - and the amendments of 1969 thus stand as classic examples of changes in the law tardily following changes in social behaviour" (McLaren and McLaren 1986:9).

In retrospect, it is not surprising that feminists were intrigued by the radical promise of reproductive technology. Campaigns to introduce legislative and social reforms such as pay equity, proper maternity leave provisions, adequate daycare and access to safe birth control and abortion have demanded enormous perseverance. As Adrienne Rich has argued, the potential empowerment of women as mothers remains subordinated to motherhood as a social institution which "has ghettoized and degraded female potentialities" (1976:xv).

If, however, technology appeared to provide an alluring solution or shortcut to resolving existing social inequities for feminists of the 1960's and 1970's, it has become suspect as a vehicle for progressive change in the 1980's and early 1990's. This growing unease reflects the realization that despite the many positive health benefits of some medical interventions in reproduction,[3] reproductive technologies have in many instances been responsible for a range of deleterious health effects to women and their offspring. Indeed, a vast literature documents the damage done to women's health by a variety of pharmaceutical devices and drugs, medical interventions and obstetric practices.[4] Further, feminists have also come to recognize that, historically, reproductive technology has not markedly advanced the cause of women's liberation.[5] In short, the reproductive technologies which feminists hoped would enhance women's reproductive freedom have remained firmly in the hands of a patriarchal and male-dominated medical profession (Brodribb 1988, Corea 1985, Ehrenreich and English 1987, Spallone and Steinberg 1987).[6] Thus, while these reproductive interventions have "offered

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[3] As Stanworth (1987a) notes, compared with their foremothers, women in North America and Western Europe now have fewer unwanted pregnancies and are less likely to die in childbirth or suffer the loss of their babies.

[4] See McDonnell (1986), Corea (1977), and the Boston Women's Health Collective (1984).

[5] See Currie (1986) for a discussion of the unfulfilled social promise of the birth control pill, McLaren and McLaren (1986) on the political and historical consequences of regulating access to abortion and contraception, Ehrenreich and English (1979) on the medical expropriation of control over labour and birth.

[6] In 1990, 44 percent of all Canadian medical school graduates were women, compared with 6 percent just thirty years ago. Nonetheless, the profession remains male-dominated as women doctors earn less and often face gender barriers in acquiring specialty training particularly in

women a greater technical possibility to decide if, when and under what conditions to have children ... the domination of so much reproductive technology by the medical profession and by the state has enabled others to have an even greater capacity to exert control over women's lives" (Stanworth 1987b:15-16).

Placed in the historical context of the development of contraceptive technologies (such as the birth control pill and the Dalkon Shield) and birthing technologies (such as the forceps and caesarian delivery), it is not surprising that feminists do not have unbridled faith in medical and technological interventions in reproduction. As this chapter reveals, feminists have drawn upon and added substantively to a wide range of empirical and theoretical work in order to build a powerful critique of new reproductive technologies. Much, although not all, of this critique has developed from the analysis of medicine as an aspect of social control. Other important focal points for feminist analysis include: the critique of science as a social institution, the analysis of emerging social policy and legislation, as well as the broader role of the state in regulating new reproductive technologies. Cross-cutting each of these elements in the critique of new reproductive technologies is an appreciation of how patriarchal and/or capitalist values are reflected in the development and use of new reproductive technologies.

2.1 Purpose and Outline of Chapter

This chapter serves two purposes within the thesis. The first is to locate and describe a wide range of feminist concerns about the health risks, problems and social implications of *in vitro* fertilization and related conceptive technologies. The second is to begin a comparison

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[6](cont'd) the higher paying fields of surgery, heart specialty and neurosurgery. Dr. Peggy Ross, president of the B.C. chapter of the Federation of Medical Women of Canada, acknowledges that child care concerns often influence career choices for medical women and Dr. Marilyn Li, head of emergency services at a children's hospital in Ontario notes that "extra years of training - as many as 10 - make it difficult for a woman to have a family life" (The Vancouver Sun, March 1, 1991).

of liberal, radical, and socialist feminist perspectives on new reproductive technologies. This chapter therefore divides roughly into two sections; the former provides a somewhat lengthy survey of feminist concerns about new reproductive technologies while the latter sketches briefly the contours of diverging feminist analyses of new reproductive technologies.

The primary emphasis in the first section of the chapter is on how new reproductive technologies such as *in vitro* fertilization reinforce and perpetuate the power of a male dominated medical profession. Only passing attention is given to existing legislation, social policy and the role of the state in regulating new reproductive technologies. While these other areas comprise important aspects of feminist analyses of new reproductive technologies, the focus on medicine as social control is central to this thesis as it provides the immediate context in which the design, development and use of new reproductive technologies must be assessed. As many feminists and other social critics have argued, the medical model of health and disease shapes our wider social values, beliefs, and practices. As such, medicine is an extremely powerful institution; its tentacles stretch from the doctor's office to the boardrooms of major pharmaceutical companies.

Feminists concerned about new reproductive technologies have drawn attention to a range of social, political and economic issues which illustrate the power wielded by a male-dominated, medical profession. I review these concerns by looking at the way in which infertility has increasingly become defined by medical practitioners as *pathological.* Reflecting larger patriarchal values concerning the dominant ideology of motherhood, the pathologization of infertility legitimates the development and use of new reproductive technologies; as a sickness, infertility requires a technological cure. Alternatively, feminist research on women's experience of *in vitro* fertilization indicates that contrary to being a purely therapeutic treatment, *in vitro* fertilization is an emotionally, physically and financially risky venture with little guarantee of success. Further, because physicians control information about, and access to, techniques such as *in vitro* fertilization, infertile women may not be well informed about the

health risks and low success rates. However, whether successful or not, *in vitro* fertilization provides researchers with increased access to eggs, sperm and embryos; such access allows the further development of techniques in reproductive and genetic engineering. Many feminists worry that together these techniques increase the physician's power over a woman's reproductive decision-making. Further, the buying and selling of a range of reproductive materials and services underscores the commodification and commercialization of reproduction and reproductive labour.

Based upon this range of concerns about *in vitro* fertilization and related techniques, feminists agree that there is a need for improved access to information and counselling services, increased resource allocation for infertility prevention programs, and basic criteria ensuring the monitoring and safety of fertility drugs and surgical procedures. However, beyond these shared responses, feminists offer divergent analyses of the probable consequences of increasing technological intervention in reproduction. The traditional categories of liberal, radical and socialist feminism provide us with a rough framework for beginning to map these differences.

In summary, I argue that liberal feminists view new reproductive technologies as having the potential to enhance women's reproductive choice and freedom, so long as these techniques are effectively regulated. Radical feminists view new reproductive technologies as threatening primarily because they place too much control in the hands of men, the medical profession and the state. Socialist feminists, while divided on a number of issues, generally view new reproductive technologies as a source of alienation for women; some new reproductive technologies may, however, serve some women's needs and interests.

Within each feminist perspective, problems with new reproductive technologies are located in the social relations of technology (who has access to information and knowledge about new reproductive technologies, who controls their use, how they are regulated etc.). As

a result, there is little consideration given to the question of how the design and development of particular techniques such as *in vitro* fertilization may embody the knowledge and values of their creators. This I argue, reflects a lack of attention to theorizing about how technological artifacts and processes may be inherently biased toward the maintenance of existing social inequities. Hence, I conclude that while a critique of patriarchy and capitalism is essential to feminist theorizing about new reproductive technologies, an equally critical understanding of the relationship between technological change and social relations is lacking.

2.2 Medicine as Social Control: Feminist Concerns About New Reproductive Technologies

From the day-to-day delivery of basic health care services to the research projects designated as priorities for investigation, medicine is charged with the power to define and treat illness. In a society characterized by pervasive class, gender and racial inequities, medicine does not, however, treat us all equally. Many have recognized that our society is becoming increasingly medicalized; that is, medicine wields such a strong influence that we have now come to evaluate everything from the nutritional content of breakfast cereal, to life expectancy in medical terms. Moreover, as Ehrenreich and English (1979) have argued, physicians have used the development of a wide array of medical technologies to enhance their jurisdiction over previously unmedicalized bodily processes and states. For instance, just as the development of the forceps allowed physicians to intervene in the process of childbirth, highly sophisticated techniques, such as *in vitro* fertilization, now permit physicians to intervene in and control conception.

Stressing that the social control aspect of medicine has become an increasingly important, although insidious, aspect of the organization of modern technological and bureaucratic societies, Illich (1976) claims that contemporary medical practice has done more harm than good. Observing that doctors often seem to inflict physical damage in the attempt

to cure, Illich argues that this *clinical iatrogenisis* (or pathology) is accompanied by both *social* and *structural iatrogenisis*. That is, as people accept and expect a higher degree of medical intervention in resolving all manner of health and social problems, individuals lose their autonomy as patients and consequently physicians are able to expropriate responsibility for individual health care.

Feminists have argued that this loss of autonomy is especially pronounced for women patients dependent upon a male-dominated medical profession. As Roberts (1981) stresses, "in the context of masculine hegemony", the doctor-patient relationship encourages the female patient to be a "good" (i.e., passive and cooperative) patient, willing to comply with the doctor's orders.[7] Further, the power relations which characterize the practice of modern medicine are amplified by the trend toward an increasing level of technological intervention in reproduction (Oakley 1984). For, while it is women who conceive, bear and for the most part assume responsibility for raising children, women are seldom consulted on matters pertaining to the design, development and use of reproductive technology.

Recognizing that control resides primarily in the hands of white, male experts, feminist critics of medical practice argue for a less technologically invasive and more self-directed and developed form of health care. In the reproductive rights arena, these concerns are reflected in protracted struggles to legalize and promote the practice of midwifery,[8] end sterilization abuse, petition for safe, effective and user-controlled contraception and establish such things as community-based women's health care clinics providing a range of services (including abortion) in a somewhat de-institutionalized setting (Clark and Wolfson 1985).

Feminists also analyse the power of medical expertise as it is derived from, and dependent upon, the expropriation of information and knowledge about women's bodies and

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[7] See also, Fisher (1988), Reissman (1983), Fox (1977) and Mitchinson (1988).

[8] See Burtch (1988) for an analysis of how Canadian midwives have struggled with both the state and the medical profession in efforts to establish the right to practice midwifery.

bodily states. Indeed, the women's health movement attempts in many ways to reclaim this knowledge for women and with it the ability to define the meaning and experience of one's own lived-in, bodily reality.[9] As Franklin and McNeil (1988:556) argue, "women's subjective experience has been neglected in the construction of technological knowledge and practice". In particular, this absence is manifested in the lack of recognition and respect for women's lived experiences of infertility and *in vitro* fertilization "treatment"; the subjective reality, in which social life is continuously produced and reproduced, is effectively denied.

Beginning from this absence, feminists have documented a wide range of health risks, problems and social biases of *in vitro* fertilization and related techniques. In summary, these feminist accounts reject unanimously *the dominant therapeutic paradigm* in which techniques such as *in vitro* fertilization are seen primarily as beneficial, and medically necessary, interventions for the treatment of infertility (Manion 1987). Calling the medical definition of infertility into question, feminists highlight the socially constructed aspects of women's reproductive expectations and experience, suggesting that it is the dominant patriarchal ideology of motherhood which underlies the traditional view that childlessness is pathological for women. Further, although physicians generally refer to the *in vitro* fertilization procedure as "treatment", feminists express deep reservations about the health hazards and question the very low success rates.[10] Some argue that *in vitro* fertilization should be considered "research" not "treatment" (Corea 1985).[11] Likewise, the lack of public information about the health risks, coupled with the scarcity of unbiased medical counselling and psychological support

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[9] See Martin (1987) for a feminist appraisal of how the views of medical science contribute to women's own self and bodily imaging, particularly with respect to reproduction.

[10] Success rates vary widely however, of the twelve *in vitro* fertilization clinics in Canada, the most "successful" one sent only 13 percent of all women treated home with a baby (Pappert 1988).

[11] For a good discussion of the political and economic implications of the medical distinction between research and treatment see Bonnicksen (1989).

services, have prompted questions about the validity of present informed consent procedures.[12] Feminists, aware of this tenuous basis for reproductive choice, are troubled by the fact that doctors have the power to decide who should have access to *in vitro* fertilization, who should mother and who should not, which embryos are suitable to implant and which are "spare" or "waste".[13] Further, the commodification and commercialization of reproductive materials and services is objectionable on many grounds, not the least of which concerns the potential for exploitation of poor and minority women who might for economic, or other reasons, be compelled to engage in egg donation, embryo transfer or surrogate motherhood arrangements (Corea 1985, Rothman 1989).[14]

Nonetheless, as most feminist commentators agree, it is patriarchal values which are most clearly revealed in the design, development and use of new reproductive technologies. Looking beyond the seemingly benign medical depictions of infertility and new therapeutic treatments, these patriarchal biases are evident in the definition of infertility as pathology and in the dominant ideologies of pronatalism and motherhood.

2.2.1 Infertility as Pathology

On first glance, the definition and etiology of infertility appear to be value neutral and scientific, providing a clear and unbiased view of a medical problem. Nonetheless, feminists conducting research on infertility and involuntary childlessness agree that there are significant social biases embedded in the medical definition of infertility. These biases reveal the ways

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[12] For a comprehensive discussion of informed consent see Annas, Glantz and Katz (1977). For reference, note that Barbara Katz now goes by the name Barbara Katz Rothman.

[13] As noted in Chapter One, the accusation that doctors are playing God with this technology is not unique to feminist perspectives. Ethicists, theologians and even some physicians themselves are also uncomfortable with the medical profession's licence and/or responsibility to make these decisions.

[14] Given that racial minorities are often overly represented amongst the poor and the infertile (McFalls 1984), racial oppression forms an important, although somewhat neglected, theme within feminist concerns about *in vitro* fertilization and related techniques.

in which the medicalization of infertility is used to justify the current and expanding practice of *in vitro* fertilization.

In North America, infertility is defined as the inability to conceive among non-surgically sterilized couples who have had unprotected intercourse for a period of one year. Precise estimates of the incidence of infertility are difficult to arrive at, although there is general agreement that 10–15 percent of all couples suffer from infertility.[15] In approximately one third of these cases, the problem lies with the woman, one third with the man, and the remaining one third are attributable to some combined problem. For women, ovulatory problems, blocked fallopian tubes and endometriosis are the most commonly diagnosed causes of infertility. "Hostile cervical environment" and the presence of antibodies to sperm are other less certain factors implicated in infertility. Difficulties in implantation may also occur as the result of uterine adhesions or chromosomal abnormalities. In comparison, relatively little is known about factors leading to male infertility. However, the absence or scarcity of sperm is a definite cause of infertility and there is evidence that sperm motility and morphology are more significant for fecundity than sperm density (Taylor *et al.* 1985).

Further, while not all infertility is explainable or even correctly diagnosed, these problems are exacerbated by defining the normal time for conception as one year. Although this may hasten the speed at which anxious would-be parents seek out medical advice, the view that it is abnormal to require longer than one year to conceive may result in unneccessary anxiety and/or premature medical intervention. As Pfeffer and Woollett (1983:26–27) argue, if we consider the length of time involved in conception for women of all reproductive ages on average, 60 percent of women who ultimately conceive do so within six months of trying to get pregnant, 25 percent will conceive within six months to a year, and the remaining fifteen percent will take more than a year. Therefore, if infertility is

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[15] See Gold (1985), Miall (1986), McFalls (1984), Menning (1980), Mosher (1982) and Pfeffer and Woolett (1983). Further, many physicians and researchers claim that the incidence of infertility is increasing in the Western world, although this is a subject of widespread dispute.

indicated by a period of one year's unprotected intercourse without pregnancy, we are including some of the "normal" population who would likely conceive within the next year or two with no medical intervention necessary. As a result, many feminists argue that the definition of infertility is too narrow and the time frame should be expanded to two years to better correspond with women's natural rate of conception, and decrease the likelihood of premature and possibly unnecessary medical intervention.[16]

Further, feminist health activists have observed that rather than being a natural occurrence, many of the physiological causes of infertility are induced or exacerbated by medical intervention. The literature of the women's health movement contains abundant examples of the iatrogenic origins of infertility and sterility.[17] For the purposes of illustration, one will suffice. As one of the most common medically indicated criteria for *in vitro* fertilization, scarred or blocked fallopian tubes may be the result of improper or delayed treatment of pelvic inflammatory disease. Damage to the fallopian tubes following pelvic inflammatory disease is the most frequently cited cause of sterility and the most important cause of conceptive failure worldwide (McFalls 1984). Further, in some cases pelvic inflammatory disease may be the direct result of using the Dalkon Shield (Mullens 1987). Pressing this analysis one step further and recognizing that it is unfair to lay all of the blame at the feet of the medical profession, iatrogenic infertility is also related to the **lack** of medical intervention when warranted and a much larger dearth of attention to a range of preventative programs.[18] The fertility ravaging effects of pelvic inflammatory disease are clearly

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[16] For a useful discussion of the implications of defining infertility over a one vs. two year time frame see Pfeffer and Woollett (1983). Klein (1989) also provides many first hand descriptions of unnecessary technological intervention based upon premature diagnosis of infertility.

[17] Some of the most commonly cited include the use of the Dalkon Sheild, thalidomide, DES, "side effects" of drug or hormonal therapy, unnecessary or bungled surgery, and coercive sterilization practices. See Corea (1977), Greer (1984), McDonnell (1986) and the Boston Women's Health Collective (1984).

[18] Ten to fifteen million Americans contract some form of sexually transmitted disease every year and over 75 percent of these are 15–30 year-olds who are in or approaching prime

exacerbated by the lack of sufficient or timely medical care[19] In addition, campaigns to reduce the incidence of sexually transmitted diseases (such as pelvic inflammatory disease) generate little political and financial support in comparison to high technology reproductive interventions. For instance, in 1987 over $3.5 million was spent on basic new reproductive technology research in Canada but only $400,000 was spent on public health and health research activities related to reproductive disorders (J. Epp, Minister of Health and Welfare, cited in Bryant 1990).

As noted above, there is a relative scarcity of research about male infertility. While obstetrics and gynecology have long occupied the status of reproductive specialty areas, there are no corresponding specialists for men's reproductive health care.[20] The consequent emphasis upon female infertility, as opposed to male infertility, perpetuates the view that infertility is primarily "a woman's problem".[21] Further, this biased assumption is obscured by continual reference to "infertile couples". As Steinberg (1990:92) notes,

> The 'gender neutrality' of the phrase 'infertile couple' may appear to avoid apportioning 'blame', allocating each partner equal weight and significance in the process of reproduction, regardless of who is 'unable' to contribute to that process ... this erasure of women, and the procedures women undergo, is particularly manifest in the context of 'IVF' treatment where (not unlike most 'infertility' treatments) they not only bear the burden and risk of 'infertility' investigation, but also of 'infertility' treatment.

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[18](cont'd) reproductive years (McFalls 1984:56). Estimates are that if the current trends in sexually transmitted diseases and pelvic inflammatory disease in the U.S. persist until the year 2000, 11 percent of women in the 1955 birth cohort will be involuntarily sterile and a further 3 percent will have suffered from an ectopic pregnancy as a result of these diseases alone (*ibid*:61).

[19] Many diseases such as pelvic inflammatory disease can obliterate, not just reduce, fecundity. Effects of disease may be prolonged and exert a negative influence on reproduction anywhere from coitus to childbirth.

[20] Urology is the area which has traditionally subsumed responsibility for male infertility. However, as Swanson and Forrest (1984) note in one of the few existing generalist books on men's reproductive health, concerns about male infertility extend beyond the limited parameters of genital anatomy and physiology.

[21] It is, however, interesting to note that "heightened awareness of women's reproductive health is, in turn, also increasing awareness of men's reproductive health needs" (Swanson and Forrest 1984:xvi).

Moreover, as Ehrenreich and English (1979) illustrate, women's bodies have been defined as essentially pathological whether pregnant or "barren". Noting the ways in which control over birthing technology assisted the male medical profession in ousting midwives and women healers from their traditional roles in managing birth and caring for the sick, Ehrenreich and English argue that once physicians recognized that childbirth was an area amenable to new forms of medical intervention, pregnancy and labour were increasingly viewed as "pathological events" requiring the supervision and intervention of a physician. Medical technology played a pivotal role in this process as the emerging medical profession claimed that the training and licensing of midwives was no longer practical since it would decrease the opportunity to use the stethoscope, pelvimeter, forceps and other new techniques useful to increasing obstetrical knowledge. Thus, the acquisition of scientific knowledge and technical skill equips the medical and scientific elite with the tools necessary to redefine reproduction such that its pathological nature becomes an important rationale for continued intervention.

In summary, feminist thinkers have argued that medical intervention in the diagnosis and treatment of infertility is commonly, although mistakenly, justified by the definition of infertility as pathology or sickness (Manion 1987). Within the "therapeutic paradigm", medical jurisdiction over infertility is recognized as a legitimate and appropriate attempt to treat a physiological disease, or abnormality, preventing the occurrence of conception and pregnancy. Proceeding from the assumption that infertility is a sickness requiring medical treatment, the therapeutic paradigm masks important social questions about infertility and childlessness. As Steinberg (1990) notes, the terms 'infertility' and 'childlessness' are conflated and used interchangeably by doctors and other *in vitro* fertilization practitioners, the media and the law. This gives the misleading impression that infertile couples are childless when in fact many are experiencing secondary infertility[22] and/or have children by previous marriages, adoption or

[22] That is, the onset of infertility subsequent to the birth of one or more biological offspring.

successful attempts at *in vitro* fertilization or artificial insemination (*ibid*).[23] Further, it also presumes that all childless couples do, in fact, want to have children.

2.2.2 Pronatalism and the Ideology of Motherhood

Feminists have long argued that the social emphasis placed on women's fertility reinforces patriarchal ideologies about the significance of motherhood.[24] The dominant ideology of pronatalism suggests that pregnancy and childbirth are highly fulfilling aspects of women's nature, and that reproduction is central to being fully female. Further, it is expected that reproduction and parenting will occur only within a stable heterosexual relationship. As such, the strength of "maternal instincts" is invoked as a biological justification for the desperation of the infertile woman who is unable to provide her male partner with offspring (Crowe 1985). For instance, Dr. Patrick Steptoe has publicly said that "[it] is a fact that there is a biological drive to reproduce. Women who deny this drive, or in whom it is frustrated show disturbances in other ways" (Cited in Stanworth 1987b:15). Thus, the social aspects of being involuntarily childless are obscured as the biological imperative appears to justify the moral legitimacy of, and necessity for, medical intervention in infertility-related problems.

Infertility is not a life threatening disease or disorder, although its consequences are widely perceived as being contrary to the fulfillment of normal social life. In Western and other societies, parenthood is prescribed in the sense that it is often a moral imperative for social acceptance; it is an experience considered essential to full emotional and sexual development; and, it affirms full adult status (Veevers 1980). For women, in particular, there are many strong social sanctions promoting motherhood as an essential aspect of being female.

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[23] Williams reviews several studies of *in vitro* fertilization participants and concludes that "women who already have children would seem to constitute a significant but unexamined proportion of the IVF client population" (1990:545).

[24] For example see Treblicott (1984) for an edited collection of diverse essays on feminist theory and mothering.

Historically, a "barren" wife might be divorced without question or ostracized from community life (Tannahill 1980). In some countries, it is considered women's sublime duty to produce the sons and daughters of tomorrow's labour force (Van de Kaa 1987).[25] In others, the pressure to reproduce is linked to fears of ethnic or cultural extinction (David 1982).[26] More common in Western societies, however, is the traditional assumption that women have a biological instinct to procreate which, if unexpressed, will leave women unfulfilled (Hubbard 1990). Hence, as more women delay childbearing in pursuit of educational attainment, career goals and minimal financial security,[27] the "biological time clock" continues ticking. For many women in their thirties there may be great pressure to have a child before it is too late.[28]

Further, physiological or bodily abnormalities resulting in infertility render the infertile subject to social stigma based upon the inability to reproduce; the infertile seem less than whole (Goffman 1963, Miali 1986, 1985). In contrast, those who are "childless by choice"

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[25] During the mid-1980's the Romanian government enforced reproduction quotas for women by limiting access to birth control and implementing strong sanctions against abortion (Van de Kaa 1987).

[26] For instance, with the lowest fertility rate in Canada, Quebec is now well below replacement level fertility. In the hopes of reviving the fertility rate, the Quebec government has implemented various economic incentives geared toward making children less of a financial burden to parents (Toronto Star, May 22, 1989).

[27] Material constraints exercise a significant influence upon family planning decisions. Romanuic (1984) found that, in Canada, most couples embarking upon childrearing at a later stage (i.e., first child after age 30) were financially well-off. Similarly, Baldwin and Winquist-Nord (1984) found that current trends in delayed childbirth stem in part from economic difficulties encountered by women competing in a tight job market. Thus, many of today's delayed childbearers are affluent, white couples with dual incomes (*ibid*). Van de Kaa (1987) also suggests that declining fertility may reflect a greater awareness of the "feminization of poverty"; without any assurance of longterm economic stability women are reluctant to embark upon childbearing and rearing.

[28] Fecundity declines with age although the starting point and rate of decline are the subject of controversy. Later age at marriage and first birth, trends which appear to be common to both the baby-boom and post-baby-boom generations, have generated increased concern with the actual risk of postponing pregnancy until after age thirty. Noting the increase in infertility-related visits to physicians amongst the baby-boom generation, Gindoff and Jewelewicz (1986:990) comment that "as they have aged, their reproductive health concerns have evolved from preventing unintentional fertility to treating unintended infertility". Furthermore, historical data suggest that when women marry in their late 30's and early 40's one third to one half of couples will remain involuntarily childless (*ibid*:989).

may be stigmatized in terms of blemished character (Veevers 1980). Faced with inordinate difficulties in confronting the "transition to non-parenthood", infertile couples who are involuntarily childless must undergo difficult role readjustments and transformations in self-identity (Matthews and Matthews 1986a, 1986b). This may invoke a period of crisis in which infertile persons experience surprise, denial, anger, isolation, guilt and grief (Menning 1980). Successful resolution of the infertility crisis often requires extensive counselling and may not occur until infertile individuals are satisfied that every available option for treatment has been exhausted. While it does pose one solution to involuntary childlessness, adoption does not resolve all of the issues surrounding infertility (Williams 1990) and adoptive parent status continues to invoke negative social sanctions related to the perceived superiority of biological parenthood (Miall 1984).

Feminist research on the social meanings of biological ties[29] helps to shed further light on the ideology of motherhood and the socially constructed aspects of the desire for children. As Williams (1990) argues, there are certain socially-constructed rewards of biological motherhood which social motherhood does not fulfill. Adoption may thus seem a "second-rate option at best". The physical experiences of pregnancy, birth and breastfeeding are likewise desirable to some women although, as Williams (*ibid*:550) explains, "the *perception* of them as enjoyable, or at least worth experiencing, may also be socially constructed to a certain extent". Research on the motivation for participation in *in vitro* fertilization also confirms that there are significant gender differences concerning the importance of the biological component of parenthood. For instance, Crowe (1985) found that men tend to exhibit a greater preference for their own genetic offspring whereas women tend to feel that the social component is more important. O'Brien (1983) has postulated that men are alienated from the process of reproduction. Their discontinuous experience begins with intercourse and is not resumed until the child is born; even then, men have paternal rights but they often do not

[29] See Achilles (1986) for a comprehensive discussion of artificial insemination and the social meanings attached to biological inheritance.

share equally in parental responsibilities.[30] Hence, it follows that men who feel a stronger "need" for biological parenthood than women may pressure their wives or partners to undergo *in vitro* fertilization even where adoption or artificial insemination (as in the case of impaired male fertility) might prove to be more viable alternatives for resolving involuntary childlessness.[31] Williams (1988), however, has found that women undergoing *in vitro* fertilization are often more determined than their spouses to continue with the program despite unpleasant experiences and prolonged failure to conceive. This suggests that the experience of pregnancy itself is desirable to women for other symbolic or existential reasons (Menning 1980), or that women also attach a particular significance to genetic continuity (Rowland 1985).

In summary, these attempts to explain the significance of biological parenthood reveal that patriarchal values stress the importance of men's genetic contribution to reproduction; this androcentric bias obscures a better understanding of how women evaluate the importance of their own genetic and gestational contributions to reproduction. Hence, feminist observations and theorizing about women's motivation to participate in *in vitro* fertilization comprise an essential aspect of the debate on new reproductive technologies. As the following discussion of women's experience of *in vitro* fertilization indicates, this technique is physically, emotionally, and financially expensive, has a very low success rate, and poses a number of health risks to women and their offspring.

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[30] Rothman (1989) also argues that patriarchal ideology concerning the significance of the male genetic contribution is related to men's alienation from reproduction.

[31] Men may also, without consent from their wives, contract a woman to become a surrogate mother.

2.2.3 Women's Experience of In Vitro Fertilization

Seizing upon a lack of reference to women's actual experience of *in vitro* fertilization in the medical literature and popular discourse, feminists such as Williams (1988), Rowland (1985), Klein (1989), and Crowe (1985) have been engaged in producing empirical research which documents the procedure from a woman-oriented perspective. Finding that participation in an *in vitro* fertilization program induces emotional stresses which may exact a heavy toll (in the form of strained marital and familial relations, deteriorating self-image and inability to get on with other aspects of life), these authors argue that women undergoing *in vitro* fertilization experience desperation and a sense of overwhelming personal failure. Many women who have undergone *in vitro* fertilization describe the experience as emotionally devastating and highly traumatic.

The seemingly endless cycle of tests, drugs and surgery leaves many women exhausted, depressed, and unable to focus upon anything other than getting pregnant (Williams 1988, Klein 1989). Upon entry to a program, this cycle begins when both partners undergo one month of treatment with the drug vibromycin. Taken by each spouse, this serves to "sterilize" the reproductive tract. This is followed by clomiphene citrate, an oral tablet taken by the woman on the third to seventh days of her cycle, to stimulate fertility. Then, beginning on the third to fifth day, an injectable hormone called pergonal is given to cause superovulation (ripening of more than one egg) to maximize the potential for extraction and fertilization of eggs.[32] Each day, the woman must have blood tests to measure estrogen levels and every other day, she must have ultrasound to measure the size of her ovaries and developing follicles. At the appropriate moment, she may also be given an injection of HCG, a hormone designed to mimick the normal body hormone for ovulation. If the ovaries respond properly, then the egg retrieval operation is timed to take place just before the

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[32] It is estimated that this drug alone may cost $150 for each daily injection, a cost only partially covered by medicare in Canada.

woman is expected to ovulate. After anesthesia, a small incision is made at the navel and the abdominal cavity is pumped up with carbon-dioxide. Utilizing a thin fibre-optic telescope, several needles and a suction device, the follicles are ruptured and the eggs are siphoned off in a saline solution (the laparoscopic method of egg retrieval).[33] Immediately rushed to the lab, the solution is examined for mature eggs. Not always successful, the surgery may result in a take of up to seven or eight eggs. Incubated in a petrie dish for about ten hours after collection, fertilization occurs when each egg is introduced to about 50,000 to 100,000 sperm. All, or a portion, of the resulting embryos are non-surgically placed in the woman within forty-eight hours. Then the waiting begins. Generally, it is two anxiety-ridden weeks before the outcome is known. In the majority of cases, implantation does not occur and the procedure is repeated. Most Canadian clinics allow three or four consecutive attempts and then the couple must go back on the waiting list (Mullens 1986).

Doctors and other *in vitro* fertilization clinical staff, who strive to relieve individual suffering through medical intervention may persuade women that "you never fail until you stop trying".[34] Thus, the pathologization of infertility contributes to blaming the victim; unwillingness to utilize, or continue with, *in vitro* fertilization amounts to the couple having somehow chosen their infertility (Rowland 1985, Manion 1987). The unfortunate catch-22 of this situation is that despite prolonged failure with *in vitro* fertilization, many women find it extremely difficult to stop the continuing cycle of tests and hormones, egg collections and implantations. They feel that it is their bodies which have failed them, not the technology; hence, if they just have the perseverance to continue, they will eventually be rewarded (Pappert 1989).

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[33] Alternatively, egg collection may proceed with the use of ultrasound technology to determine the precise location of eggs to be extracted by a single suction needle. This technique is simpler, cheaper and only takes 10-15 minutes compared with up to an hour under the standard laparoscopy method. Also, there is no need for a general anesthetic (The Vancouver Sun, February 24, 1987). There are, however, other risks (such as perforation of the bladder) associated with this method.

[34] Saying displayed on the wall of an infertility clinic.

In short, it is highly debatable as to whether or not *in vitro* fertilization is a solution to infertility. For the lucky few, the months of traumatic involvement are rewarded, but for the remaining eighty percent or more, the experience is an expensive one - financially, physically, and emotionally. Speaking out against what she feels is the dark side of *in vitro* fertilization, Jan Silverman (CBC Radio, "Drawing the Line", April 1987) admitted that her high hopes were unfounded and pointed out that "it is only the success stories that you read about ... you lose track of the failures." She also added that without the existence of *in vitro* fertilization she might have been able to come to grips with her infertility sooner. For *in vitro* fertilization participants (such as Silverman) it becomes very difficult to redefine the experience of infertility and seek alternate solutions to biological parenthood. This is exacerbated by inadequate support and counselling services offering unbiased information about alternatives to *in vitro* fertilization (Klein 1988). Moreover, additional stress may also be linked to financial worries related to the cost of *in vitro* fertilization and/or a decline in family income if the woman has to quit or take a leave of absence from work in order to comply with an almost daily regime of tests, hormone injections, and other interventions.[35]

2.2.4 In Vitro Fertilization: Treatment or Research?

In vitro fertilization, and other related conceptive techniques such as embryo transfer, involve unknown physical risks which may compromise the health and well-being of mother and child. While seldom a topic for extensive medical research and publication, these health risks to women, which may be incurred at all stages of the *in vitro* fertilization procedure, have become an important focal point for feminist research. As scientists and concerned feminists, women such as Arditti (1984), Klein (1989, 1984) and Minden (1984)[36] have

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[35] Participation in *in vitro* fertilization and related conceptive techniques is expensive - In North America and Australia, clinics charge $3000 - $6,000 for each *in vitro* fertilization cycle and, with the exception of the province of Ontario, this cost is not covered by medical insurance.

[36] These three feminist scientists edited the 1984 collection of essays entitled Test-Tube Women: What Future for Motherhood. This is now one of the best known and most widely

investigated and publicized some of the most significant health-related concerns of *in vitro* fertilization practice.

As Steinberg (1990) notes, most of the research done in the medical sector is concerned with the effects of hormones and drugs on fetuses and offspring rather than on the women who take them. Research on Clomid and Pergonal, two fertility drugs routinely administered during *in vitro* fertilization, indicates that these "hormonal cocktails" may have numerous side effects[37] which seriously jeopardize women's health and well-being (Klein 1989). Based upon the existing scientific literature "there is evidence that clomiphene citrate may have a long life span in a woman's body, and may cause deleterious effects in the women's children and in a woman herself" (Klein and Rowland 1988:251). These negative effects are exacerbated by repeated cycles of superovulation in which dosage guidelines provided by the pharmaceutical companies are often exceeded. Documentation on women's experiences with the drug clomiphene citrate (Clomid) reveals a range of "negative 'side effects' including depression and emotional instability as well as other more severe physical adverse reactions" (such as birth defects, ill health, and cancer). Further, Klein (1988) and Solomon (1989) describe the incidence of Pergonal-related death and Rowland (1984) describes women as "living laboratories" for the testing of these fertility drugs.

Other physical risks to women of the *in vitro* fertilization procedure include adverse responses to anesthesia and surgery during laparoscopy and egg retrieval. Further, because *in vitro* fertilization clinics often transfer three or four embryos at a time in order to increase

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[36](cont'd) circulated books on new reproductive technologies. Because of its popularity and impact it is "has now acquired the status of a feminist primer" (Franklin and McNeil 1988:552).

[37] Using antihistamines as an example, Conn and Fox (1980) point out that the "whole notion of "side-effects' is a semantic one; all drugs...have a wide range of effects on the body". Thus antihistamines, sold to us as a "cold remedy" have the major side-effect of producing drowsiness, something the drug companies choose not to promote. Similarly, the birth control pill temporarily suppresses ovulation while at the same time having a number of other side-effects which may not be apparent at the time.

the chances of pregnancy, there is a high probability of multiple births and concomitant greater risks to women and offspring. Ectopic pregnancies are more common and babies conceived through *in vitro* fertilization are four times as likely as non *in vitro* fertilization babies to have increased rates of abnormalities (such as low birth weight or congenital defects) or be stillborn (Begin 1989).[38] In calculating national expenditures on *in vitro* fertilization in Australia, Bartels (1987) discovered that the ratio of *in vitro* fertilization treatment cycles to a non-problematic birth outcome is 34 to 1.[39] The average cost to the health care system of an *in vitro* fertilization baby is 45 times the cost of a child naturally conceived and these babies often require special and prolonged medical attention. Mothers spend, on average, triple the amount of time in hospital after the birth and are more likely to undergo caesarean delivery whether the birth is multiple or not (de Wit and Corea 1989).[40]

The chances of "success" with *in vitro* fertilization remain low and current research also suggests that women who elect to undergo *in vitro* fertilization may not have any greater chances of conceiving than women who opt for either conventional means of infertility treatment or no treatment at all (Office of Technology Assessment 1988). In addition (and contrary to claims of much of the medical literature) success rates for *in vitro* fertilization are not improving (Klein 1989). A frequently cited editorial in Fertility and Sterility further confirms that success rates are often calculated by massaging the data in order to produce misleading figures, a practice which Soules (1985:513) claims is "a failure of adherence to the highest ethical standard of truth in expressing the IVF pregnancy rate". Soules further states

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[38] Begin cites an unnamed Australian study conducted in 1985 in which the results of 900 *in vitro* fertilization pregnancies were reviewed. Australia is an internationally renowned leader in the development of *in vitro* fertilization and remains one of the few sources of such data at present. The generation of such data may, however, be largely due to the successful lobby efforts of outspoken feminists such as Robyn Rowland.

[39] A non-problematic birth outcome is is defined as the absence of premature birth, stillbirth, neonatal death or congenital defect.

[40] Australian data reviewed in Reproductive and Genetic Engineering .

that the exaggeration of pregnancy rates "appears to be a marketing ploy to lure prospective infertile couples into becoming active IVF patients". Given that even at the best clinics there is an 85–90 percent failure rate for *in vitro* fertilization, this technique is more appropriately termed "experimental" than "therapeutic" and "patients" would be more accurately described as "research subjects" (Corea 1985).

Nonetheless, whether research or treatment, many couples are willing to take their chances with *in vitro* fertilization. As a nurse and spokesperson for the infertility support group RESOLVE, Barbara Eck Menning (1981:264)[41] weighs the costs and benefits of *in vitro* fertilization and concludes that "in vitro puts the recipient couple no more at risk for the usual maternity risks than the average population" and "[one] thing is sure: the couples who are infertile due to hopeless tubal damage run a 100 percent risk of remaining childless if they are not allowed access to *in vitro* fertilization as a technology." For Menning (*ibid*), and many other infertile women who oppose limitations on access to *in vitro* fertilization, it is vital to "[let] those who will incur the risk make the decisions about the technology". Nonetheless, feminists and infertile women agree that in order to make well-informed decisions about the use of *in vitro* fertilization and related techniques, women must have improved access to accurate and unbiased information about the health risks and success rates.

2.2.5 Medical Control of Knowledge, Information and Access

At present, control over information about new reproductive technologies is almost entirely in the hands of "those who have the greatest stake in the successful promotion of these RT's (reproductive technologies) – the men who developed them and practice them" (Williams 1986b:7). The lack of scientific knowledge on the part of the general public means that the highly technical language used by the experts necessitates translation and

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[41] Based upon her own experiences of infertility, Menning recognized a need for a supportive environment. Thus, in the early 1980's she founded RESOLVE, an American network of infertility support groups.

interpretation in order to fully understand how these techniques work. Williams argues that the lack of accurate and publicly available information concerning the health risks and success rates of *in vitro* fertilization is directly linked to the medical monopoly on expertise.

Noting that many women undergoing *in vitro* fertilization may be ill-informed about the side effects of drug regimens and the possible adverse reactions of prolonged treatment, some feminists articulate deep reservations about the adequacy of informed consent procedures and the context in which women give "consent". Noting that consent forms really serve only to protect physicians from legal liability, and do little to ensure that women are fully aware of the possible consequences of *in vitro* fertilization treatment, feminists, such as Rothman (1989), have called for revamped "informed choice" procedures wherein women contemplating *in vitro* fertilization would receive counselling on the full range of options available for resolving the infertility crisis. Given the necessity for patient confidentiality, it is difficult to know how many women are advised of other options. *In vitro* fertilization participants fearing for their own status in an *in vitro* fertilization program, are reluctant to criticize clinical procedures and in some instances these women may be deterred from even talking to each other about their experiences.[42] Thus, feminists and infertile women are in agreement that public dissemination of information must be improved and that physicians should bear greater responsibility for this (Menning 1981).

Medical control over the administration and practice of *in vitro* fertilization results in doctors making decisions about when technological intervention is indicated and what levels of risk are acceptable. As a result, medical appropriation of knowledge about women's bodies and bodily states (such as pregnancy or infertility) increases in tandem with the expanded use of highly sophisticated technologies. Feminists have explored this dimension of the medicalization of society in recent work on ultrasound technology and the impact which this fetal imaging device has upon women's experience of pregnancy (Patychuk 1985, Rothman

[42] Personal discussions with a woman undergoing *in vitro* fertilization in Vancouver, B.C.

1986, Petchesky 1987). For women undergoing ultrasound, a common occurrence with *in vitro* fertilization pregnancies, the tendency is to seek external, objective proof of the pregnancy in order to confirm the questionable physical and subjective reality of a pregnancy. For Petchesky, this impulse to "see inside" dominates ways of knowing about pregnancy and tends to discredit women's felt experience. Rothman (1986) uncovered similar findings in her study of prenatal diagnostics, noting that until women receive reassuring amniocentesis results the pregnancy is categorically "tentative". Further, a recent Swedish study of pregnant women concluded that routine ultrasound screening would result in more accurate prediction of the due date. This would, in turn, result in fewer inductions before the baby was ready and thus, less fetal distress and fewer emergency Caesarean sections (Globe and Mail, April 16, 1988). This self-perpetuating cycle of technological dependency alienates women from their sense of what is occurring within their own bodies and serves to further remove them from the decision-making process. Women's knowledge (in this case of the date of conception) is devalued as diagnostic technology replaces the importance of the patient's own description of what is happening. However, as Petchesky (1987) argues, some women derive pleasure and comfort from seeing the visual image; a factor which reminds us that "the difficult questions about how women ought to use reproductive technologies cannot be answered from the standpoint of a common reproductive consciousness" (Stanworth 1987a:5).

A further example of the use of diagnostic information concerns the common and misleading medical practice of including statistics on the rate of chemical pregnancies[43] with confirmed viable pregnancies resulting from *in vitro* fertilization (Soules 1985). Such diagnoses inflate clinical success rates while deceiving infertile couples. For women who have been clinically diagnosed as pregnant, but subsequently discover that this was merely a temporary

[43] Chemical pregnancies are very early pregnancies, detected through clinical analysis of blood chemistry. At this stage, the pregnancy is usually undetectable by the woman or by routine diagnostics. Nearly 25 percent of chemical pregnancies are lost before they are detectable by routine clinical practices and hence, they should not be included in the success rates for *in vitro* fertilization (Bryant 1990:8).

fluctuation in blood chemistry, it is difficult to determine when and if technology may be trusted to confirm hope. Nonetheless, many *in vitro* fertilization participants stress that they feel they are getting closer to pregnancy with each cycle of treatment - a false probability - fostered by doctors who may encourage use of *in vitro* fertilization as a diagnostic test useful to locating the causes of unexplained infertility (Williams 1988).

At a broader level, feminists have also addressed the hidden agenda of those in control of policy concerning the "medically indicated" criteria for *in vitro* fertilization and related conceptive technologies. Pointing out that most Canadian clinics stipulate that "treatment" with *in vitro* fertilization is only available to stable, married (heterosexual) women under the age of forty, Williams (1986a) unmasks the specific judgements being made about the relative social and gender-specific importance of biological parenthood. Once recommended only for women with blocked or non-existent fallopian tubes, *in vitro* fertilization is also now considered an option for couples with male infertility factor. In effect, this means that a perfectly healthy and fertile woman will undergo all of the tests, drugs, egg collections and implantations of *in vitro* fertilization in order to bear her husband's (or partner's) child.

At the same time, however, applications for *in vitro* fertilization from unmarried and lesbian women are not generally considered in Canadian clinics as it is felt that this "would provoke public controversy and endanger the existence of IVF programs which rely on public acceptance for their continued existence" (Williams 1986a:6). Medical criteria for *in vitro* fertilization include a range of *social criteria* reflecting traditional and patriarchal assumptions about who is fit to mother and who is not. If, as the medical profession claims, these technologies were created to help infertile women, such normative judgements would not comprise an important aspect of treatment. Instead, these judgements reveal to many feminists that beneath the veneer of rhetoric about reproductive "choice" lies a normative bias toward reproducing the nuclear family and the dominant ideology of motherhood.

2.2.6 Fetal Rights and Who is Fit to Mother

Patriarchal values underlying access to techniques such as *in vitro* fertilization reflect the medical research community's desire to maintain public approval. Feminists, aware of this bias, have drawn attention to the fact that *in vitro* fertilization provides physicians and researchers with an unprecedented level of access to the raw materials of reproduction (i.e., eggs, sperm and embryos), essential components in the continued development of techniques in reproductive and genetic engineering. Seeking to assuage public opinion, researchers must increasingly contend with the politically sensitive questions of how "spare embryos" should be treated; whether or not it is permissible to create embryos for the sole purpose of conducting research; and how long it is ethically permissible to maintain an embryo in the laboratory.

As Mies (1990) argues, low success rates of *in vitro* fertilization require that more embryo research be conducted if the technique is to be truly successful. For this reason, new definitions of the embryo have been devised; now a *pre-embryo* up until 14 days, the human embryo itself is increasingly becoming defined as human, or non-human, in order to suit the needs of researchers ever vigilant about the threat of public outcry. Indeed, Mies (1990:438) cites the well-known animal rights activist and bioethicist Peter Singer who says that "[in] lacking any capacity for experience, it [the embryo] is much more like a lettuce than a person or even a laboratory mouse or rat". Noting that the case for non-humanness of the embryo is essential to embryo research since this requires that "spare embryos could be thrown away or artificially aborted", Mies is concerned to observe that nowhere is it mentioned "that an embryo is part and parcel of a woman, that it cannot live outside the symbiosis with the woman". Without romanticizing the embryo, Mies (*ibid*) concludes that "the first division, therefore, is that of the embryo and the woman".

The devaluation of the embryo necessary to making embryo research a palatable venture stands in contrast to a concomitant inflation of the importance of the fetus once it is

growing within a woman. As a "spare" embryo, potential human life is expendable; researchers freeze, dissect and discard embryos in the name of scientific investigation. However, once implanted in a woman's uterus, the embryo acquires a greater importance than the woman who nurtures and sustains it. Noting this contradiction, feminists have argued that the "fitness" to mother is becoming increasingly defined by the degree to which a woman is willing to submit to the moral authority of the medical profession and state in determining what is in the best interests of the fetus. Recent advances in "fetology", a new branch of prenatal medicine concerned with the health of the fetus in-utero, coupled with a resurgence of public concern over "fetal rights" have fueled this trend (Laborie 1987, Raymond 1987). As a result, pregnant women must observe increasing levels of constraint on their behaviour. For instance, once pregnant, the *in vitro* fertilization participant must continue to submit to technological intervention (in the form of amniocentesis, ultrasound, and/or a Caesarean section) in order to keep the ostensibly pathological nature of pregnancy at bay. The best interests of the fetus assume priority and become the ultimate moral arbiter in the on-going medical appropriation of the pregnant woman's ability to exercise bodily autonomy. Women are seen as fetal incubators, the maternal environment and, with surrogacy contracts, as "wombs for hire" (Vandelac 1988).[44] Further, as women become increasingly dissociated from active intervention in medical decision-making, women's needs and interests are increasingly viewed as being in conflict with those of the fetus.[45] As Orland (1988:212) describes it,

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[44] Some surrogate mothers confirm that they are able to distance themselves emotionally from what is occurring physically. For instance, during the Vancouver hearings of the Canadian Coalition for a Royal Commission on New Reproductive Technologies, a Canadian woman, who had been a "surrogate" mother for her sister and brother-in-law, revealed that because she was able to view herself as a "hotel room" for nine months, she was able to carry the baby without coming to view it as her own.

[45] Two recent precedent-setting cases highlight this tension. In British Columbia, "Baby R" was apprehended before birth by the provincial Ministry of Social Services when the mother refused a Caesarean section considered medically necessary to the survival of the baby. Even when she gave last minute verbal consent, the apprehension was stayed since she was considered unfit to be a mother (The Vancouver Sun September 4, 1987).

A second case is that of Pamela Rae Stewart, the first American woman charged (in 1986) with criminal liablity for her conduct during pregnancy. Medically advised of a

"[p]regnant women are delivered by technoapparatus medicine in a double sense: from their child, but at the same time too, from their own responsible relations with the being that is growing in their body".

In short, the separation of various components of the reproductive experience is brought about by the increasing ability of modern medicine to intervene in, and alter, natural bodily processes. Including the technical practices of gamete and embryo donation, cryopreservation and embryo transfer as well as the social practice of surrogate motherhood, the expanding use of *in vitro* fertilization divides the process of reproduction into a number of discrete stages — with *in vitro* fertilization, a child could have as many as five parents (if a woman gestated a donated embryo and subsequently turned the baby over to two social or adoptive parents). Coupled with the technology of *in vitro* fertilization and embryo transfer, surrogacy arrangements further rupture the links between genetic, gestational and social motherhood. For many feminists, this raises profound questions about who is to be considered the "real mother" and how children conceived through *in vitro* fertilization will feel about their laboratory origins.

2.2.7 Quality Control and the 'Precious Product'

Through *in vitro* fertilization, embryo transfer and gamete donation, researchers have used their access to eggs, sperm and embryos to develop and experiment with a range of techniques in genetic screening and manipulation. For instance, it is argued that we will soon have the ability to select for particular known genetic traits and ultimately to correct defects and/or create new forms of life. Pre-conceptive sex selection procedures, already available in private Canadian clinics, are among the first of these "quality control" procedures to be

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[45](cont'd) dangerous condition in which the placenta can tear away from the uterus causing haemorrhaging and fetal death, Stewart, unable to care for her other children, required have total bedrest. Furthermore, it is unclear as to whether her boyfriend may have forced intercourse upon her, thus initiating the trauma which resulted in a shortage of oxygen to the baby, who was born brain-dead and ultimately died (Bonavoglia 1987:93).

widely implemented. Although techniques for sex-preselection are not 100 percent effective, boys can now be selected with an 85 percent chance of success (Office of Technology Assessment 1988). Techniques for selecting girls are, on the other hand, not nearly as well developed or in such high demand. Internationally, there is a great demand for male sex-preselection technology and research has shown an almost universal preference for male (or male first-born) children (Spallone and Steinberg 1987). However, whether pre-conceptive or post-conceptive,[46] sex selection techniques have aroused enormous controversy in the public domain as well as among feminists. Deploring the "choice" to abort female fetuses because they are female, feminists are accused of being inconsistent with respect to a woman's right to choose.[47] Many feminists, however, view sex selection as the ultimate form of sexism; radical feminists in particular, view it as "gynocide" or "femicide" - the deliberate killing of the potential to become female.

Further, although it is not yet possible to select for eye or hair color, it is estimated that sometime in the 1990's scientists will have completed mapping of the entire human genome (Sylvester and Klotz 1987). While this project may increase our ability to detect and "treat" genetic defects leading to congenital disease, fears are that it will lead to the application of "positive" eugenics - the building of "a better man". For example, through fiscal or political incentives, only selected, or allegedly superior, humans would be encouraged to reproduce.

Given advances in embryo transfer technology, surrogate motherhood contracts may also take on a new and racist twist. In the U.S., a surrogate mother is currently paid about $10,000 for her services - a fee which amounts to less than minimum wage on an hourly

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[46] Ultrasound and amniocentesis will also disclose the sex of the fetus but not until the second trimester of pregnancy. Chorionic villi sampling (removal of a sample of fetal cells), usually done at 9 - 12 weeks, will also disclose the sex of the fetus.

[47] This position was developed by several anti-abortion intervenors at the public hearings of the Canadian Royal Commission on New Reproductive Technologies held in Vancouver, B.C., November 1990.

basis. With embryo transfer, there is great potential for the exploitation of women in poverty-stricken countries. Hired simply as incubators for embryos, these women would be "authentic surrogates" - contributing none of the genetic material. Clients, concerned with skin color and "the breeder's" IQ, would no longer worry about screening and the women contracted might be satisfied with a fraction of the standard $10,000 fee (John Stehura, President of the Bionetics Foundation, cited in Corea 1985). Many feminists worry that commercial application of these practices will lead to a new "breeder class" of women. Radical feminists, in particular, view this possibility as the equivalent of reproductive prostitution (Corea 1985, Raymond 1989).

2.2.8 The Commercialization of Reproduction

Many of the most disturbing questions related to the development and application of the new reproductive technologies are derived from the fact that reproduction is becoming increasingly commercialized. For instance, it is now possible to buy and sell reproductive materials and services. Transactions may be taxed and a variety of legal and medical fees may be applied for services rendered.[48] The creators of new life forms are awarded patents[49] and the developers of new techniques are opening franchise operations to offer their services to a broadening clientele.[50] Through such commercial ventures, the end "products" of reproduction become commodities valued according to market demands.

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[48] With the Goods and Services Tax, Canadians now pay tax on donated sperm used for artificial insemination. It is not clear whether this falls under "goods" or "services".

[49] Coming into line with 18 other countries, Canadian plant breeders may soon have legislation allowing for patents on plant materials they have developed. Bill C-15, the Plant Breeders' Rights Act, is favoured by the private sector as it will allow companies to collect royalties for patented plants (The Vancouver Sun February 17, 1990). The first patent on an animal was granted in 1988 to Harvard University for a new cancer-susceptible mouse. Almost any type of animal (except humans) can be considered for a patent (The Vancouver Sun April 16, 1988).

[50] Embryo transfer techniques provide a interesting case study in how American entrepreneurial activity has seized upon investors' enthusiasm for biotechnology. See following discussion.

New reproductive technologies, which are just one facet of a rapidly expanding biotechnology industry, are closely linked to developments in animal husbandry. The cattle breeding industry, which pioneered techniques in artificial insemination and embryo transfer, now boasts the ability to clone one or many identical animals from a single embryo (The Vancouver Sun, March 5, 1988). Once refined, this controversial development holds the potential for highly profitable commercial application. Furthermore, with the exception of cloning, these same techniques are now being offered as infertility services and in the U.S., in particular, they are generating considerable excitement as a lucrative new area of investment. For example, two of the original U.S. biotechnology corporations, Genentech and Cetus, set Wall Street records for the fastest increase in price per share and the largest amount of money raised in an initial public offering of shares (Bullard 1987). A third company, Fertility and Genetics Research, which pioneered the technique of embryo transfer in cows, is now setting up a network of profitable human embryo transfer clinics in the U.S. (Corea 1985). The founders of Fertility and Genetics Research, (two brothers, ironically named Dr. Randolph and Dr. Richard Seed) have, however, had some difficulty in locating sufficient numbers of "egg donors". As Dr. John Buster (a physician involved in setting up the Fertility and Genetics Research embryo transfer program) announced, concern about the long-term availability of "the primary resource" (i.e., women) may stall investor confidence (Nova April 20, 1987).

Another significant aspect of the business of reproduction concerns the extent to which pharmaceutical and insurance companies exert strong sanctions in favour of increased technological intervention in reproduction. Noting that the "growth of scientific interest in IVF, the establishment of a new medical/scientific field in reproduction and their support from professional and capital interests are key features in the normalisation of a new reproductive technology", Burfoot (1990:61) pinpoints the vested interests of two major pharmaceutical companies (Organon and Serono) in providing the hormones required for the superovulation

and control of ovulation in *in vitro* fertilization. Further, these pharmaceutical giants often sponsor major conferences for specialists in the field, providing complimentary drinks, literature and even football tickets to physicians who practice or might be encouraged to practice *in vitro* fertilization.[51]

Insurance companies providing malpractice coverage, particularly in the highly litigious American context, may also encourage physicians to rely heavily upon diagnostic testing and extensive technological intervention in the birth process. However, as Bonnicksen (1989:102-105) argues, the recent inclusion of *in vitro* fertilization under the coverage of many U.S. health insurance plans indicates that financial entitlement to coverage for previously excluded infertility services may lend an air of credibility to *in vitro* fertilization and increase demand. Significantly however, the Medicaid program (for low income and welfare recipients) does not include infertility services in its coverage (*ibid*). In an excellent essay on the political economy of health care in Britain, Lesley Doyal argues that inequities in the distribution of health care resources are particularly acute for services associated with fertility control. Thus Doyal (1987:188) concludes that "the debate about IVF may be largely a red herring, diverting attention away from the equally important problem of how to prevent infertility in the first place".

2.3 Diverging Feminist Analyses of New Reproductive Technologies

The foregoing survey of feminist concerns about the health risks, problems, and social implications of *in vitro* fertilization and related techniques indicates that feminists have good reason to reject the dominant therapeutic paradigm. Questioning the degree to which these techniques increasingly provide men, the medical profession, and the state with the tools necessary to wrest control of the reproductive process away from women, feminists have

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[51] Personal conversation with the wife of an *in vitro* fertilization practitioner.

successfully focused attention on what new reproductive technologies may mean for women's reproductive health and autonomy. As stated at the outset, mainstream medical, legal, and ethical perspectives on new reproductive technologies have overwhelmingly failed to look at the use of new reproductive technologies from woman-centred perspectives.

In particular, all feminists (whether liberal, radical, or socialist) agree that the definition of infertility should be revised in order to reflect "natural" rates of conception and prevent premature, or possibly unnecessary, medical intervention. Significant health risks associated with the use of fertility drugs must be monitored and made public, and standardized measures of *in vitro* fertilization success rates must be implemented. Information about all such health risks and success rates must be routinely included in advising women of their options for infertility treatment. Moreover, because existing informed consent procedures do little to ensure that women are fully advised of all possible courses of action, many feminists have also indicated the need for unbiased third party counselling. This would broaden informed consent procedures to include consideration of the social context in which decisions are made and hence, would allow for more fully informed choice. Further, medical criteria used to determine eligibility for *in vitro* fertilization and related techniques should not reflect normative judgements about who is, and who is not, fit to parent. For instance, single and/or lesbian women should not be excluded from *in vitro* fertilization programs on the grounds that they are not in a stable heterosexual relationship. Finally, infertility prevention programs must be developed and implemented.

These moderate requests for revisions to the current clinical use of *in vitro* fertilization and related techniques, represent a consensus amongst feminists that, at minimum, the medical profession's control over these techniques must be more closely monitored and regulated. Beyond this broad level of agreement, however, liberal, radical and socialist feminist analyses of new reproductive technologies reflect a wide range of views about the probable consequences for women of increased technological intervention in reproduction. On the one

hand, liberal feminists view new reproductive technologies as an enhancement of women's reproductive freedom and choice, so long as they are properly regulated. On the other hand, radical feminists regard new reproductive technologies as a threat with great potential to undermine women's reproductive autonomy. Socialist feminists, while sympathetic to the wishes of infertile women who seek to use new reproductive technologies, nonetheless regard these techniques as a form of women's alienation from the reproductive process.

The following discussion sketches the chief characteristics of liberal, radical and socialist feminist perspectives on new reproductive technologies.[52] As one of the few published analyses of the three feminist perspectives on new reproductive technologies, Rushing and Onorato's paper, "Controlling the Means of Reproduction: Feminist Theories and Reproductive Technologies", provides a useful reference point for this task. In short, Rushing and Onorato (1987:1) argue that differing feminist perspectives on new reproductive technologies "stem from basic disagreements over the nature of patriarchy in general and the function of reproduction in particular". Departing from their focus, I argue that feminist disagreements also arise from important, but hitherto unexamined, assumptions about the nature of technology, the relationship between technological and social change, and women's limited ability to intervene in and alter the methods, projects and aims of science and technology.

2.3.1 Liberal Feminist Perspectives

As the most moderate voice in the cacophony of feminist responses to new reproductive technologies, liberal feminists espouse the view that technological intervention in reproduction will, with adequate regulation, enhance women's reproductive choice and freedom (Menning 1981 and Andrews 1989). Sharing with many infertile women the conviction that women must have the right to choose between any existing options for resolving their infertility, liberal feminists adopt a highly individualistic approach to considering the potential benefits and risks

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[52] See Jaggar (1983) for a comprehensive discussion of liberal, radical and socialist feminist theory.

of increased technological intervention in reproduction. While recognizing the importance of women's rights to engage in or refrain from childbearing, liberal feminists reflect the view that if individual needs are met then society as a whole will be good and just (Rushing and Onorato 1987).

As a reflection of the dominant social values of Western democracy, liberal feminist perspectives on new reproductive technologies emphasize the importance of protecting an individual's right to privacy. Within the context of a male-dominated society, women's reproductive rights have been impinged upon, though this is no more or less significant than any other infringement of women's individual right to privacy.

For liberal feminists, increased technological intervention in the process of reproduction is considered a question of personal choice or at least a matter for the woman and her partner to decide, usually in consultation with a physician (Menning 1981). Hence, liberal feminists argue for equitable access to reproductive technologies for all women, and believe that the state should enact legislation to ensure individual reproductive rights and proper informed consent procedures.[53] Unlike many radical and socialist feminists, liberal feminists do not always distinguish between *informed consent* and *informed choice*;[54] this reflects some liberal feminists' tendency to gloss over the social context in which decisions are made. Other liberal feminists, such as Barbara Menning (founder of the infertility support group RESOLVE), strive to enhance reproductive decision-making by providing support and information to women considering the use of techniques such as *in vitro* fertilization. From a

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[53] Informed consent procedures require that patients are advised of the risks and probable outcomes of any treatment or surgery. Often, this procedure may involve little more than the signing of a document designed to ensure the physician's freedom from legal liability.

[54] As an alternative to informed consent, informed choice requires that patients and physicians consider the social context in which reproductive decision-making occurs. For instance, before prescribing the birth control pill, physicians would discuss with their women patients a range of birth control options. These options would be evaluated in light of the woman's domestic situation, cultural or religious preference etc. as well for the immediate health and longterm health implications.

liberal feminist perspective, women must however play a central role in developing and administering the policies and legislation governing new reproductive technologies (Andrews 1989).

Viewing the body and body parts as property (Andrews 1989), liberal feminists implicitly accept that, as autonomous individuals, we own our bodies in much the same way as we own any other property. In this sense, we are free to do as we wish with our bodies and body parts — this freedom extends, in its widest interpretation, to the right to engage in the practices of surrogate motherhood, egg donation and/or prostitution (Jaggar 1983). In particular, liberal feminists such as the prominent U.S. lawyer Lori B. Andrews, have argued that women have the right to control their bodies and, hence, also have the right to donate eggs or to engage in pre-conceptive motherhood contracts. A "surrogate mother" who gestates an embryo for another couple thus has no claim upon the resulting child and the "real mother" is clearly the genetic and social mother. In the case where a woman agrees to be artificially inseminated for the purposes of bearing a child for a couple unable to have their own, the genetic contribution of the contracted woman does not nullify the privileged standing of the contracting couple, even if the woman should change her mind about relinquishing the child upon birth. A contract signed is a contract to be adhered to.

In reference to the arguments that strong pronatal societal pressures coerce women into using *in vitro* fertilization, or that surrogate mothers are unable to predict how they will feel about relinquishing the child they have gestated and given birth to, Andrews (1989:369) states that it is her "personal opinion that it would be a step backward for women to embrace any policy decision based upon a presumed incapacity of women to make decisions". Women are as fully rational as men and hence, to insist otherwise is to jeopardize existing progress toward gender equality.

In summary, liberal feminists do not offer a systematic critique of the commercialization of reproduction through new reproductive technologies, nor do they strenuously object to the way in which these techniques vest increasing power in the hands of the medical profession and state. Proper regulation of the medical profession and judicious reform of existing legislation will — granted, with no small amount of effort — ultimately provide a conducive social framework for women's enhanced reproductive freedom and choice. Hence, technological change poses no indelible threat to women's equality or reproductive autonomy.

2.3.2 Radical Feminist Perspectives

Summing up the radical feminist critique of new reproductive technologies, Maria Mies (1985) asks, "what do we need all this for?" None of our so-called future technologies (including reproductive and gene technology) are really developed and applied in order to satisfy pressing human needs. Rather "[they] are technologies which offer solutions for which the problem has yet to be found" (Mies 1990:440). Stressing the patriarchal domination of women and nature as the underlying motivation for the pursuit of science and technology,[55] radical feminists, in particular, charge that reproductive technology represents male seizure and control of women's reproductive process. With *in vitro* fertilization, the continuous experience of motherhood is reduced to a set of discrete stages, and then reassembled in the laboratory by the "technodocs" and "pharmacrats" (Corea 1985).

Tracing the origins of physicians obsession with dominating and controlling reproduction, Corea (1985:250) argues that for men the womb is a dark and dangerous place, "both life-giving and death dealing". Citing anthropologist Sheilia Kitzinger, Corea goes on to explain how obstetricians have come to feel that pregnancy might proceed more efficiently if the mother (and the deadly womb) were not around. Noting that "the prospect of an

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[55] See Carolyn Merchant's book, The Death of Nature: Women, Ecology and the Scientific Revolution, for an analysis of the violence inherent to the scientific domination and subordination of nature.

artificial womb fills commentators - including obstetricians, ethicists and journalists - with deep enthusiasm", Corea (*ibid*) and other radical feminists look to the future with trepidation, fearing that ultimately women's bodies will be dispensed with and the fetus will grow in "a glass and steel 'mother machine'".

In this respect, the comments of physicians and scientists have proven to be a rich source of insight for many feminists critical of recent scientific advances. Noting that many scientists are motivated to conduct research for reasons clearly divergent from the moral imperative cited by Dr. Steptoe,[56] radical (and some socialist) feminists have also pointed out the connections between reproductive and genetic engineering and militarism. As Mies (1990:440) claims, atomic technology, computer technology, gene technology and reproductive technology "were partly invented for military purposes and now civilian markets have to be found for them".[57] In vitro fertilization, as a source of eggs, sperm and embryos, is vital to the research interests of those who seek greater control over the genetic characteristics of the population at large, be it for "defense" purposes, corporate profits or eugenics. Whether these research endeavors are targeted at the apparently benevolent elimination of genetic disability, or the explicitly coerced sterilization of women of colour, these larger projects are linked and developments in one area necessarily have far reaching implications for other areas.

As noted in Chapter One, radical feminists priorize the importance of women reclaiming reproduction and sexuality through the rejection of, and resistance to, violence against women and male control of women's bodies; whether this be in the form of pornography, rape, prostitution, or harm inflicted by the male medical profession. Based upon extensive research and interviews with women undergoing *in vitro* fertilization, Renate Duelli Klein (1988:104)

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[56] Dr. Steptoe was convinced that our humanness is ultimately dependent upon our ability to intervene in and control nature. Not to do so is, in a sense, immoral. "Why", he asked, "should we sacrifice the infertile to the fertile?" (CBC Radio, April 30, 1987)

[57] For instance, the Human Genome Initiative has isolated the project of creating genetically altered bacteria for the purposes of race-specific biological warfare (Personal conversation with Judy Rebick, President of the National Action Committee on the Status of Women, Canada).

offers one of the most cogent statements of the radical feminist view of *in vitro* fertilization as violence toward women.

> This medical experimentation on women's bodies is a new form of violence against women, and, instead of curing a problem it often creates one: psychological and physiological illness. Procedures associated with the new reproductive technologies - which supposedly assist the production of a child - amount to a violation of a woman's bodily integrity, of her physical health and mental sanity, and, in fact, quite fundamentally of her dignity as a human being.

Further, radical feminists argue that this violence done to women in the name of benevolence is obscured from public view and absent from medical reports and research on the safety and efficacy of infertility treatments such as *in vitro* fertilization.

Taking a firm stance that informed consent is a "farce" when women are "in such a vulnerable position", radical feminists such as Renate Duelli Klein (1988:109) argue that *in vitro* fertilization is a "constructed choice" and not a "real choice" and hence it is meaningless to talk about informed consent. Likewise, for Corea (1989:182), the consent procedures for *in vitro* fertilization and surrogacy contracts represent "junk liberty [which] is for the people the patriarchy would like us to be: junk people, junk women ... Women who act like machines. Women who let themselves be used and then quietly throw themselves on the junk heap".

Based upon these concerns, many radical feminists argue that new reproductive technologies represent an unmitigated threat to women.[58] New reproductive technology is inherently threatening because it is controlled by a powerful male-dominated medical profession (Corea 1985 and Spallone 1989). This technology cannot be a source of liberation for women as long as it is defined and administered within a patriarchal context. Arguing that women are coerced into using new reproductive technology by a system of male authority, some radical feminists have been accused of being insensitive to the plight of the infertile. Fearing that women are becoming increasingly alienated from the process of

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[58] The Feminist International Network of Resistance to Reproductive and Genetic Engineering literature contains many strong statements to this effect.

reproduction (compartmentalized into separate roles as egg donors, gestational incubators and social mothers), radical feminists argue that new reproductive technologies will only serve to exploit women and deliver further control to men, the medical profession and the state. Thus, radical feminist responses to this technology are passionate calls for resistance, with little room for liberal reform. Energy should be directed toward deterring women from using particularly invasive procedures such as *in vitro* fertilization and embryo transfer.

2.3.3 Socialist Feminist Perspectives

Calling the radical feminist projection of the future into question some socialist feminists, such as Michele Stanworth (1987a:4), emphasize that "reproductive technologies need to be put firmly in their place, as one dimension - but not necessarily the most important - of the forces that shape reproduction and the lives of women, men and children today". Reminding us that an "overemphasis upon technology distracts attention from the politics and organization of health care in general, from the legal system which frames our rights over our bodies and our children, from political struggles over the nature of sexuality, parenthood and the family and from the impact of varied material and cultural circumstances in which people create their personal lives", Stanworth is clearly opposed to any sort of technological determinism.

Like radical feminists, many socialist feminists also describe new reproductive technology as a source of alienation for women (Rothman 1989). Noting that the liberal view of reproductive freedom places a heavy emphasis upon individual choice, but often fails to recognize the socio-economic reality in which affluent, white, heterosexual couples are often considered the most suitable parents, Rothman uses the recent "Baby M" case to illustrate the class-based and sexist nature of the dominant ideology on reproductive rights.[59] Asking

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[59] In 1985, Mary Beth Whitehead, an American working class woman, signed a contract with Dr. William Stern, an affluent and well-educated man. In this contract, Whitehead agreed to be artificially inseminated with Stern's sperm and to bear a child for him. When she refused to surrender the child, a lengthy and highly publicized trial ensued in which the biological

for which women these "substitutes" are available, Rothman (*ibid*:45) argues that;

> Upper-class women can have, can buy some of the privileges of their paternity, using the bodies of poorer women to 'bear them offspring'. And upper-class women can, as they so often have, be bought off with these privileges, and accept men's world view as their own. And so we have women, right along with men, saying that what makes a child one's own is the seed, the genetic tie, the 'blood'. And the blood they mean is not the real blood of pregnancy and birth, not the blood of the pulsing cord, the bloody show, the blood of birth, but the metaphorical blood of the genetic tie. This is the ultimate meaning of patriarchy for mothers; seeds are precious; mothers are fungible.

Thus, for Rothman, mothers are increasingly alienated from the process of reproduction. Providing reproductive labour, mothers are workers whose skills are undervalued, while the product of their labour, "men's babies", is becoming "a precious product"; this, Rothman terms the "proletarianization of motherhood". Likewise, Stanworth (1987a:2) echoes the fact that "it is the involvement of the pregnant and birthing woman which makes the process of reproduction possible" and "it is precisely the significance of her pregnancy which the terms of the discussion deny".

Further removing control of the experience of reproduction from women, new reproductive technology maintains the patriarchal social order. Capitalist relations of production exploit women by transforming reproductive capacity into a commodity, allowing men to profit from the production of human life. Thus, socialist feminists argue that we must examine the social, political, and economic implications of new reproductive technologies. Bearing in mind that new reproductive technologies appear to provide only individual solutions to what is fundamentally a social problem, socialist feminists are doubtful about the progressive nature of this technology but do not dismiss the idea that under certain conditions it may serve some women's interests (Stanworth 1987a, 1987b, 1987c). However, for most socialist feminists, there must be a fundamental transformation of the social relations of reproduction if new

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[59](cont'd) father, William Stern, was awarded full custody. This ruling was upheld on the basis that the contract was, in light of public policy, valid and that it was in the best interests of the child to be raised by the more affluent Sterns. This ruling was subsequently overturned on appeal and Whitehead now has visitation rights. Her daughter, who has two first names, now celebrates each birthday twice, once with the Sterns and once with her biological mother Mary Beth Whitehead.

reproductive technology is to be truly liberatory for women. Reproductive choice cannot occur in isolation and, thus, individual needs will only be met when underlying power structures are changed. Furthermore, women must become involved in the design, and implementation of, reproductive technology if it is ever to reflect women's needs and interests.

2.3.4 Assessing Feminist Perspectives on New Reproductive Technologies

As socialist feminist Barbara Katz Rothman (1989) argues, new reproductive technologies are coercive in the sense that, rather than presenting more choices, they present new choices which may irrevocably alter the process of reproduction for all women. Doubting the liberal feminists' claim that techniques such as *in vitro* fertilization provide more "choice", radical and socialist feminists have drawn attention to the way in which new reproductive technology rapidly gains credibility or becomes "normalised" (Burfoot 1990) and then becomes the accepted and preferred option, despite the fact that there may be little proven benefit.[60] In summary, the fear is that once *in vitro* fertilization is widely accepted it may, when coupled with the technology of genetic screening, allow for pre-conceptive sex selection or the elimination of certain, inheritable diseases and thus become the medically preferred method of reproduction for all women. If this should occur, the process of reproduction will be further subject to the control of the medical profession and women will continue to exercise less and less control over their own experience of pregnancy. Furthermore, insufficient resources are being devoted to the prevention of infertility and as a result, new reproductive technologies are rapidly becoming accepted as a technical solution to a problem which may have other more feasible and socially acceptable solutions (Doyal 1987).

Like radical feminists, socialist feminists emphasize that gender inequality is a reflection of the underlying power structures in society. Socialist feminists are, however, more cautious than radical feminists about postulating all-encompassing theories of male domination or near

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[60] See also, Beck-Gernsheim (1989) for a similar analysis of how reproductive technologies are becoming routinized and sanctioned forms of alternate reproduction.

technological determinism. Recognizing that sex, race, and class contribute to many unique and differing experiences of infertility and reproduction, socialist feminists are seldom convinced by radical feminist perspectives which may falsely universalize women's reproductive experience (Stanworth 1987b). Incorporating a class analysis, socialist feminists argue that new reproductive technologies affect women differentially; in some instances they may serve women's needs but in other instances they may prove to be a source of women's exploitation. As a consequence, few socialist feminists are willing to adopt the hardline tactics of radical feminist opposition to new reproductive technologies, preferring instead to focus their critique on the social structures which perpetuate women's alienation from the reproductive experience.

Arguing that equitable social policies will ameliorate the negative effects of new reproductive technologies, liberal feminists implicitly perceive technology as a neutral tool, its good and bad effects contingent upon the motives and morals of its users. Contrary to the determinism of radical feminist analysis, the voluntarism of the liberal feminist view blinds us to the way in which the design and implementation of new reproductive technology reproduces and exacerbates existing gender, race and class inequities. Thus, the liberal feminist position has only limited usefulness for the task of connecting individual reproductive agency with the historical and social consequences of new reproductive technologies for all women. While severe this deficiency does not, however, preclude the usefulness of a restored sense of agency; nor does it detract from the importance of continued feminist theorizing about infertility and involuntary childlessness as social problems with important and unexamined dimensions.

Bearing in mind the difficulty of finding a common or universal standpoint from which to assess women's collective reproductive experience, it is significant to note that each of the three feminist perspectives on *in vitro* fertilization and related techniques deals rather differently with the tension between individual autonomy in reproductive decision-making and the existence of socially prescribed or coerced choices. Liberal feminists view each reproductive

technology as distinct and delegate the right to make personal decisions about which technologies are to be used or rejected to individual women. Linkage between individual decision-making and historically and socially prescribed choices and pressures is therefore weak. Rejecting the notion that women share a universal reproductive consciousness or experience, socialist feminists stress the *class-specific* nature of women's oppression and argue that specific technologies must be examined individually in order to determine their potential benefits or harms. Both stand in contrast to the radical feminist position in which existing and potential reproductive technologies appear to be linked as part of a seamless cultural web contributing to the universal oppression of women.

Indeed, the universalizing tendencies of radical feminist analysis are echoed in much of the feminist literature on medicine as social control. In this literature, women appear to be totally vulnerable to the will of male physicians — unable to guard their own self-interests or speak up for themselves about what they consider to be appropriate treatment. Emphasizing that "women [are] not simply passive victims of medical ascendancy", Riessman (1983:3-4) argues that "[w]omen collaborate in the medicalization process because of their own needs and motives, which in turn grow out of the class-specific nature of their subordination." As women stand both to gain and to lose in this process of medicalization, consensus about seeing particular life problems in clinical terms is always tenuous and ridden with contradictions for women. Further, these gains and loses must be placed in the social, political and economic contexts in which they arise. Socio-economic status, ethnicity, sexual orientation, age and a host of other variables diversify women's reproductive needs, preferences and experiences and thus, it is to be expected that women will exhibit a wide variety of responses to the development and use of new reproductive technologies.

This diversity must not, however, preclude insight into how new reproductive technologies may affect women collectively. Recognizing the manner in which individual actions produce and reproduce social institutions, practices and beliefs, it would be short-sighted to

focus only upon the gains or losses of one class of women without indicating the broader connections between social and historical trends affecting the experience of reproduction and motherhood for all women. As Petchesky (1980) argues, reproduction is "irreducibly social and individual at the same time". Feminists concerned about issues of reproductive freedom and choice must therefore contend with the dual nature of reproduction.

In their analysis of liberal, radical and socialist feminist perspectives on new reproductive technologies, Rushing and Onorato (1987) state that these differing feminist perspectives stem from basic disagreements about the nature of patriarchy and the role which reproduction plays in women's oppression. In short, these authors argue that liberal feminists view new reproductive technologies as a potentially liberating force which must be regulated in order to safeguard and maximize individual reproductive choice; radical feminists view new reproductive technologies as a source of women's universal patriarchal oppression; and socialist feminists view new reproductive technologies as a source of women's alienation in capitalist patriarchy.

In agreement with Rushing and Onorato's analysis, I further suggest that liberal, radical, and socialist feminists are primarily concerned with the social relations surrounding the development and use of new reproductive technologies. Well-armed with a critique of patriarchy and/or capitalism, feminists have devoted much attention to theorizing about how existing social relations must be restructured in order for women to enjoy greater reproductive freedom and choice. However, there has been a lack of attention given to theorizing about the ways in which the artifacts and processes of technology may themselves have an inherent tendency to create and recreate the existing power relations of patriarchy and/or capitalism.

To illustrate the need for a critical theoretical framework for thinking about the relationship between technology and social relations, I offer one brief example of recent feminist research on technological intervention in the management of childbirth. In her

qualitative analysis of women's experiences during labour. Francis Evans (1985) found that pregnant women expressed contradictory views about the use of medical technology in the management of birth. Dissatisfied with the clinical experience of pregnancy, in which women often felt sidelined and humiliated by doctors, the same women expressed a strong desire for *increased* use of medical technology, despite the fact that it provided doctors with even greater control over the birth process. Explaining the ambivalence of these views, Evans states that "in the language of sociology, women were more disturbed and affected by the social relations within which technology is organized than they were by its use *per se*" (*ibid*:113). Evans concludes that "it is misleading to see the central problem as whether or not the technology is used ... instead control over medical knowledge and practice is the crucial issue" (*ibid*:126). If Evans had taken this analysis one step further to ask how it is that control over medical knowledge and practice affects the design, development and use of birthing technology, she might have pondered a larger question. If the women with their feet up in the stirrups were suddenly in control of medical technology, what qualitative changes might we expect?

To paraphrase Marx, women like men, make history but not in conditions of their own choosing. Given that many aspects of the design, development and use of new reproductive technologies are deeply troubling to many women concerned with the creation of a more just and equitable society, it remains an important task to clearly delineate a critical framework for the analysis of how technology may impede or facilitate these political goals. It is only through clarity on this central issue that feminists will be able to respond effectively to, and remake, conditions which are not of our own choosing.

At issue then, are the dual questions of how technology is related to the social context in which it exists, and what this implies for women's collective abilities to intervene in and alter the projects of science and technology. Of central importance to Chapter Three is this aim of locating, and defining, a way of thinking about technology in which human agency is

coupled with a pragmatic appraisal of the ways in which capitalist patriarchy is reproduced by and through the knowledge and values embodied in technology.

CHAPTER 3

BEYOND THE TRIPARTITE MYTH: A CRITICAL FRAMEWORK FOR TECHNOLOGY AND SOCIAL CHANGE

> On principle it is quite wrong to try founding a theory on observable magnitudes alone. In reality, the very opposite happens. It is the theory which decides what we can observe. (Albert Einstein, cited in MacKinnon 1989:106)

Sociologists have long been concerned with the study of social causes of change, but few have incorporated technical change as an important factor (Yearley 1988). Economists, though concerned with the impact of technical change, have often treated technology as if it existed outside of the economic sphere, while a number of historians have argued that technological change is not a new phenomenon; it has been recognized as a central factor in social change since at least the Industrial Revolution and thus does not merit special status in the analysis of contemporary social change (Noble 1977).

Rejecting the view that technological change is an extraneous or unimportant factor in the study of social change, Bereano (1984, 1976) and Noble (1977) describe the contemporary era as historically unprecedented. Technological changes are now occurring on a scale unknown to our ancestors and at a pace which has dramatically decreased the amount of time between the initial development and subsequent application of new technologies. The boundaries between the realm of science as pure knowledge, and technology as the "applied arts" of science, are in many cases no longer discernable (Savan 1988).[1] Furthermore, technical innovations are capable of far more extensive effects than ever before. From genetic engineering to nuclear weapons, modern technology has provided us with unparalleled creative and destructive powers but very few answers about how or even if these powers ought to be used.[2]

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[1] It should be noted however, that the existence of an objective or pure science has been extensively disputed in radical and feminist critiques of science (see Benston 1986, Bleier 1984, Harding 1986a, Keller 1985 and Kuhn 1986).

[2] There are clear links between the deployment of nuclear weapons and the study of

The certainty of technological progress, once taken for granted, first came under widespread scrutiny during the 1960's and 70's as the general public became increasingly wary of the accelerating pace of technological and social change in Western industrialized countries. The social and political unrest of the times focused public attention upon issues such as the population explosion, environmental degradation, the Vietnam War and the use of chemical weapons such as agent orange. Books such as Rachael Carson's The Silent Spring and Alvin Toffler's best-seller Future Shock, served to heighten this growing awareness and shake public faith in scientific expertise. With the 1980's anti-nuclear movement and the renewed campaign for ecologically sound resource management, public concern about and involvement with both local and global issues has continued to foster intense skepticism about the desirability of accepting uncritically an ever more technologized world.

However, despite all the undesirable effects of various new technologies, we, as a society, continue to place enormous faith in the ability of science and technology to solve our problems and, scientists in turn appear to share this optimism. Currently engaged in mapping the entire human genome, biologists and medical researchers hope that one day we will have the ability to alter the defective genes responsible for inheritable disorders such as cystic fibrosis or muscular dystrophy. Once available, complete genetic screening of fetal tissue samples may provide a blueprint for an individual's succeptability to a whole range of conditions such as cancer or heart disease (Nova, April 1990). How will we decide what to do with this technology? If we are able to screen out those individuals most likely to develop cancer given exposure to a particular workplace hazard, will the onus be on the employer to ensure worker safety or will an increasingly litigious society proscribe the employer's right to bar such individuals from employment?[3]

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[2](cont'd) genetics. Ironically (or perhaps revealingly), research on radiation and genetic mutation began in Hiroshima and Nagasaki during the immediate postwar years. Dr. James Neel, one of the physicians leading the research effort was a close associate of scientist Curt Stern who worked on the Manhattan project (Kevles 1985:223-224).

[3] Several such cases have already been documented in the United States. In more than one

The recognition of technology as an important social determinant has catalyzed attempts both to understand and manage technological change.[4] Yet, as researchers have discovered, we are often subject to feelings of intense ambivalence about the meaning and experience of technology. This ambivalence is widespread amongst academics, professionals and politicians, but is particularly strong among those most immediately affected by technological change.[5] In Autonomous Technology, Langdon Winner (1977:46) describes this paradox in thinking about technological change.

> On the one hand we encounter the idea that technological development goes forward virtually of its own inertia, resists any limitation, and has the character of a self-propelling, self-sustaining elocutable flow. On the other hand are arguments to the effect that human beings have full, conscious choice in the matter and that they are responsible for choices made at each step in the sequence of change. The irony is that both points of view are entertained simultaneously with little awareness of the contradiction such beliefs contain. There is even a certain pride taken in embracing both positions within a single ideology of technological change.

On the one hand, technology appears to be a neutral set of tools, techniques and practices, fully amenable to conscious human control; on the other, technology appears to be a pervasive characteristic of social organization, carrying its own momentum quite independent from the desires of ordinary people. There may be a kernel of truth in each of these positions, however, as critics of technological change have argued, the polarization between overly deterministic or voluntaristic positions impedes our understanding of the complex interaction of technological and social change (Bush 1983, Leiss 1990, and Winner 1977). As

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[3](cont'd) instance, the individuals concerned carried a recessive gene for a particular known disorder but were not physically affected by it. Nonetheless, insurance companies and employers discriminated against these individuals by refusing life insurance or employment (Beers 1990).

[4] Evolving out of public concerns about the environmental and social effects of large scale technological innovation, the U.S. Congress Office of Technology Assessment was established in 1972. Since that time, the topic of technology assessment has generated a considerable body of literature. See in particular, Dickson (1989) for a critical review and Brooks (1976) for a more favourable assessment.

[5] For example, Balka (1987:30) found that workers displayed an "overwhelming sense that technological change means progress" while at the same time recognizing that "technology changed their jobs in ways they viewed as undesirable".

the preceding chapter suggests, analysis of the theoretical assumptions underlying various feminist perspectives on new reproductive technologies reveals a similar disarray in ways of thinking about technology.

Gay (1986:69) suggests that a good model for the analysis of technology will have "the ability to clarify some of the problems that our ambivalence towards technology poses". Further to this, I would add that a good model must also allow us to understand the source of our ambivalence; that is, a good model must facilitate understanding of how and why popular beliefs about technology obscure the inherently political character of technology.

3.1 Purpose and Outline of Chapter

In this chapter, I review and assess various models for thinking about the relationship between technological and social change. In particular, the chapter draws upon the sociology and political philosophy of technology as well as the contributions of labour process analysts and feminist critics of technological change. New reproductive technologies do not comprise a focal point for this chapter although there are several instances in which they usefully illustrate concepts under discussion. As such, this chapter serves three general purposes within the larger project of the thesis; 1) to describe and critically evaluate various ways of thinking about technology, identifying larger world views compatible with each, 2) to identify distinctive aspects of the technology and social change relationship as it is mediated by sex and class-based inequities, and 3) to highlight the possibilities for strategic intervention offered by each particular way of thinking about technology.

Underlying discussion in this chapter is the tension between technological determinism and human agency. At its most fundamental level, this tension is expressed in opposing views about the degree to which the artifacts and processes of technology are themselves imbued with inherently oppressive or liberatory characteristics.

I begin the chapter by locating a working definition of technology. Given that many definitions are value-laden reflections of deeper ideological views of technology, there is little in the way of common understanding as to what such a definition should include. Nonetheless, agreement amongst theorists of technology, such as Leiss (1990) and Winner (1980, 1977), allows us to proceed under the shared assumption that an adequate definition of technology must include consideration of the social context in which the specific artifacts and processes exist.

Subsequent sections of this chapter examine in turn, what Bush (1983) has referred to as the "tripartite myth of technology" — that is, technology as triumph, threat, or neutral tool. Ultimately, each of these ways of thinking about technology oversimplifies the complex relationship between technological change and social relations; thus, it is an important task of this discussion to locate theoretical deficiencies within each. The technology as triumph and technology as threat perspectives, are opposing versions of the technological imperative. Reflecting strong acceptance of technological determinism, each portrays technological change as an autonomous and self-directed process which will either create new material prosperity or lead us to the brink of disaster. In either case, there seems to be little room for human agency.

Alternatively, there is the proposition that technology is a neutral tool completely governed by the rational application of human will. Technology is neither completely good nor completely bad; hence, we must rationally manage technology in order to maximize potential benefits and minimize potential harms. More difficult to discredit than the first two views, this third way of thinking about technology is appealing because it suggests that we are the "masters" of our own destiny. Nonetheless, as Bereano (1984, 1976), Bush (1983), Noble (1983a, 1977), Pacey (1983) and Winner (1980, 1977) argue, the neutral tool view obscures understanding of the ways in which knowledge and values become embedded in technology, creating an inherent tendency for technology to reinforce existing social inequities.

Built upon a critique of the tripartite myth of technology, is a fourth way of thinking about technology which Beckwith (1987) describes as the "technology is politics school". This view holds that the design, development and implementation of technology is fundamentally a political phenomenon closely related to the distribution of power and the practice of social control. Technology shapes and is shaped by society; therefore it is important to examine the power relations which inform the design, development and use of particular technologies. As such, labour process analysis and the socialist critique of capitalism have added much to the development of this technology-as-politics perspective. The gender-specific implications of technology, however, have been largely left to feminists to articulate.

Drawing upon a critique of capitalism and patriarchy as the dominant value systems shaping technology, I argue that the technology-as-politics perspective offers the most useful framework for feminists and other social activists. In particular, the contributions of Bush (1983), McNeil (1987), Rothschild (1983) and Zimmerman (1986) have pushed the gender-blind analysis of technology-as-politics to a far more powerful analysis. The chapter concludes by summarizing the most significant elements of the technology-as-politics perspective, noting in particular, the ways in which concerned citizens may intervene in the design, development and use of technology.

3.2 Defining Technology

As a relatively new field of scholarly work, the literature on technological change contains a wide range of views but no clear consensus as to how to define and think about technology.[*] Numerous operational and theoretical definitions exist, some highly particular and

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[*] With the formation of the Society for the History of Technology in 1958, the journal Technology and Culture began publication, providing a forum for the emergence of this new discipline. Prior to this, only a small number of works addressed the technology and social change relationship; among these were Mumford (1934) and Giedon (1948). Since 1960 however, a whole range of new sub-disciplines has arisen addressing everything from the impact of household technology (Bose and Bereano 1983, Vanek 1974) and workplace

others broad, but few help to clarify in precise terms the relationship between tools, techniques, technologies and their human counterparts. Of little practical use to social scientists, the Oxford Dictionary definition of technology as "the scientific study of mechanical arts and applied sciences (as engineering)" or "these subjects and their practical application in industry", says nothing of the social aspects of technology. Alternatively, Forbes defines technology as "the product of interaction between man [sic] and environment, based on the wide range of real or imagined needs and desires which guided man in his conquest of Nature" (cited in Leiss 1990:25);[7] an improvement over the more traditional dictionary definition but as Leiss argues, too vague to be really useful and deceptive in that technical phenomena appear to be merely an unintegrated aspect of society. Others, such as Ellul (1967) have defined "technique" as inclusive of nothing less than the whole social milieu and the way in which we think about it. In contrast with the popular use of the term "technology", Ellul's "technique" denotes much more than just the skills, methods or technical side of technology. Clarifying this point, Ellul (1990:xv) states that,

> The problem is one of language. American usage has planted in our minds the idea that the word *technology* refers to actual processes. This is the way the media use the term. But in a strict sense technology is discourse on technique. It involves the study of a technique, a philosophy or sociology of technique.

Referring to this range of definitions, Winner (1977:9–10) notes "there is a tendency among those who write or talk about technology in our time to conclude that technology is everything and everything is technology. In a dialectic of concepts that Hegel would have appreciated, the word has come to mean everything and anything; it therefore threatens to mean nothing".

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[6](cont'd) automation (Braverman 1974) to the history of women as technological innovators (Irvin 1981, Stanley 1983).

[7] Many commentators on technology do not recognize, or observe, the need for gender-neutral language. As Bush (1983:164) argues, with ample illustration, the practice of using he/man to represent all of humanity obscures the role that women have played in technological development; worse still, it gives the impression that men and women derive the same costs and benefits from technological change.

Clearly, a precise definition of technology is not easily agreed upon. The concept is laden with ideological presuppositions concerning the relationship between technology and society. Leiss (1990) and Winner (1977), however, provide a basis from which it is possible to proceed. Distinguishing among tools, techniques and technology, Winner (1977:11-12) notes that the hardware (or "physical devices of technical performance") includes all of the "tools, instruments, machines, appliances, weapons gadgets - which are used in accomplishing a wide variety of tasks" while "the whole body of technical activities - skills, methods, procedures, routines - that people engage in to accomplish tasks" may be included "under the rubric of ***technique*** ". Thus techniques, as "solutions to practical or theoretical problems" may be "considered as operational responses to environmental or theoretical problems". In human societies, techniques may encompass a wide range of activities related to both the material and ideational realms, "saving souls as well as manufacturing steel" (Leiss 1990:29-30). Roughly, then, there are techniques and there are technical artifacts. Technologies, on the other hand, are combinations of techniques which have achieved general significance in particular societies or historical periods. Thus, "technology" includes more than just the tools and techniques; technology "has a social character, albeit not a fixed one, incorporating tools or techniques in an operational context" (Leiss 1990:32).

As Leiss (1990) and Winner (1977) argue, confusion in thinking about the technology and social change relationship arises from pervasive belief in the existence of a technological imperative. Whether optimistic or pessimistic about the effects of technological change, several thinkers have expanded on the theme that it is technology which irrevocably shapes social change.[8] Modern technology, as a powerful force which ultimately sets the parameters for human society, is the harbinger of a new form of social organization dramatically different from the past. This perspective may be reflected in the accepted practice of naming specific historical periods according to their dominant technology (for example the Stone Age, the

[8] Most notably, Jacques Ellul (1967).

Nuclear Age or the Information Age) or more generally in the use of terms such as "technological society", "technocracy" or the "technological order". The question of whether this new era represents progress or inevitable doom is one to which commentators have responded with zeal.

3.3 Technology as Triumph

Proponents of technological development such as Samuel Florman (1981:193), author of Blaming Technology: The Irrational Search for Scapegoats, have argued that science and technology are inherently and universally progressive forces which "simply cannot stop while there are masses to feed and diseases to conquer, seas to explore and heavens to survey". As a triumph over nature and a source of wealth, technology must be used to harness existing material resources and extract the maximum potential for development. Existing problems, whether social or technical, can be resolved through the development and application of new technology. Consequently, it is only a matter of time before technology extends its material benefits to all.

Claiming that there is a moral imperative to pursue technological development, this view of technology as "triumph" is embodied in the statements of many scientists, medical researchers and engineers. As an illustration, the comments of Dr. Patrick Steptoe are typical of those who share the belief that the key to a prosperous future lies in the unfettered development of technology. When asked if new reproductive technology is getting out of hand, Dr. Steptoe (CBC Radio, April 1988) replied,

> I feel that God has given us the brains and skills to use and mankind deserves now to know some of the secrets of reproduction ... Can this be wrong? I don't think so. I think that the advances which are there must be taken by man and used for his benefit and for the benefit of countless people in the future.

This view of technology as inevitable progress finds its early origins in the seventeenth century ideas of Francis Bacon. Bacon believed that the traditional sources of human misery (such as envy and greed) could be overcome "if only society's rulers could be persuaded to champion his project for the conquest of nature by promoting the mechanical arts" (Leiss 1990:4). As Pacey (1983) describes it, this "unfolding of technological rationality" began to seem consistent and inescapable. Increasing interest in the measurable aspects of progress (expressed numerically or by means of graphs) led to the practice of plotting improvement over measured periods of time. This linear view conveyed a sense of "regularity, based on the internal logic of technology ... and encouraged efforts to discover the 'laws' which supposedly govern progress" (*ibid*:24). Technical advances, as the leading edge of progress, would advance human society and any social problems which occurred along the way were due to "cultural lag" or delay in adapting to technological change. Hence the view illustrated by a Chicago World's Fair guidebook from 1933 ... "Science finds - Industry applies - Man conforms" (cited in Pacey 1983:25). Technological change is the key to social evolution and there is little we can do about it other than adapt or be left behind. Thus, as Ogburn (1976:20) states, "from this standpoint, technology is seen as the generator of social problems because of lags in adjustment to mechanical inventions". As the primary impetus for social change, technological innovation waits for no-one and hence problems are a reflection of the correspondingly slower pace of social change.

While this view of technology as inevitable progress has obvious shortcomings, it has held a particular appeal for those seeking to describe the benefits of technological innovation. Endowing technology with the power to transfer manual labour to machines, and improve the quality of everything from the brightness of laundry to the freedom of sexual expression, technophiles have consistently sought to justify unbridled technological development with the promise that a new and improved tomorrow is just around the corner. Rather than questioning the existing disparities in material wealth, we are encouraged to believe that it is

only a matter of time before technology extends its benefits to all.

Recognizing that women's experiences of technological innovation reveal a radical disjunction with this view of technology as the ultimate benefactor, a considerable body of empirical work has documented a wide range of adverse social and political changes directly challenging popular wisdom that technology has been a source of liberation for women. For example, despite the number of new household appliances, the time women spend doing housework has not appreciably declined over the last fifty years (Bose and Bereano 1983, Vanek 1974). Although the burden of hard physical labour has eased somewhat with washing machines, vacuum cleaners and microwave ovens, Rothschild (1983:84) argues that "a technologized household within a technologized society ... has liberated women to perform new kinds of household labour". As consumer, chauffeur, family counsellor, activity coordinator and hostess, women's new skills are equally demanding although less visible. Noting these changes, Karpf (1987:161) states that this is one of the fundamental contradictions of the 'women and technology' debate. "The skills which may have had higher status were also experienced as burdens on women's time and energies." Thus, she asks "are the new skills any less valuable, though they are less visible and do not run on motors or use elbow grease?" Perhaps not, but these new skills have not erased the sexual division of labour or challenged the traditional social relations of the family. It has only been through prolonged and intensive efforts to lobby for such things as universal access to daycare, wages for housework and pensions for homemakers, that women have been able to publicly articulate the importance of domestic work as productive labour.[9] Thus, although technological change has relieved some of the burden of performing arduous domestic tasks, it remains doubtful at best that it has measurably improved the overall status of women. Rather than looking to the development of more "labour-saving" devices, we must ask how it is that technology

[9] See Benston (1969) on the political economy of domestic labour; Luxton (1980) and Jaggar and McBride (1985) on the value of reproduction as productive labour; Dalla Costa and James (1972) on wages for housework; and Gee and Kimball (1987) on pensions for homemakers.

promises so much yet delivers so little in the way of measurable improvements to the average person's quality of life. Abstracting technology from its social and political context obscures such avenues of inquiry, stifling the legitimate concerns of those most immediately affected by technological change.

While it may be easier to effect temporary solutions to problems by way of technology than by trying to change human behaviour, our current propensity toward adopting technical solutions to what are fundamentally social problems is not serving us well. A critic of this view that technical change will bring inevitable progress, Pacey (1983) has used the term "technical fix" to describe the belief that problems can be solved by means of technique alone. Using the example of chemical water treatment to counteract river pollution, Pacey (*ibid*:7) stresses that this technical fix represents "an attempt to solve a problem by means of technique alone, and ignores possible changes in practice that might prevent the dumping of pollutants in the river in the first place". A similar illustration concerns the incidence of infertility; if proper measures were taken to protect workers from hazardous exposure to radiation and toxic substances or to reduce the spread of sexually transmitted diseases, then technical fixes such as *in vitro* fertilization would be far less important. Further, these examples note the way in which a technical fix may simply alleviate the problem's symptoms without effecting any change to the origins of the problem. Thus, a technical fix (such as chemical water treatment or *in vitro* fertilization) may result in the creation of a new spate of problems requiring yet another technical fix.

3.4 Technology as Threat

Sometimes referred to as neo-Luddites, critics of the view that technology equals progress argue the opposite extreme: that is, technology represents a threat which must be halted (or at the very least redirected) in order to preserve human freedom and dignity.

Although much maligned for an anti-technology stance, the Luddites were among the first to recognize that technological change was the vehicle for dramatic social changes in the industrial organization of work. Hence, contrary to the popular view that the Luddites were simply anti-technology, their machine smashing was a deliberate attempt to forestall what appeared to be an inevitable loss of autonomy in the workplace (Noble 1983a).

A classic in the literature on technology theory, Ellul's book, Technological Society, advances the view that economics, politics and culture are inextricably situated within a technical milieu. Technique, which is nothing less than "the whole ensemble of practices by which one uses available resources in order to achieve certain valued ends", has pervaded human endeavours to the extent that we are no longer masters of our own destiny.

For Ellul (1976:35), the new technical milieu is an autonomous system, a closed circle which is self-determining and independent of all human intervention. Constantly striving for the most efficient solutions to problems of increasing complexity, technique "is formed by an accumulation of means which have established primacy over ends". Almost as a law of nature the system expands geometrically, the accompanying loss of human freedom signifying for Ellul (1976:37), an iron cage of the future in which society is "overorganized, overordered, overregulated, in short, technicized".[10]

Pessimistic about the possibility of transforming this situation, Ellul does not offer any avenues for collective hope to counter this bleak vision of the future. As Gay (1986) notes, Ellul does not ultimately believe that it is machines which control our destiny: rather, it is the pervasive logic of "technological society" which sets us on a course of no return. Radically affected by the technical milieu, we are no longer able to master technology

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[10] Outlining the similarity between Ellul's notion of a technicized society and the ordering or "systematic arrangement" of society which Max Weber identified as "the linear process of transformation in all social history", Winner (1977:180) argues that like Max Weber, Ellul laments the 'disenchantment of the world'. Although not quite as pessimistic, Illich (1973) also argues that technological innovations have become institutionalized forms of enslavement which exercise a "radical monopoly" over our lives.

through rational decision-making for rationality, in its subordination of ends to means, is a type of efficiency which is itself subordinate to technique. Technology has become the master and "the human individual is to an ever greater degree the *object* of certain techniques and their processes" (Ellul 1976:38). Individuals may reject this view by taking a personal moral stand but individuals are ultimately powerless in challenging the universality of technique for this would require that everyone reject deeply embedded normative beliefs and values. According to Gay (1986:69), this "runs counter to much feminist theory in which it is claimed that a collective change in consciousness is the only way to transform society and make the system respond to what are identified as human needs".

However, despite his conclusions, Ellul's views on technology are useful to feminists for one primary reason; that is, Ellul regards technique as nothing less than the whole social milieu. Technology is so embedded in a complex web of social, political and economic relations that it is impossible to separate the experience of technology as an artifact or process from the values and norms which permeate all aspects of daily life. For women, who are often on the passive receiving end of technological change and apparently powerless to control the impact which technology has on their lives, technology does appear as a constraint to human agency.

Using the example of workplace automation, Bereano (1984) notes that for the thousands of women who are suddenly given word-processors in place of their typewriters, the phenomenon of technological change is much more complex than simply getting a new, high-powered machine. There is a dramatic redefinition of roles as the women who were once allowed a certain degree of control over the various office functions of typing, filing and answering the telephone are suddenly accountable to key stroke counts in an increasingly rationalized workplace. Thus, Ellul's view that technique is a pervasive social and political phenomenon remains as an important insight which mirrors women's experience to a much greater degree than the abundant optimism of the first view. However, the fundamental

problem of Ellul's view is that we are left without any recourse for action. Human agency is of little significance in the larger scheme of things and, as a consequence, it appears to be futile to engage in strategies for collective change.

In summary, the two views described above (in which it is claimed that all technology is "good" or "bad") share one pervasive problem. By imbuing technology itself with the power to create social change, whether considered desirable or not, each view reflects and reinforces a strong form of technological determinism. Fortunately, however, few social commentators are presently willing to adopt this *prima facie* assumption and the two views described above have been soundly criticized over the last two decades. Much more difficult to discredit, the widely held view that technology is neutral holds that the effects of technological innovations are simply a result of the social and political context in which they are used. Technology can be used for good, or for evil, but technology itself is value-neutral.

3.5 Technology as Neutral Tool

As a rejection of technological determinism, Mesthene's book Technological Change presents an alternate view of technology which emphasizes the voluntaristic character of technological developments. Beginning with the observation that "technological change induces or 'motors' social change in two principal, closely interrelated ways", Mesthene (1970:26) notes that "new technology creates new opportunities for men [sic] and societies, and it also generates new problems for them. It has both positive and negative effects, and it usually has the two *at the same time and in virtue of each other*" (original emphasis).

Defining technology as "the organization of knowledge for the achievement of practical purposes", Mesthene (1970) argues that technology is not an independent force. As technology itself is a neutral element without inherent good or bad moral or political values, it is the

application of human will which ultimately creates the use or abuse of a particular technology. As a factor relevant to the study of social change, technological advances represent crossroads for the achievement of certain socially and politically derived goals or possibilities. Hence, for Mesthene, technological change is a complex phenomenon requiring rational decision-making in order to best manage the range of effects of any new technology. As the product of human agency, technology is thus amenable to human intervention. This recognition is crucial if concerned citizens are ever to play an active role in creating and managing technology. Unfortunately though, in focusing entirely on the voluntaristic character of technology, Mesthene does not account for the significant political constraints upon democratic involvement in the design, development and use of technology.

Ultimately optimistic about the new options which technology makes possible, Mesthene (1970:60) states that technology:

> creates new possibilities for human choice and action, but leaves their disposition uncertain. What its effects will be and what its ends will serve are not inherent in the technology but depend on what man will do with the technology. Technology thus makes possible a future of open-ended options.

Technology, it seems, is generated *ex nihilo*: it exists in a vacuum neither influenced by the immediate political context of its development nor tied to a particular infrastructure necessary for its implementation. Vandermeer (1987) points out that according to this view, nuclear power might be bad under capitalism but good under socialism. Techniques in genetic blueprinting might be useful to find the children of the "disappeared" or harmful if used to enforce a program of eugenics (Beckwith 1987). Thus, although Mesthene recognizes a wide range of desirable and undesirable effects of technology, he tends to ignore how new technological innovations come into existence. There is little or no mention of the social, political and economic underpinnings of technological developments and, hence, attention is focused upon the assessment of technology's effects upon environmental or social change. Basic questions about the political decisions and values related to the development of a particular technology are left unexplored.

Characterizing this use/abuse model of technology as the "technology-in-space point of view", Vandermeer (1987) agrees that there are numerous empirical examples which seem to lend support to this model if we are willing to accept an initial implicit assumption; that is, given technology X floating in space, it is possible to bring it down to earth and use it beneficially or detrimentally. A popular example used to illustrate this argument concerns the development and use of the mechanical tomato harvester. Used to undercut the anticipated organizing activities of Californian farmworkers, the tomato harvester might also be used in Cuba where a chronic shortage of labour has stifled attempts to expand tomato production (a goal promoted in order to make more vegetables available in the Cuban diet). Hence, if the tomato harvester were floating in space and was brought down to earth in California it would be a bad thing, while if it was brought down to earth in the countryside of Cuba then it would be a good thing. However, it is quite obvious that tomato harvesters do not float around in space waiting, along with a myriad of other inventions, for the right historic moment to be plucked from thin air and brought down to earth for human use. Technologies such as the tomato harvester are created with specific intentions and, for the most part, are applied in ways which closely conform with the projects of dominant social groups. The tomato harvester, for instance, was created with the intention of undercutting the organizing efforts of Californian farmworkers. As such, this technology has political and economic underpinnings which are not negated by simply transferring it to another social context. For instance, no matter what is done with the tomato harvester after it has been developed, the initial decision to build this particular machine, and not some other, has solidified existing class relations and exacerbated the practice of creating technologies not for the purpose of meeting basic human needs, but rather for the purpose of increasing management control over workers and generating more profit. Thus, as Vandermeer (1987:21) argues, if we "ignore the rich history of human relations that went into the development and implementation of the tomato harvester to begin with, it isn't surprising to come to a conclusion that likewise ignores it". By ruling out the origins of technological development,

the neutral tool view simply ignores what is most problematic. Technology represents the embodiment of knowledge and values and as such, its purposes and potentials have historic and social consequences which extend beyond the actual artifact or process itself.

Arguing that the neutrality of Mesthene's use/abuse model is deceptive, Bereano (1984:17) believes that it provides decision-making elites with the appearance of rational choice without the substance of democracy. "This free enterprise model says that the problems associated with technology are what the economists call 'externalities' - the unexpected, unintended side effects of things". Confronted with the choice to simply proceed either with, or without, due concern for the consequences of technological change, decision-makers are never held responsible for the corporate control over the production of technological innovations and expertise.[11] Thus, the political and social aspects of technology are masked by the appearance of rational choice. How it is that particular technologies have both good and bad effects at the same time remains obscure.

Gay (1986), also critical of Mesthene's tendency to deal with technology as an isolated phenomenon, agrees that Mesthene's model does not encourage us to treat problems related to technological change at anything more than face value. Although Mesthene recognizes that people may exploit technology for selfish or altruistic reasons, he abstracts technology from its social and political network, neglecting the important issues of why particular technologies are developed, whose interests they serve, and how technology's effects are distributed across society. Hence, Gay concludes that Mesthene's model is of limited use to feminists concerned with having a greater say in the development and use of technology. The question of how women might define and create substantially different technologies of greater practical benefit to women's needs and interests is sidelined by focusing on the rational management of existing technologies. Technological artifacts and processes carry no inherent tendencies or

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[11] The corporate control over the development of technology is a theme which Noble (1977) elaborates upon in America By Design: Science, Technology and the Rise of Corporate Capitalism.

"valence", as Bush (1983) describes it, and as a consequence we have no alternative but to conclude that there is nothing unique about the study of technological change.

Bush (1983:152) argues further that the view that technology is neutral and/or progressive has "long been used to rationalize inequity" for it sustains the belief that "it is only a matter of time until technology extends its material benefits to all citizens, regardless of race, sex, class, religion or nationality". Thus for Bereano and Bush, the view that technology is a neutral tool is worse than useless for it legitimates the ideology of corporate liberalism and subordinates our ability to unmask the mechanisms by which powerful groups create and employ particular technologies as a means to consolidate and extend their power. Furthermore, as Vandermeer (1987) indicates, this view absolves scientists and technologists from the need to assume greater social responsibility in their research and development programs.

Clearly, the problems related to the use/abuse model are sufficient to warrant its rejection as an effective tool for critical analysis. However, in contrast with the two forms of technological determinism discussed earlier, this model does at least restore the possibility of human agency. As Winner (1980:122) notes, the social determination of technology provides "an antidote to naive technological determinism - the idea that technology develops as the sole result of an internal dynamic, and then, unmediated by any other influence, molds society to fit its patterns". However, this "corrective" moves too far in the opposite direction, suggesting that "technical *things* do not matter at all", and that "there is nothing distinctive about the study of technology in the first place". The following section refutes this assumption by examining a theory of technology-as-politics. Integral to this more critical perspective is the notion that capitalism and patriarchy are produced and reproduced through technology.

3.6 Technology as Politics

The dominant theme within the technology-as-politics model is that technological change is fundamentally a political process perhaps more inclined to reproduce and exacerbate existing social inequities than to fundamentally alter them. As Dickson (1986:15) notes "[i]n a material sense, technology sustains and promotes the political system within which it has been developed. At the same time, technology acts in a symbolic manner to support the legitimating ideology of this system - the interpretation that a society places on the world and its position in it". Thus, contrary to theories of technological determinism which portray social change as if it springs directly from technological change, this critical perspective deconstructs what appears to be a seamless web of technologization; revealing how the dominant capitalist and patriarchal modes of social reproduction become incorporated into and reproduced by technology.

Proponents of the technology-as-politics perspective have emerged from two distinct, but largely compatible, branches of social critique. Critics of capitalism, as well as labour process analysts, have contributed to the understanding of how the needs of capital shape the design, development, and use of technology. In this respect, workers have also had much to say about how technological change affects the dynamics of management control. However, in focusing primarily upon technologies of production, this branch of the critique has precluded attention to analysis of technologies of reproduction (i.e., in the broader sense, all domestic production including procreation and childcare). Noting that the "exclusion of gender relationships from historical and sociological studies of technology has impoverished such work", McNeil (1990:6-7) and many other feminists[12] reject the "genderless perspectives of the founding fathers of the social studies of technology". In response, feminist studies of technologies of the "private" or "domestic sphere" have added important new dimensions to

[12] See Bush (1983), Benston (1989), Cockburn (1988), Linn (1987), Karpf (1987), Rothschild (1983) and Zimmerman (1986).

the study of how technology creates and recreates the sexual division of labour.

The following discussion of the technology-as-politics perspective reviews these two branches of critique, showing how technology embodies both capitalist and patriarchal values.

3.6.1 Technology and Capitalism

Social critics, and theorists of contemporary capitalism, have been sidetracked in their critique of technology by two conflicting tendencies. Within the left critique of technology, remnants of the technology as neutral perspective pervade the scientific socialism of some labour process analysts (Benston 1987) while elements of technological determinism sustain the "fetishization" of technology (as dead labour) by focusing too much attention on the hardware of technology (Linn 1987). Left theorists such as Benston (1989, 1987) and Noble (1977) have attempted to resolve these difficulties and, in so doing, encourage a more powerful analysis of the ways in which technology and capitalism fortify and sustain one another.

As noted above, scientific socialism has promoted the view that technology itself carries no moral or political values; after the revolution existing technologies will serve socialism as faithfully as they have served capitalism. This view may hold obvious appeal to those concerned with progressive social change as problems are linked, not to the physical machinery of production, but to the existing organization of production - an element which appears to be far more malleable. However, the view that technology might be transplanted to a different social order and become liberatory, hinges upon the separation of technical machinery from the social and political context in which it is embedded. Noting that left theorists have generally supported some notion of social progress based upon technology, Benston (1989) and Noble (1983a, 1983b, 1983c) agree that until recently there has been little in the way of critical analysis of how the needs and structure of capital itself shape the technological systems of modern industrial society. This "blind spot" in left social theory is due to an "uncritical acceptance of Marxist scientific socialism", derived from the failure to

see that just as "the products of the human mind [are] shaped by the material conditions of the society from which they came ... science itself [is] so shaped" (Benston 1987:134). As a result, some critics of capitalism have mistakenly assumed that overthrow of the existing economic system will transplant capitalism's technology into a new and more equitable social order in which labour is no longer alienated and technological benefits will be dispersed to all in the form of reduced needs for manual labour, increased leisure time, and an improved quality of life.

As a well-known exception to this tendency within scientific socialism, Braverman's theory of de-skilling (1974) broke with prevailing views to argue that the automation of production results in the fragmentation of labour and that ultimately this process will lead to a diminished supply of jobs and a loss of worker autonomy. Linn (1987), however, argues that concern with the negative effects of technology on workers' lives and labour process reflects an inordinate amount of emphasis upon technology as hardware or "dead labour". As a consequence of this, "living labour" or the people who actually produce technological artifacts and processes are ignored and technology does not appear as a cultural product reflecting the social conditions in which it was created. The "fetishization" of technology thus enables us to believe that it is technology which exploits labour and technology which can in turn empower us (*ibid*). Noting the dangers of this view of technology, Linn (1987:128-129) cautions that:

> the political consequences of considering technology in this way have been disasterous. Technology has been held responsible for de-skilling, job-killing, worsening health and safety conditions, increases in the pacing, control and surveillance of workers, and so on. The focus has been on technology, on hardware, on fixed capital. But there is more to technology than hardware, more than inert matter. On its own, inert matter is nothing at all. For it never exists in that asocial sense. It is always constituted in the social practices of language and other forms of representation, in traditions of use, with associated techniques and training procedures, in domains of knowledge, and in relations of production and consumption.

In order to explain the political and economic implications of particular technologies, theorists such as Noble (1977), Winner (1980), and Bush (1983) suggest that it is essential to re-open the question of whether technical artifacts and/or processes may in fact have inherent political qualities. For instance, in America By Design, Noble charts the intertwoven history of technological change and corporate capitalism. Arguing against the determinism of historians who tend to see technology as a "disembodied historical force impinging upon the affairs of men", Noble (1977:xix) attempts to reconcile orthodox Marxist views of technology with a more skeptical view in which technological artifacts and processes are inherently political phenomena. Asking how it is that technology has become solely a vehicle of class hegemony and not also a vehicle for liberation,[13] Noble (*ibid*:xxiii) assumes no separation between the forces of production and social relations, seeing the two "as Marx did, fundamentally interrelated; to study one is to study the other". However, in objecting to the orthodox Marxist view that the forces of production both reinforce and undermine the existing social order, Noble also rejects the scientific socialists' conclusion that technology is ultimately a source of liberation. Noble argues that instead of creating a crisis of overproduction which would ultimately destroy capitalism, technological innovations have strengthened capitalism. Under the guise of scientific management, the corporate enterprise has "assumed the appearance of modern technology, the management experts lending to the power of capital, the sanction of objective science" (*ibid*:xxvi).

Noble's critique is particularly important because he introduces a new and significant departure from the conflicting tendencies in socialist thought in which technology is viewed as the motor of progressive social change and/or the origin of alienated labour. Instead of talking about the effects of technology **on** society, Noble tackles the question of how the values of the existing social system are reproduced **through** the practice of technological innovation. Technology is neither neutral nor is it the sole perpetrator of worker's oppression.

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[13] As Noble points out, this critical question was originally posed by Herbert Marcuse in his critique of Weber's ahistorical use of the concept of rationalization.

As Benston (1987) argues in her critique of scientific socialism, Noble's analysis of technology is of immediate practical use because it provides the basis for effective strategies for influencing technological change. This empowerment rests upon the ability to see that while technology reflects social relations and therefore may reinforce existing patterns of domination, it is also popular beliefs about technological determinism which mask these patterns of domination and stifle efforts to resist the promise that it is only a matter of time before a technological cornucopia delivers its material benefits to all. Thus, Noble (1983a:9) argues that;

> the political and ideological subordination of people at the point of production ... has disqualified them from acting as subjects on their own behalf ... invalidated their perceptions, knowledge and insights about what is to be done, and has rendered them dependent upon others for guidance.

Recognizing that technology embodies social bias, but that the demystification of this bias empowers ordinary people, Noble furnishes a new set of questions about how to effectively intervene in the development and implementation of technological change such that the process and outcome might more closely reflect the needs and interests of those most immediately affected.[14] Advocating the need for shop floor resistance and production slowdowns in order to buy time, Noble (1983c) argues that "a strategy for the present" is as essential as "a strategy for the future". Hence, technological change activists must become involved "at the point of production", rather than allowing decision-making processes to be deferred to those removed from the immediate effects of foreseen changes. As Benston (1986:71) notes "the devaluing of workplace experience shows clearly the role that expertise plays in reinforcing hierarchy and control". Unless workers themselves are involved in the planning and implementation of technological change, the values reflected in design will be those of the technical experts, hired by management to develop systems capable of enhancing productivity and control. This distinction between the users and experts, while of obvious

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[14] The Swedish UTOPIA project provides just such an example. Facing the prospect of automating much of the printing and layout of a large newspaper, workers were able to design and implement the workplace changes in a democratic way. Rejecting computer hardware and software systems which seemed inherently undemocratic in their design of the work process, workers fashioned the changes according to the principles of worker autonomy and a cooperative environment (Winner 1990).

importance to labour struggles, also bears particular importance for the analysis of women's troubled relationship with technological change. However, it has been left almost entirely up to feminist scholars and activists to examine the specific ways in which technological change has affected, and reflected, the existing sexual division of labour both within the workplace and within the domestic or private sphere (Linn 1987, Karpf 1987 and McNeil 1990). Noting that labour process analysis has been modeled on "a 'gender-blind' approach to technology", Karpf (1987:162) reminds us that "[m]echanization does not ripple uniformly through the workplace". Taking Braverman to task for a lack of sensitivity to the ways in which women's work is particularly subject to de-skilling, Karpf emphasizes that the notion of skill reflects ideological presuppositions about certain types of work which are devalued by virtue of their association with women, nature and/or traditionally female tasks in the sexual division of labour. This criticism remains as a blunt reminder that the left has not yet adequately dealt with the sphere of women's unpaid labour, much less incorporated an analysis of reproduction as productive labour (Jaggar and McBride 1985).

Further, the devaluing of women's labour is also reflected in what is recognized as technology. As Linn (1987:134) asks "[w]hy are the chemical processes, stainless steel tools and electrical gadgetry of hairdressing not often seen as technology, when television repair is associated with technology? And yet, relative to the routinized processes of TV repair men, hairdressers need to exercise more decision-making and problem-solving in their work". Constituting a challenge to definitions of technology, as well as the social relations of technology, feminists are pushing the gender-blind critique of technology-as-politics to a far more powerful analysis.

3.6.2 Technology and Gender

Arguing that women's contributions have been hidden from history, Ursula Franklin (1985:3) notes that "women's voices are not yet sufficiently prominent in the intellectual analysis of technology *per se* ... there are at present no women's names in the textbooks placed alongside the names of Mumford, Schumacher or Ellul ... Such contributions are still to come". Women scholars have, however, researched and analyzed the contributions of women to technological innovation and invention throughout history,[15] the specific impacts of particular technologies on women,[16] and the future implications of the women and technology question.[17]

Developing alongside the feminist critique of science,[18] there have also been a number of recent efforts to articulate a feminist theory of technological change. Recognizing the need to review technology from a position which accounts for the sexual division of labour within both the public and the private or domestic spheres, Bush (1983), like other critics of technology and social change, rejects the idea that technology can be value-neutral and argues that the effects of technology are the combined result of its design and the social context of its use. Designed within a social system which serves the interests of the most powerful, the development and use of technology reflects dominant social values concerning gender as well as race and class. Prevailing social values are reflected in the application of technical knowledge and skills and the everyday use of technology, in turn, tends to reinforce and exacerbate the accepted norms and values which influenced its development. Thus, for Bush, technology is an equity issue which raises a number of questions of immediate relevance to

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[15] See McGaw (1982), Irvin (1981), Stanley (1983) and Trescott (1979).

[16] See Menzies (1982) on the effects of computerization, Vanek (1974) and Bose and Bereano (1983) on household technologies, Corea (1985), Ratcliff (1989) and Rothman (1989) on reproductive technologies.

[17] See Zimmerman (1986) and Rothschild (1983).

[18] See Harding (1986a), Bleier (1984), Benston (1989) and Keller (1985).

feminists.

When society is characterized by a sexual division of labour, the impact of technological change is experienced differently by women and men. Men who predominantly occupy the *design context* of technology, employ the decisions, materials, personnel and techniques necessary to developing or creating technology. Women typically remain in the *user context* (which includes the motives, intentions, advantages and adjustments called into play by the use of the tool or technique), about which much less is known, although "most men do not know that they do not know anything about women and the user context" (Bush 1983:158). Thus women often appear to be the passive recipients of technological innovations which, more often than not, have little affinity for the actual needs and preferences of those who will use them and, in some cases, these innovations may have immediate and particular effects which are quite contrary to women's health and autonomy.

As Bush (1983:164) insists, "people accept and adopt a technology to the extent that they see it creating advantage for themselves and, in competitive situations, disadvantage for others". This view of competitive advantage, although not as extensively developed as it might be, becomes clearer once technology is viewed as a multidimensional phenomenon which spans a number of specific operative contexts including the design, or developmental, and the user contexts mentioned above. Two other important contexts which Bush mentions are; the *environmental context* (which describes the physical, physiological and ecological consequences of development and use of a particular tool or technique) and the *cultural or social context* (which describes the effects of technology on the norms, values, aspirations, organizations and institutions of the society in which it is employed). Bush's list is not exhaustive and suggested additions might include the *political context* (which describes the effects of the technology on organization and mandates of decision-making bodies whose function it is to directly regulate one or more aspects of the technology)[19] and the *economic context* (which

[19] Bush's later suggestion, found in a reprint of New Equity for Technology.

includes the specific economic advantages and disadvantages created, and sustained, by the use of a particular technology; particularly as these competitive advantages contribute to class structure).[20]

To capture the idea that technology has a particular tendency to create and/or reinforce specific effects, Bush (1983:155) suggests the concept of "valence". Analogous to the bias or charge of atoms which have lost or gained electrons through ionization, valence depicts the way in which,

> particular tools or technologies tend to be favoured in certain situations, tend to perform in a predictable manner in these situations, and tend to bend other interactions to them. Valence tends to seek out or fit in with certain social norms and to ignore or disturb others.

Thus for Bush, technical artifacts or processes are themselves imbued with a particular inherent compatibility, or adherence to, certain normative values and behaviours. Stating that "television is valenced to individuation" and "guns are valenced to violence", technology appears to push social interaction in particular predetermined directions but social values and human intervention do not appear to visibly push technology in particular directions. A lack of clarity on this point leaves the impression, however unintended, that technological change influences social production and reproduction but not the converse.[21] This, in turn, appears to return us to a technological imperative standpoint in which tools, techniques and technologies are the unmalleable products of autonomous scientific advance and there is little room left for human agency. However, in order to maintain the distinction between technological determinism and Bush's concept of valence, it is important to recall that while specific technologies may embody a particular social bias, that bias is a reflection of the dominant values instilled in the design, and manifested through the use, of the technology.

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[20] Human memory being fallible, I do not recall whether this was my own suggestion or the product of a conversation with Ellen Balka.

[21] Bush agrees that the above statements give this impression, although this is not what she intended (Personal conversation 1990).

Couched in Bush's discussion of the various contexts of technology, the concept of valence provides a powerful tool to assist in understanding women's relationship to technological change. Within the user context, women who are on the receiving end of technological change are affected by the decisions of primarily male experts who control the design or developmental context of technology. The knowledge and everyday experience of technology's users is devalued and decisions about which technologies will be developed and how they will be designed continue to be made by those furthest removed from the effects of such decisions. In contrast with Noble's (1977) emphasis upon capitalist control over the design and development of particular technologies, Bush, therefore, emphasizes the gendered relations of technology. Further, whereas Noble is primarily concerned with examining the power relations which shape technology, Bush focuses attention on how the design and use of technology shapes social relations. Both analyses, however, comprise valuable contributions which illuminate the potency of technology as an embodied form of knowledge and values capable of producing and reproducing the gendered and class-based relations of patriarchy and capitalism.

With Bush's concept of valence in mind, it becomes self-evident that feminists who seek a more equitable form of social organization, cannot simply expect that the transfer of control over existing technology will be sufficient to extinguish its existing social biases. Some technologies may, according to Bush's suggested line of argument, be totally incompatible with the political values of a democratic and feminist world.

Objectionable to social scientists eager to isolate the purely social causes of technology's effects, the assertion that some technologies may be irreconcilable with democratic and feminist values is both the most challenging and difficult to sustain. As Winner (1980:121) notes,

> At issue is the claim that the machines, structures and systems of modern material culture can be accurately judged not only for their contributions of efficiency and productivity, not merely for their positive and negative

> environmental side effects, but also for the ways in which they can embody specific forms of power and authority.

Taking nuclear power as an example, Winner (1980:134) argues that as uranium supplies dwindle, plutonium by-products may be proposed as an alternative fuel. Dangerous for a host of environmental reasons, plutonium re-cycling also raises concerns about the international proliferation of nuclear weapons. Plutonium must therefore be subject to very strict safeguards; a situation which Winner argues might necessitate the regularization of "background security checks, covert surveillance, wiretapping, informers, and even emergency measures under martial law". All of these pose immediate concerns about the sacrifice of civil liberties while at the same time appearing to suggest the impossibility of utilizing plutonium without the creation of a powerful central authority charged with enforcing such "safeguards". While none of this is "required" by plutonium use, it remains true that "once a course of action is underway, once artifacts like nuclear power plants have been built and put in operation, the kinds of reasoning that justify the adaptation of social life to technical requirements pop up as spontaneously as flowers in the spring ... After a certain point, those who cannot accept the hard requirements and imperatives will be dismissed as dreamers and fools".

Accepting the argument that some technologies are incompatible with democratic and feminist values thus has the superficial appearance of advancing the radical critique of technology to a point dangerously close to that of technology as unmitigated threat. Indeed, feminists opposing new reproductive technologies from this vantage point have often been dismissed as being anti-technology in much the same way as the Luddites were dismissed for their recognition that new technologies of production were actually the harbingers of dramatic changes in the social relations of production. Technology once again, appears to propel social change in particular and predetermined directions. However, in this instance the escape hatch from technological determinism is clear, as there are at least two possible avenues for responding to the political values embedded in specific technologies: 1) we can alter design features or 2) we can reject the use of the technology altogether and search for other, more

socially acceptable alternatives. Both of these allow for at least a measure of human intervention - a point which Gay (1986:70) reminds us is of fundamental concern to feminists seeking "a better accommodation with the technical world".

In the first instance, Bush (1983) has noted that there are certain features in the design of particular technologies which directly contribute to the reproduction and exacerbation of existing gender, race and class inequities. Winner (1980:134) argues that some such technologies are *flexible* in design and therefore "their consequences for society must be understood with reference to the social actors able to influence which designs and arrangements are chosen".[22] Hence, from a feminist perspective, it is critical for women to become involved in the planning and implementation of new and existing technology; women must be active and valued participants in decision-making about which technologies are to be developed, how these technologies will be designed and used, and what ultimate goals they will serve. This conviction, shared by Bush (1983) and Gay (1986) is also echoed by Rose (1987) who argues that the project of a feminist critique is not to reject science and technology out of hand, but rather to create a science which reflects women's needs and interests.

In the second instance, Winner's example of nuclear power and the use of recycled plutonium illustrates the way in which some technologies may have inextricable tendencies to produce or reinforce established systems of power and authority which are in direct opposition to desired democratic and feminist values. In this case, Winner (1980:134) believes that there are no alternate designs which might rectify the undesirable effects and hence, "the initial choice about whether or not to adopt something is decisive in regard to its consequences". Furthermore, with some technologies there may be "no genuine possibilities for creative intervention by different social systems - capitalist or socialist - that could change the intractability of the entity or significantly alter the quality of its political effects".

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[22] An example of flexible design was given in footnote 14 of this chapter.

Strategic efforts then, must be channelled into the rejection of *inflexible technologies* and the development of alternate and more flexible technological systems.

Unfortunately, Winner does not (and in my estimation cannot) provide us with clearcut guidelines about which variety of interpretation is applicable to specific technologies. This is, as he notes, the grounds for passionate debate. Moreover, as no-one can predict all of the possible consequences of developing particular technologies, the possibility of unanticipated risks and adverse effects always remains. Whether we are concerned with radiation contamination or the hazards of creating virulent new strains of genetically altered bacteria, the creation of increasingly powerful new technologies dramatically increases the potential for inadvertent disaster.

Do the potential benefits outweigh the inherent risks? The question pervades discussion of these issues and returns us to the theme of ways of thinking about technology. Having identified and dismantled popular views of technology as triumph, threat and neutral tool, I have argued that critics of technological change require a model which facilitates understanding of the complex technology and social change relationship. Such a model must reflect the social and political contexts in which technology is embedded but must not succumb to the paralysis induced by popular notions of a technological imperative. Likewise, strategic responses encouraged by the recognition of technology as the ordered, but malleable, practice of human action and intervention in the material world, cannot proceed effectively without a clear understanding of the specific constraints upon democratic citizen involvement in the process of social change. To summarize the findings of this chapter and suggest some minimal guidelines for this critical framework, it is useful to revisit briefly the related questions of how technology embodies social bias, and what this suggests for feminists concerned about the development of new reproductive technologies.

3.6.3 A Critical Framework: Summary

Several complementary lines of argument have arisen in the preceding discussion of technology-as-politics. Beginning with the most moderate of these claims, *all technology is embedded in a political and socio-economic context which immediately influences decisions concerning the design and development of particular technologies.* Rather than simply being the spinoff of an objective science in systematic pursuit of pure knowledge, technological innovations, and the uses to which they are put, reflect the values, goals, and intentions of their creators. With the tomato harvester example, we have seen that a particular machine or technological artifact may be developed and/or applied with the explicit purpose of imposing restrictions on human freedom (in this case, undermining the organizing efforts of exploited farmworkers in California). Similarly, it was suggested that the same machine might be put to more equitable uses in another social context (Cuba). In this case, technological artifacts are clearly political things but they do not carry a certain intractable tendency to serve only undemocratic goals. This conclusion does not imply the neutral tool perspective, however, as no matter where we take the tomato harvester its creation and production have constituted particular social relations which will not be undone by merely using the machine in another, possibly more progressive, setting.

Refining this line of argument, is Bush's discussion of *technology as an equity issue.* Within a society characterized by gross inequities in the distribution of wealth and a sexual division of labour, particular technologies have a differential impact based upon how the individual or group concerned is placed within the class, race and gender system. For instance, if surrogate motherhood contracts become legally enforceable and commercialized, economically disadvantaged women may become the new "breeder class" and economically privileged women may, for legitimate medical or dubious social reasons, seek this alternative to the risk or inconvenience of conventional pregnancy. Further, coupled with egg donation a surrogate arrangement need not involve a genetic contribution from the surrogate; hence the

practice may increasingly reflect strong elements of racial exploitation as economically disadvantaged women of colour gestate the babies of predominantly white and economically advantaged women.

Finally, there is the stronger and more radical proposition advanced by Bush (1983) and Winner (1980). Technologies are "valenced" or biased toward particular types of social interaction and thus, technology itself is *imbued with a unique affinity for certain political values and normative behaviours.* As Karpf (1987:162) summarizes, "[i]t is people and social forces which create technologies, but the resulting products both bear the imprimatur of their social context and themselves reinforce it: technology is constituted by, but also helps to constitute, social relations". A technology may be *flexible* however, such that changes in design may modify the types of interaction to which it is predisposed (Winner 1980). Alternatively, the proposition that certain technologies have properties which are entirely incompatible with feminist and democratic goals, leads us to accept that in some instances the initial decision about whether or not to develop these technologies is decisive. As we shall see in Chapter Four, many feminists concerned about new reproductive technologies do indeed articulate a way of thinking about technology which reflects substantial acceptance of this stronger proposition.

The critical framework suggested by the technology-as-politics perspective indicates that there are at least three possible levels or points at which strategic intervention is possible; 1) the level of initiation (i.e., whether to build the thing at all), 2) the level of design (i.e., how it is built), and 3) the level of use (i.e., what you do with it once it's built).[23] While these provide only a sketch, it is apparent that there are a number of ways in which concerned citizens, and scientists alike, might alter the direction of technological change, achieving ultimately the development of technology "as if people matter" (Franklin 1985).

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[23] I am endebted to Nick Witheford for proposing this particular way of summarizing the technology-as-politics perspective.

CHAPTER 4

MAPPING FEMINIST DISSENT ON NEW REPRODUCTIVE TECHNOLOGIES: FROM THE MARGINS TO THE CENTRE

> [I]deological commitments that override the realities of what women know dictate a model of the activity which, when embodied in technologies, enforces the ideology. (Suchman and Jordan 1988:1)

> I foresee great changes in the evaluation of technology and almost all of them will come from bringing in direct experience, which is, after all, the central core of vernacular reality. (Franklin 1990:40)

Seen merely as a collection of artifacts and processes which can be used or abused, the political character of technology remains opaque. However, seen as the material embodiment of knowledge and values, technology is aligned closely with the production and reproduction of the existing social order, its values, social practices and institutions. Within this "technology-as-politics" framework, technology has an indelible ideological character which contributes to particular ways of thinking about, structuring and interacting with the social and natural worlds.

Being on "the receiving end of technology", our everyday lived experience and ways of thinking about technology are mediated by experts with disproportionate power to control the design, development and use of technology. Within the realm of this "user context", women, and others lacking the power accorded to those with "certified expertise", often experience technological change as a disempowering force. Such disempowerment stems from two related sources: the ideological hegemony of the technological imperative, and, the power relations which surround, and are embedded in, the design and use of technology (Franklin 1990:40). With respect to the former source of disempowerment, Bush (1983), Noble (1983a), and (Winner 1977) propose that belief in the technological imperative results in placing insufficient emphasis upon the role of human agency in shaping technology. Because our wider cultural values reinforce the inevitability of technological change, we are inclined to accept that there is little which can be done to halt or re-direct such change (Hill 1988). Compelling us

either to adapt or be left behind, belief in the technological imperative leaves little recourse for action. As disaffected bystanders, the inexorable logic of technological advance seems to steer its own course.

Unthinking the technological imperative, feminists such as Bush (1983) have developed practical and political frameworks for analysis and activism on issues related to technological change. The success of such critical standpoints, however, hinges upon the recognition that the dominant ideologies of capitalism and patriarchy tend to obscure and subordinate alternate ways of thinking about technology.[1] As a result, the development of a feminist critique of technology is part of an unfolding dialogue which builds momentum around the conceptual problems and choices identified from newly uncovered or discovered vantage points. Harding (1986b:649) concludes that disputes within feminist theorizing should, therefore, not be seen as "a process of naming issues to be resolved but instead as opportunities to come up with better problems than those with which we started".

Chapter Two of this thesis demonstrates how feminists have unthought the dominant therapeutic paradigm of new reproductive technologies, creating through this process a critical analysis of the ways in which capitalism and patriarchy provide ideological underpinnings which legitimate the development and expanding use of this technology. However, in order to respond effectively to the challenges posed by the powerful conglomeration of capitalist patriarchy and reproductive technologies, feminists must avoid succumbing to either version of the technological imperative (as threat or as triumph) or to the equally misleading view that technology is neutral. This demands close attention to a series of complex but related questions and problems which many feminist scholars and activists have begun to address on

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[1] I do not wish to leave the reader with the impression that ideology is analogous to false consciousness in the Marxian sense. Rather, ideology, while a fundamental condition of social existence is "something out of which we think, rather than something *that* we think. It works ... 'behind our back'. We do not have it in front of us, as an object of thought" (Ricoeur 1978:47). Thus, as a "code of interpretation" (*ibid*), ideology brings certain aspects of social relations to the foreground while obscuring others.

a substantive, if not theoretical level, in their analyses of new reproductive technologies.

Given that technology is an inherently political phenomenon capable of producing competitive advantage for some while eroding the status, autonomy and opportunities of others, feminists advocating reproductive choice must place new reproductive technologies in their social, political and economic contexts; asking in which contexts do they provide choices which empower women and in which do they threaten women's empowerment? In whose interests are these new choices? Who will benefit, who will pay, and who is choosing the choices in the first place?[2] What choices have been lost or rémain undeveloped? Moreover, given Bush's notion of *valence* and Winner's analysis of *flexible* or *inflexible technologies*, what aspects of design and development must be considered? Which reproductive technologies are valenced in a way contrary to the attainment of a democratic and feminist world or, alternatively, how is it that particular reproductive technologies might be transformed to meet women's needs and interests? As I have argued earlier in this thesis, these and other questions point to the need to locate and draw upon a critical theoretical framework for thinking about technology. A feminist critique of patriarchy and capitalism does not provide a sufficient set of theoretical and conceptual tools with which to understand and respond to new reproductive technologies.

Lacking a shared way of thinking about technology, feminists diverge on the question of whether it is technology, or social relations, which deserve primary consideration in theorizing about the present, and probable future, consequences of technological intervention in reproduction. These diverging views of technology reflect the historical and theoretical development of feminist debate on new reproductive technologies; alliances between and disjunctures within liberal, radical, and socialist feminist perspectives further reveal that consensus does not exist even amongst feminists of the same ideological stripe.

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[2] I thank Laurine Harrison for putting this insight so succinctly.

Believing that artificial reproduction and external gestation would herald women's liberation, early radical feminists saw technological change as an inherently progressive force. However, as radical feminists became wary of the male-dominated medical profession's control over women's natural abilities to procreate, technological intervention was increasingly seen as a threat to women's reproductive autonomy.

Liberal feminists, who continue to stress that some new reproductive technologies may be beneficial to women, believe that technology can be rationally managed in order to mitigate potential harms. Likewise, some socialist feminists share with liberal feminists the view that it is the social relations of technology which determine the potential harm and/or benefit associated with its use and development. Other socialist feminists, aligned with more recent developments in radical feminist analysis, emphasize that new reproductive technologies are inherently biased toward the maintainance of existing power relations. These new alliances between, and disjunctures within, liberal, radical, and socialist feminist analyses suggest that there is no emerging consensus on how increasing technological intervention in reproduction is likely to affect women within a social context which remains dominated by male power structures. Further, while the traditional categories of liberal, radical and socialist feminism play a useful preliminary role in illuminating the diversity of feminist responses to new reproductive technologies, these categories are ultimately constraining.

4.1 Purpose and Outline of Chapter

In this chapter, I draw upon the work of feminist philosopher Anne Donchin (1986) to build a more nuanced framework than that which is offered by the somewhat crude distinctions between liberal, radical, and socialist feminism. Reviewing a cross-section of feminist, as well as more traditional, responses to new reproductive technologies, Donchin isolates ways of thinking about technology as an important, although often overlooked, theme

for discussion. Using the yardstick of how acceptable it is to pursue extensive technological intervention in reproduction, Donchin describes three general positions on new reproductive technologies: pro-interventionist, moderate interventionist and non-interventionist.[3] To these, I have added a fourth category — anti-interventionism. This fourth category is necessary because I wish to distinguish clearly the differences between two strands of radical feminist opposition to new reproductive technologies. Donchin suggests this distinction but, in her fairly short paper, does not expand her typology to fully encompass it. Together, the four positions on new reproductive technologies comprise a spectrum which captures the diversity of feminist thinking on new reproductive technologies.

These four positions, and their primary characteristics are outlined in Table 1 (which appears on the next page). The following discussion is intended both as an orientation to this table and as a brief outline of the substance of this chapter. At the far left of the table, are pro-interventionists. The primary proponents of this position are early radical feminists (and orthodox marxists) who view technology as a triumph over nature. Natural reproduction is the source of women's oppression and thus, pro-interventionists favour the unfettered development of techniques in artificial reproduction. At the far right of the table are non-interventionists. The primary proponents of this position are radical feminists and "ecofeminists", who argue against technological intervention in reproduction on the basis that it threatens women's natural procreative powers. Unlike more recent radical feminists, non-interventionist radical feminists rely upon biological essentialism to make a case for opposing new reproductive technologies; as such, nature and women's procreative abilities are viewed as given properties which are unmediated by the social world.

In the centre left of the table are moderate interventionists who, as the name suggests, attach a number of qualifications to their endorsement of new reproductive technologies. The

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[3] Donchin's original term for pro-interventionism was "radical interventionism". I have used the term pro-interventionism to avoid confusion with radical feminism.

Table 1: Summary of Feminist Positions on New Reproductive Technologies

	Pro-interventionist	Moderate Interventionist	Anti-interventionist	Non-interventionist
Proponents	Early radical feminists Orthodox Marxists	Liberal feminists Some socialist feminists	Most radical feminists Most socialist feminists	Other radical feminists Ecofeminists
Views on Reproduction	Biology as primary source of women's oppression Women's liberation requires control over reproduction	Biology not destiny Women's liberation linked to reproductive rights	Biology socially constructed Women's liberation demands reclaiming experience and meaning of reproduction	Biological essentialism Women's liberation derived from virtues/insights attached to reproductive abilities
Views on Technology	Technology as triumph over nature Emancipation through increasing technologization Technology as value-added means to desirable ends	Technology as neutral tool Use/abuse model Progress through rationalized management of technology Technology as solution with individualized costs and benefits	Technology as politics Oppression with increasing technologization Technology valanced toward maintaining the social order	Technology as threat Deterministic model Domination and destruction of nature/women through technologization Technology as desecrator of natural world
Views on New Reproductive Technologies	Ectogenesis and artificial reproduction desirable goal	Wide range of low and high tech interventions should be available	Human reproductive and genetic engineering transfer too much control to existing powers	Reproductive interventions obscure/destroy female consciousness
Strategies	Unfettered development Support state subsidized research	Regulatory framework Private or public delivery Emphasis on access to services and information	Organized opposition Moratorium on research and development Campaign against consumption Longterm re-shaping of social institution of science	Retreat from technological society Advocate holistic practices

primary proponents of this position are liberal, and some socialist feminists. In general, moderate interventionists regard technology as a neutral tool and argue that new reproductive technologies must be carefully managed in order to mitigate harm and maximize potential benefit. In the centre right of the table, are anti-interventionists. Most radical and socialist feminists are proponents of this position. Unlike non-interventionists, anti-interventionists view biology as a socially constructed phenomenon. Thus, anti-interventionist opposition to new reproductive technologies avoids appeal to women's natural function and is, instead, based upon the argument that these technologies exacerbate existing social inequities. As such, anti-interventionism provides a far more powerful analysis than non-interventionism.

The spectrum of feminist positions outlined above is useful to this thesis for several related reasons. First, it offers a rough depiction of the historical development of feminist debate on new reproductive technologies. For instance, as revealed in Table 1, recent radical feminist anti-interventionism has emerged from earlier pro- and non- interventionist positions. Second, this spectrum of positions makes it possible to trace and describe not only the diversity between feminist perspectives but also the diversity within feminist perspectives. Finally, this spectrum unites questions of feminist theory and practice. Various strategies, which are listed at the bottom of Table 1, indicate that the underlying theoretical assumptions of each position have important implications for the kinds of political activism which feminists are able to undertake in response to new reproductive technologies.

As I have stressed earlier, both versions of the technological imperative (as triumph or threat) understate the role of human agency in shaping technology. Because of adherence to one or the other form of the technological imperative, pro- and non-interventionism are fundamentally flawed. Belief in the technological imperative encourages a sort of paralysis which dulls the initiative to act and, in so doing, fosters the conclusion that women must be content with either passively adapting to or completely rejecting technological change. Clearly, neither is a desirable alternative. Resistance to what is considered most objectionable must be

accompanied by efforts to develop alternatives. Both projects however, require a commitment to the possibility of human agency as transformative, even if it is narrowly circumscribed by existing gender, class and racial inequities.

As an antidote to the technological determinism of pro- and non-interventionism, moderate interventionism stresses the voluntaristic character of technology. Technology can always be managed for the common good; hence, all we need do is modify the ways in which it is used. While this is an improvement over technological determinism, such optimism obscures the way in which knowledge and values become embedded in technology, bending social relations toward the maintenance of existing power relations. In short, I argue that it is only the anti-interventionists which capture the crucial insight that technology and social relations are, in this way, dialectically related.

4.2 Pro-interventionism

As the most pronounced manifestation of faith in the liberatory potential of technology, the pro-interventionist position on new reproductive technologies stresses the primacy of progressive social change through technological advance. Proponents of this position include early radical feminists such as Shulamith Firestone (1971) and novelist Marge Piercy (1976). Orthodox Marxists, though not specifically concerned with new reproductive technologies, also favour this position as it pertains to technologies of production. Desirable ends -- the overturning of existing sexual and class oppression -- will be facilitated through the development and use of technologies which free women from the biological constraints of reproduction, and free workers from the burden of manual labour.

Donchin (1986:125) argues that pro-interventionists divide into two distinctive factions, "those who support advances in knowledge of reproductive advances without regard to possible technological applications and those who favor reproductive research for the sake of the

technological future such research will facilitate." While we shall be concerned with only the latter group,[4] both sorts of interests represented by the pro-interventionist position "view technology as 'a victory over nature' ... [favouring] not only *reproductive* technology but the technological transformation of production and the elimination of labour as well" (*ibid*). Taking "the relations of procreation to be the base of society and the source of women's oppression" (*ibid*:130), early radical feminists have argued that women's cultural subordination can only be overcome through technological intervention in reproduction. As a natural and ahistorical process, reproduction is counterposed to technology; technology is the means by which "humanity transcends the givens of natural existence, bends them to its purposes, controls them in its interest" (Ortner 1974:72).[5]

While few recent feminist writers in the genres of science fiction, documentary, empirical research and/or theory would now endorse a strongly pro-interventionist position, early radical feminist writings on new reproductive technologies provide a valuable resource for understanding the origins of particular theoretical assumptions, the antitheses of which now resonate strongly within more contemporary feminist thinking. As a milestone in feminist theory and a cogent statement of the pro-interventionist position, Firestone's book, The Dialectic of Sex: The Case for Feminist Revolution, offers a powerful vision which has incited much controversy since it was first published in 1970. Says Mary O'Brien (1983:81), "Firestone aspires to do for the social relations of reproduction what Marx did for the relations of production". Citing natural reproduction as the fundamental source of women's oppression, Firestone (1971:206) calls for a sexual, economic and technological revolution, the

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[4] The former group is comprised primarily of scientific researchers, and some philosophers "who argue that we should push the frontiers of knowledge forward now and concern ourselves with about undesirable applications only as the need becomes manifest" (Donchin 1986:125).

[5] Ortner (1974:73) makes the general argument that every culture "recognizes and asserts a distinction between the operation of nature and the operation of culture (human consciousness and its products)". In fact, Ortner argues that the distinctiveness of any culture rests upon how it transcends natural conditions.

first demand being "the freeing of women from the tyranny of their reproductive biology by every means available, and the diffusion of the childbearing and childrearing role to the society as a whole, men as well as women". Women's ability to overturn existing social relations and overcome the biological constraints of reproduction is to be achieved through the development and use of all forms of artificial reproduction. In the short term, this requires that women seize total control over reproduction. According to O'Brien (1983:82), this seizure of control will be only temporary, an aspect of Firestone's analysis "presumably inspired by Marx's notion of a transitional dictatorship of the proletariat."[6] However, what is not clear in Firestone's program, is the sequence of events which must unfold in order to realize this revolutionary future. Are new social relations the motor which will inspire the development of liberating technologies such as *in vitro* fertilization and the artificial womb? Or, will technological change precipitate subsequent desirable changes to the existing social order? Evidence supporting both propositions indicates that while Firestone does see technological and social change as a dialectical process, she does not suggest that technology is imbued with the values of its creators.

Supporting the first proposition, that changing social relations will lead to enhanced scientific and technological advances, Firestone argues that (in 1969) people are unprepared culturally for techniques such as sex-selection, test-tube fertilization, and the artificial placenta. Noting that most Americans are only prepared to use these reproductive innovations in order to preserve existing values of family life and reproduction, Firestone rejects the "nightmarish possibility" of the present powers making progressive use of this technology. Transformation of existing social relations must come first and, thus, she (*ibid*:233) recommends that once women have shed reliance upon "cultural superstructures" and come to realize that they have

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[6] Firestone adapts Marx's analysis of class relations in order to build her own analysis of sexual oppression. Sex-class, however, is primary for Firestone and the paradigm for her analysis is radical, not socialist feminism. As Eisenstein (1979a, 1979b) argues, radical feminism does not address the connections and relationships between the sexual and economic class systems; economic class is subsumed by sex-class.

no real motivation for pregnancy,[7] "artificial methods will have to be developed hurriedly". Science and technology are inherently progressive forces when harnessed by a new social order in which the prevailing distribution of power has been overturned, enabling us to overcome our reticence toward using technology in new and liberating ways. As a result, radicals must stop their "breastbeating about the immorality of scientific research" and concentrate energy on efforts to control scientific discoveries "by and for the people" (*ibid*:196).

In turning to the question of how this new social order is to be brought about, Firestone (*ibid*:221) grants reproductive technology and cybernetics a leading and catalytic role. "Even if the development of artificial reproduction does not soon place biological reproduction itself in question", cybernetics is a source of revolutionary social change imbued with the potential to "eventually strip the division of labour at the root of the family of any remaining practical value". If the tools of biological revolution are, as of yet, unavailable to propel women into liberation, we can rely upon the elimination of manual labour to undercut relations of subordination in the family. "Machines could thus act as the perfect equalizer", obliterating both the class system and women's oppression through a "radical redefinition of human relationships" (*ibid*:201). According to this view then, radical and progressive social change is best facilitated by throwing all energy into the rapid and unfettered development of cybernetics and biotechnology.

Resolving to some extent, Firestone's two potentially conflicting propositions about the technological and social change relationship Donchin (*ibid*:133) argues that,

> [W]ithin Firestone's conceptual framework technology plays an instrumental role twice over, first by transforming the means to achieve socially desired goals without itself affecting the character of the goal, and second, by neutrally serving the interests of whichever party happens to control the means of production or reproduction.

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[7] For Firestone, pregnancy is merely a consequence of the instinctual sexual drive and as such, there is no maternal instinct per se.

Hence, if technology is ultimately the motor of social change for Firestone, it is also neutral such that the social values of its creators may be discarded, like worn parts, when the machinery of production (and reproduction) is put to more progressive use.

Firestone endorses a way of thinking about technology which has come under close scrutiny in the two decades since the book was published. The weaknesses of her argument are manifold although one of the most prominent concerns her naive faith in technological progress as a source of liberation. In particular, she has, despite her selective use of other aspects of Marxist analysis, neglected to analyse how the alienating effects of mechanized production are to be transcended in mechanized reproduction. Technological intervention in reproduction represents a woman's freedom *from* her body and bodily processes; a negative freedom, which Eisenstein (1979a:19) suggests is a poor substitute for the positive "integration of body and mind". Unlike Piercy (1976), who offers an alternative view of a gentler, more humane and ecologically sound form of technological practice, Firestone makes no qualifications about what kinds of technologies we should be developing or how new forms of human interaction might compensate for an increasingly technologized existence. Moreover, her implication that the transcendence of gendered existence will inevitably lead to harmony in human relationships and the abolition of power, remains a utopian vision prompting O'Brien's (1983:82) final analysis: "Shulamith's baby is a theoretical waif, programmed for the theatre of a disturbingly mechanistic future".

Clearly, Firestone's program for a technological future appears light years away from current feminist observations of how capitalist patriarchy makes use of new reproductive technologies to exercise greater control over women and the process of reproduction. Referring to Alison Jaggar's (1983) mention of "the lack of enthusiasm for Firestone among grass-roots feminists", Donchin (*ibid*:131) argues that more recent radical feminists have increasingly observed that because "technology has so often been used to reinforce male dominance ... these feminists do not see how women could take control of technology and use it for their

own ends." Further, simple reasoning seems to suggest that if it were biology that stood at the root of women's oppression, patriarchy would have little incentive to transform biological reproduction and thereby liberate women. As a result, many contemporary feminists challenge "both the claim that it is women's biological function that lies at the root of their oppression and the derivative implication that technological reform can eliminate oppressive social practices" (Donchin 1986:132). Indeed, the development of this more critical line of enquiry has spawned a range of responses which run counter to Firestone's original thesis of social liberation through technological advance.

4.3 Non-interventionism

Non-interventionists reject the pro-interventionist premise that reproduction and motherhood are the basis for women's oppression. Central to the non-interventionist position is the conviction that women derive special attributes and powers from their procreative abilities — whether actualized through reproduction or not. As the major proponents of non-interventionism, many radical feminists have argued that new reproductive technologies represent a threat not only to women's reproductive health and autonomy, but also to women's integrity as human beings. In particular, objections to new reproductive technologies are based upon claims that they are unnatural and, that "whether 'old' or 'new', these procedures (reproductive technologies) have in common that they represent *an artificial invasion* of the human body" (my emphasis, Klein 1985:65).

Questioning "the advisability of any practice which tampers with nature's way of doing things" (Donchin 1986:125), non-interventionists stress the interconnectedness of the natural world and view the violation of women's bodies through new reproductive technologies as part of the exploitation of nature. United by a strong critique of the reductionism inherent to the methods and aims of science and technology, non-interventionists share a number of

close links with "ecofeminists", and other adherents of a committed philosophical holism.[8] The underlying philosophy of this non-interventionist position "rests on the 'female principle', the notion that women are closer to nature than men and that the technologies men have created are based on the domination of nature in the same way that they seek to dominate women: both women and nature have become objectified into the Other to be exploited and ravaged" (Karpf 1987:163).

The work of Adrienne Rich (1976) has had a lasting relevance for feminists convinced that new reproductive technologies pose an unmitigated threat to women. In Of Woman Born: Motherhood as Experience and Institution, Rich advances the argument that it is the patriarchal institutionalization of motherhood which is oppressive, not women's actual procreative abilities. As such, Rich locates women's struggle for liberation in the rejection of all forms of institutional and individual patriarchal control over women's bodies and lives. Women's unique power as mothers, once stripped of the alienating and passifying encumbrances of patriarchy, will grant women a special capacity for generating a new kind of social existence. In particular, the reclaiming of reproduction and the birth process is central to Rich's vision. Offering an extensive critique of the alienation of labour at the hands of patriarchal medicine, Rich (1976:182) believes that "as long as birth - metaphorically or literally - remains an experience of passively handing over our minds and our bodies to male authority and technology, other kinds of social change can only minimally change our relationship to ourselves, to power, and to the world outside our bodies." Women's rejection of a technologically induced "twilight sleep",[9] thus becomes a powerful metaphor which

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[8] Although appearing superficially to be allied with feminist non-interventionists, more traditional non-interventionists, such as theologian Leon Kass (1985), offer strong moral objections to new reproductive technologies on the grounds that these technologies undermine respect for human life and the institution of the family.

[9] "Twilight sleep", is an anesthetic compound composed of morphine and scopolamine, which was widely used during the early twentieth century to ease the pain of childbirth. This practice, often demanded in the U.S. by upper and middle-class women (Reissman 1983:7), continued until it was found to have toxic effects upon the infant (Rich 1976:165).

encapsulates Rich's (*ibid*:292) conviction that,

> The repossession by women of our bodies will bring far more essential change to human society than the seizing of the means of production by workers....In such a world women will truly create new life, bringing forth not only children (if and as we choose) but the visions and the thinking, necessary to sustain, console and alter human existence - a new relationship to the universe.

In Rich's vision of a post-patriarchal society, there may eventually be room for some forms of technological intervention in reproduction. Once motherhood and sexuality are no longer "wedged resolutely apart by male culture", women should be able to choose between alternate means of conception whether "biological, artificial, or parthenogenetic" (*ibid*:180).[10] What exactly these artificial means are or might be is unclear, although it is important to note that Rich's speculations preceded feminist critique of the widespread use of techniques such as *in vitro* fertilization. Thus, it seems safe to suggest that Rich would favour a far less invasive and destructive form of technological practice than that which now characterizes the practice of patriarchal medicine. Further, Rich does not imply that the technologies we now have are acceptable ones nor does she suggest that women's liberation will be facilitated through technological advance. The dominant theme of her analysis, and the focal point for more recent feminist analyses of new reproductive technologies, is the conviction that women must reject male medical control over women's bodies and reclaim a more natural experience of motherhood and sexuality.

One of the books which has most conspicuously advanced Rich's case against the patriarchal institutionalization of reproduction and motherhood is Gena Corea's (1985) The Mother Machine: Reproductive Technologies from Artificial Insemination to Artificial Wombs. Extensively researched, the book documents the development and use of a wide range of new reproductive technologies. In particular, Corea's detailed account of the corporate infrastructure

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[10] Parthenogenesis involves duplication of the female egg without fertilization by sperm - a practice which results in female only off-spring. It occurs naturally in many plants and some animals. Spallone and Steinberg (1987:229) note that *in vitro* fertilization researchers in Australia have observed that some women's eggs have divided parthenogenetically as a result of undergoing cryopreservation.

of the biotechnology industry leaves little doubt that new reproductive technologies are part of a much bigger, and more ominous, picture than is commonly acknowledged. The "technodocs" and "pharmacrats" are stepping up the male "war against the womb". "Recruiting" donors, "bombing" women's ovaries with fertility drugs, "capturing" and "harvesting" eggs, men are wresting control over reproduction away from women. Like farmyard animals, women are exploited as the test-sites for a range of new drugs and techniques designed to enhance men's technological control over reproduction and nature.

The theoretical framework for Corea's analysis is drawn from Mary O'Brien's (1983) political philosophy of reproduction. Briefly, O'Brien has argued that throughout history men have had a discontinuous reproductive experience which originates with the act of intercourse and resumes only in the form of parental obligations once the child is born. In contrast, women have a continuous reproductive experience which proceeds through intercourse, gestation, childbirth, lactation and, more often than not, primary responsibility for childrearing. Hence, men's alienation from reproduction arises directly from men's freedom from reproductive labour; overcoming such alienation is only possible through paternal appropriation of the child. However, while it is certain who the child's mother is, the identity of the father may be uncertain. Hence, ever since the discovery of the male role in procreation, men have sought to secure paternity through the control of women's sexual activity. Applying O'Brien's theory to the analysis of new reproductive technologies, Corea (1985:303) argues that the male take-over of female procreative powers is motivated by envy and male compulsion to overcome reproductive alienation.

> Today, it is largely the obstetrician/gynecologist who breaks, controls and employs to his own ends the magical force of the female. In controlling the female generative organs and processes, doctors are fulfilling a male need to control women's procreative power, a need they seem to feel no less strongly than did seventeenth century alchemists or tribesmen who practiced couvade, transvestism, subincision and other initiation rights.

Now, with the development of powerful techniques in reproductive and genetic engineering, men "are far beyond the stage at which they expressed their envy of women's procreative

powers" (Corea 1985:314). Re-assembling the raw materials of reproduction in the laboratory, men seek not only their own form of continuous reproductive experience but also "to manufacture a life better than that which women can birth" (*ibid*).

While providing a compelling account of women's exploitation at the hands of patriarchal medicine, Corea's theoretical framework cannot encompass the complexity of evidence she presents. In agreement with McNeil and Franklin (1988), I suggest that her analysis may be challenged as essentialist and ahistorical. The overarching social relations of patriarchy are reduced to little more than a reflection of biologically-based sexual difference. Aside from calls to "break the silence" and place women's concerns on the public agenda, Corea suggests that there is little to be done to stop men's war against women and nature — it is all unfolding as if the ends are pre-determined. Historically, the only thing that has changed is the degree to which technology has equipped and extended the reach of men's power over women. This, however, is abstracted from the social and historical conditions in which women have both complied with, and resisted, such change. As a consequence, women, like farmyard animals, appear to be the unknowing and passive victims of technological intervention in reproduction.

In short, Corea (1985), like Rich (1976), locates the source of women's oppression in patriarchal control over women's bodies and minds; liberation requires that women discover and celebrate women's intuitive, emotional and instinctual affinity with the natural world. Technological intervention in reproduction severs this connection and hence, women have little to gain and much to lose from compliance with new reproductive technologies. However, in fostering the view that women are somehow closer to nature, non-interventionism discourages women from attempting to re-shape the methods, projects and aims of science. As hapless victims of scientific progress, women remain excluded from the doing of science; retreating from, rather than re-shaping the technological world.

Objecting to the impasse derived from biological essentialism, Evelyn Fox Keller (1985) argues that women have been excluded from the doing of science and technology not because we are naturally unsuited to it but because of social norms which perpetuate the view that these are activities inappropriate for women. Further, while many women may reject the stated aims and goals of science, its values of control, and the development of technologies with destructive effects, women cannot afford to neglect the project of reshaping science as a social institution. To do so, is to abandon all hope and give in to the encroachment of an ever more technologized world. Objecting to such a retreat, Jan Zimmerman (1981:366) argues that,

> To refuse to acknowledge the dominance of technology in economic structures and daily life - to return home to build a solar oven, to grow a garden and bake bread, to retreat to self-sufficiency and labour-intensive survival in a beautiful, but small and unrealistic world - is to leave those who already hold the chips playing the game.

4.4 On the Margins: Pro- and Non-interventionism

Pro-interventionism and non-interventionism offer diametrically opposing assessments of the desirability of increased technological intervention in reproduction. The former demands the unfettered development of new reproductive technologies while the latter opposes all forms of artificial reproduction. As the most extreme feminist positions on new reproductive technologies, pro-interventionism and non-interventionism are placed on the margins of Table 1. While both have provided useful starting points for feminist debate, neither presents an effective theoretical basis for feminist analysis and action; nor does either encompass more recent developments within the feminist debate on new reproductive technologies.

Both pro-interventionism and non-interventionism are hampered by substantial acceptance of the technological imperative — whether technology is viewed as triumph or threat, the outcome appears to be pre-determined. Pro-interventionists, such as Firestone, impart too

much power to technology as a force which will automatically lead to progressive social change. Further, few feminists would now profess any desire to actualize such a mechanistic future. Alternatively, in the non-interventionist position of Rich and Corea, technology poses an inevitable threat to natural motherhood and, hence, to women's ability to develop the values and attributes derived from this this unique source of power. There appears to be little room for any sort of technological intervention in reproduction; hence, non-interventionists reject the use of new reproductive technologies, at least until patriarchal social relations are eradicated.

Further, pro-interventionists and non-interventionists appeal to some notion of women's natural function. Whether a source of oppression or a source of unique power, women's biological abilities appear as attributes which exist in isolation from the social relations and meanings attached to reproduction. Writ in such simple terms, it is extremely difficult for feminists to extricate themselves from this nature/culture dualism.

However, despite their problems, the pro-interventionist and non-interventionist positions have contributed substantially to the emergence and development of subsequent feminist debate on new reproductive technologies. On one hand, the optimism of pro-interventionism continues to prompt consideration of how women might benefit from increased technological intervention in reproduction.[11] On the other hand, such optimism must always be tempered by an appreciation of the negative effects of new reproductive technologies; non-interventionists have been prominent in bringing these to the foreground. However, as we shall see, the moderate and anti-interventionist positions have propelled feminist debate on new reproductive technologies beyond the rather narrow confines of pro- and non-interventionism.

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[11] To this end, mainstream advocates of new reproductive technologies have also drawn upon Firestone's analysis to argue that women's reproductive autonomy is served by the widespread application of *in vitro* fertilization and related techniques.

Recognizing the pitfalls of biological essentialism, most contemporary feminists avoid assuming any position which sanctifies women's natural role in reproduction or natural affinity with nature. Women's affinity with nature, emotions and nurturance is best understood as it is derived from the sexual division of labour in which reproduction, childrearing and service oriented tasks inculcate in women the very qualities and skills which have been presumed to be natural. From this perspective, nature is not a given. We only know and interact with the natural world through a set of culturally mediated categories and practices. All knowledge and all social relationships are, at least in part, socially constructed and hence, we have good reason to accept the claim that a nature/culture dualism is also socially constructed.

4.5 Moderate Interventionism

Moderate interventionists emphasize our ability to use technology wisely and in service of the common good. Stressing the voluntaristic character of technology, moderate interventionists are primarily concerned with the social relations which govern how technology is used. As the product of human intervention in the natural world, technology must be assessed and rationally managed in order to maximize its benefits and minimize its potential abuses. In this sense, technology is largely viewed as neutral.

With great affinity for the Western liberal tradition, moderate interventionists, affirm the individual's right to control reproductive activity as it is derived from the right to privacy. This includes the right of access to all forms of technological intervention in reproduction where these interventions can reasonably be conducted without impinging upon the rights of others. In essence, this position is pro-interventionist in the sense that supporters give primacy to the individual's right to choose and only secondary emphasis to other social values. However, unlike the pro-interventionism of Firestone, there is little in the way of revolutionary intent. Further, a qualified faith in human progress is linked to rational control

over technological change rather than belief in technology's inherently progressive character.

Moderate interventionists divide into at least two factions. On one hand, support for a more permissive version of moderate interventionism is found amongst liberal feminists and some advocates of new conceptive technologies. Many physicians and lawyers, who may stand to gain from a highly favourable climate for the further development and application of new reproductive technologies, also take this position. As Donchin (1986:128-129) understands it, "[s]upporters of innovative reproductive technologies are by implication advocating application of these individualistic norms to an increasingly broader range of circumstances". Hence, some moderate interventionists may seek a regulatory framework in which it is possible to extend the "rights of *noninterference*" to include "support for service demanded from *other* parties". In general, this means that the right to have a child is accorded equivalent status to the right not to have a child. For instance, proponents of this position argue that the state has an obligation to offer *in vitro* fertilization, provide donor gametes and/or arrange surrogate motherhood contracts for those individuals unable to have children by more traditional means (Menning 1981, Andrews 1989).

On the other hand, a qualified version of moderate interventionism is found amongst some socialist feminists who believe that it is, on balance, dangerous to allow the state increased powers of regulation over reproduction. In particular, increased governmental intervention may result in the loss of control in other contentious areas (such as access to abortion). As such, the qualified version of moderate interventionism rejects the possibility of extensive governmental regulation and, instead, demands closer public scrutiny of technological development, better procedural guidelines, mechanisms for accountability, and research on the consequences of clinical applications of new reproductive technologies.

4.5.1 Liberal Feminist Moderate Interventionism

Liberal feminist proponents of moderate interventionism include U.S. lawyer, Lori Andrews, who has been a prominent and controversial participant in the Rutgers University "Project on Reproductive Laws for the 1990's".[12] Noted for her endorsement of new reproductive technologies, Andrews rankled many feminists with her position paper "Alternatives Modes of Reproduction" (1989). Basing her analysis upon the primary tenet of feminism, that women have a right to control their bodies and in particular, their reproductive capacities, Andrews (*ibid*:364) argues that "there is considerable agreement (although not unanimous) among feminists that women should be able to use *in vitro* fertilization". In parallel with fertile women's reproductive decision-making, women's choices to use *in vitro* fertilization, or to become a contracted surrogate mother, must be respected as voluntary and informed. Distancing herself from traditionalist views of "biology as destiny" and, disavowing any support for feminist arguments that women's choices to use new reproductive technologies are coerced through strong pronatal societal pressures, Andrews argues that a ban on reproductive technologies, such as *in vitro* fertilization, would both penalize infertile women and jeopardize feminist progress toward transcending outdated views of women as less rational than men.

On the issue of payment for surrogate motherhood, Andrews rejects the argument that this will lead to the exploitation of women's reproductive labour. Postulating that surrogate motherhood does not comprise "baby-selling" and that it is, therefore, a legitimate market transaction, Andrews (*ibid*:371) states that, "if indeed the underlying activity is one we wish

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[12] Since it was formed in 1985, two goals have characterized the Projects work. First, participants seek to encourage discussion and debate, and where possible consensus, on issues of reproductive autonomy and gender equality as they relate to new reproductive technologies. Second, participants wish to ensure that those who create and administer reproductive law and policy are fully aware of the implications of these gender issues. To these ends, the Project has prepared and published a series of position papers which were presented to the bioethics community at a Forum on Reproductive Laws for the 1990's, held in New York City on May 4, 1987 and attended by over 400 experts in the fields of law, medicine and public policy (Taub and Cohen 1989:v-vi).

to countenance or even want to encourage, our focus should not be on banning payment, but on making sure that the surrogate gets paid more". In order to facilitate women's abilities to make informed and voluntary choices to use reproductive technologies, Andrews (*ibid*:370) recommends "enhanced participation of women in the development and implementation of reproductive technologies, greater access to information and resources, and greater control of these techniques". In short, for Andrews, it is the social, and particularly the legal context, in which new reproductive technologies exist that is decisive in determining the potential implications for gender equality and the overall enhancement of women's reproductive autonomy. Provided with adequate information and meaningful participation in the administration of reproductive technologies, women stand to gain, rather than lose, from increased access to new reproductive technologies.

Reviewing recent feminist debate on new reproductive technologies, U.S. lawyer Juliet Wikler (1986) also argues that social context is fundamental to feminist evaluations of what these technologies are likely to mean for women. In particular, Wikler locates the primary source of conflict in feminist writings on new reproductive technologies in "the uncertainty over how to regard surrogate mothers, subjects of experimentation, and others offering themselves up to the new technology ... together with the ambivalence shown to the new technology because it is at once personally empowering while not controlled by women". Contrasting the need for state intervention in reproductive decision-making, with the fears expressed by feminists "who insist that inviting government intervention will jeopardize the freedoms now enjoyed", Wikler is acutely aware of the particular American context in which existing provisions for access to abortion are slowly, but steadily, being eroded by antiabortionists. "The danger to the feminist program, of course, is that once the right to privacy in reproductive decisionmaking loses its status as a natural or constitutional right, women risk losing choices that they now have" (Wikler 1986:1051). Hence, feminists are faced with a dilemma; on the one hand, in the presence of a strong anti-abortion lobby,

state regulation of research in, and development of techniques such as *in vitro* fertilization and embryo transfer may result in declining access to abortion. On the other hand, a lack of state intervention may disenfranchise some of those who wish to use new reproductive technologies. In either case, women's reproductive rights are obstructed.

In common with Andrews, Wikler (1986:1055) emphasizes that the "capacity of the new technology for good or evil depends on the social context surrounding its use and application". Because "the direction of technological innovation is not self-determining", we are able to manage technology in beneficial ways. Nonetheless, Wikler emphasizes, more strongly than Andrews, that a focus on legislative reform is a necessary, but insufficient, condition to ensure that women's reproductive rights and interests are protected. In particular, a focus solely on regulatory measures obscures the need to consider the values which inform the development of particular technologies. Are existing new reproductive technologies what women really want or are there alternatives which should be considered? Wikler's critique of liberal feminism's tendency to focus too heavily on reproductive rights issues makes a valuable contribution to broadening the liberal feminist agenda. Nonetheless, Wikler does stop short of suggesting that the values which inform the development of technology are themselves embedded in the design of the technology. Hence, she does not call for a halt to the development of new reproductive technologies on the basis that they are biased toward the reproduction of women's cultural subordination. Rather, Wikler's (1986:1047) analysis ultimately rests upon her conviction that "the risks notwithstanding, access to the new reproductive technologies will be valuable to women with reproductive problems".

Liberal feminists do not suggest, or engage in, a critique of the alienation which socialist and radical feminists argue is fundamental to the use of *in vitro* fertilization and related techniques. Jaggar (1983) suggests that this disregard for the embodied nature of our existence reflects the liberal feminist tendency to devalue physical labour in the process of vindicating women's equal capacity for rationality and intellectual pursuit. Given this liberal

tendency toward "somatophobia", socialist and radical feminists have been united by a shared critique which is the logical outgrowth of both the socialist tradition of rejecting a "mental/manual distinction [that] has been used to control and exploit workers" and a deep radical feminist affinity for the project of women reclaiming the body as a precondition to liberation (Jaggar 1983:186). Socialist feminist Barbara Katz Rothman (1989) is in agreement with radical feminist Janice Raymond (1989) that liberal feminists, such as Andrews, have compromised the meaning and value of women's reproductive labour, and with it the respect that should be accorded to motherhood. While Andrews strives to protect a surrogate mother's bodily integrity and decision-making autonomy, Rothman (1989:244) argues that her position is compromised by attempting to sustain the distinction that while "it is indeed her body ... it is not her baby in her body, not if she has contracted it away". The denial of the embodied experience of being a woman and a mother is deeply troubling to feminists, such as Rothman (*ibid*:251), who concludes that "there is a logic to defending women's rights to be demeaned if that is what women want, if that is the deal that women rationally made - but it feels like defending the right of blacks to sell themselves back into slavery if that is what they want."

4.5.2 Socialist Feminist Moderate Interventionism

In common with liberal feminists, socialist feminist moderate interventionists have faith in our abilities to regulate and curb the potentially negative effects of technological change. For Michele Stanworth (1987a:3), this conviction is clear in her introduction to Reproductive Technologies: Gender, Motherhood and Medicine; "with the newer technologies, as with the old, ('routine' techniques for contraception, abortion, infertility treatment or antenatal care) blanket acceptance or rejection is no substitute for informed and critical appraisal." Social alternatives are not "shaped by technologies alone, and technological determinism - whether of the variety that claims that scientific-technical progress provides the key to all social problems, or of the kind that seems to target technology as *the* obstacle to freedom - will

not do" (*ibid*:4).

Objecting to the way in which some "feminists have increasingly seen in the new reproductive technologies nothing less than an attempt to appropriate the reproductive capacities which have been, in the past, women's unique source of power" Stanworth sets out to offer a "fresh appraisal" of reproductive technologies. As such, Stanworth (1990:289) locates feminist resistance to new reproductive technologies in the context of a "vigorous critique of science [which] in this account needs to be tempered with a deeper understanding of the constraints within which science and medicine operate, and of the way these can be shaped for the greater protection of women and men".

As one of the most prominent and controversial voices within the feminist debate on new reproductive technologies, Stanworth's analysis (1987a, 1987b) has come under close scrutiny in recent book reviews, editorials and articles from the journal Reproductive and Genetic Engineering. In particular, Stanworth has elicted the ire of radical feminists who argue that she has adopted an "implicitly liberal" stance condoning the "particular academic perspective that assumes technological progress is neutral", all of which renders her analysis irrelevant to the real politics of women's liberation (Ettorre 1988:215). Perhaps in response to such criticism, Stanworth (1990:290) stated more recently that,

> Far from being neutral artefacts or neutral ways of doing things that are independent of the societies they inhabit, reproductive technologies -- like all technologies — bear the hallmark of the cultural context in which they emerge. Prevailing social relations are reflected in the nature of technologies, their particular strengths and weaknesses, the possibilities they open up and the avenues they foreclose.

In Stanworth's statement, she proposes that technology is inherently biased toward the reproduction of existing social relations. Nonetheless, the full implications of this view of technology are only partially reflected in her more detailed analysis of *in vitro* fertilization and related techniques. For Stanworth (1987a, 1987b, 1987c, 1990), the possibilities opened up by new reproductive technologies are not equally accessible to all women, nor are they

equally acceptable to all women. Placing her own analysis alongside Lesley Doyal's (1987) examination of the gender and class-based inequities in the provision of basic as well as high-tech infertility treatments, Stanworth (1987a, 1987b, 1990) distances herself from liberal feminist moderate-interventionists (such as Andrews 1989, Wikler 1986 and Menning 1981) who make few distinctions about how technology's costs and benefits are distributed across society. In this respect, Stanworth clearly establishes that technology is an equity issue (Bush 1983). However, Stanworth's analysis of the differential and class-based effects of technology does not make a case for how, in the long run, new reproductive technologies may offer new choices to some women while simultaneously closing off choices for other women.

Derived from the conviction that "our bodies do not impose upon us a common experience of reproduction", Stanworth (1987c:4), in agreement with Rayna Rapp (1988), rejects the view that women share a universal reproductive consciousness.[13] Further, as someone who has herself experienced infertility, Stanworth (*ibid*) argues that we will only come to understand the meanings of new reproductive technologies "by understanding the diverse wishes and requirements of women and the way that they are currently underserved by medical and social arrangements". Recommending in particular, that it is unfair to target the infertile as being "unsisterly" in offering up their bodies to medical science, Stanworth (1990:293) reminds radical feminists that all reproductive technologies, from the routine aspects of prenatal care to the newer conceptive technologies, allow the medical profession access to women's bodies and therefore, validate medical medical power. Why then should we expect that only infertile women must "turn their backs on medical treatment" (*ibid*)? Better feminist responses might include a campaign to increase the range of infertility services (with both low and high-tech treatments), provide woman-staffed counselling, and petition for more research into the causes of infertility. Such efforts would "make common cause with infertile

[13] Rapp (1988:97) criticizes the tendency to "equate feminism with opposition to the new reproductive technologies, as if there were a unified category called 'woman' whose natural ability to bear children now stands under the threat of total male, mechanical medical take over."

women and men, who are often themselves very critical of the quality of help they are offered and the terms on which it is available" (*ibid*:296).

Further, the pressures which compel women to pursue motherhood affect all women, regardless of their fertility. As such, there seems no acceptable justification for singling out infertile women as being responsible for "reinforcing the illusion that motherhood is inevitable; any desired pregnancy, presumably, could have that effect" (*ibid*). Thus, Stanworth (1990:297) concludes that "a focus on the degrading impact of conceptive technologies is attractive, perhaps, because it seems to make possible the impossible: to attack the coercive aspects of maternity, the way that motherhood makes victims of women - and to do so in the name of motherhood itself".

Adopting a "rational [rather] than polemical" voice, Linda Birke, Susan Himmelweit and Gail Vines (1990:xi) share many of Stanworth's concerns. Cautioning readers that the liberatory potential of some technologies "resides in the possibility of women taking control", Birke *et al.* (*ibid*:54) also recognize "there are undoubtedly some technologies that are so imbued with a particular set of social values that the technology itself seems intrinsically oppressive or liberatory". In such cases (e.g., chastity belts are the example cited), no amount of taking control will alter the oppressive features of the technology; these technologies are "inflexible" (Winner 1980). Nonetheless, new reproductive technologies are highly complex, and while they "bear the marks of their development in an unequal society", some of these technologies "may be used by women for their own benefit - some may not; each new development will have to be considered on its merits. The history of their development by itself does not provide the answer" (Birke *et al.* 1990). Thus, Birke *et al.* caution against ways of seeing developments in new reproductive technologies as a "slippery slope" inevitably leading to greater male power. In agreement with Stanworth, these authors (*ibid*:55) argue that to do so is to "ascribe too much power to the technology itself, a form of technological determinism". Rather, Birke *et al.* cite Cynthia Cockburn (1988) to affirm the

point that "it is not technology that is out of control, but capitalism *and men*" (original emphasis). Despite their nod to the possibility of inherently oppressive technologies, Birke *et al.* do not engage in speculating that *in vitro* fertilization, or other related techniques, are inherently oppressive for women. Rather, it is the power relations of the existing social organization which instigate and perpetuate threats to women's reproductive autonomy.

In short, while the technologies which feminists might have developed would no doubt be different from those developed in a capitalist patriarchal context, this does not preclude women from using existing technologies in liberating ways. "Indeed, to the extent that reproductive technology allows us to question the automatic assumption that current social relations of reproduction are inevitable, it can be welcomed" (Birke *et al.* 1990:57). However, aware of the health risks and problems associated with *in vitro* fertilization and related techniques, Birke *et al.* (*ibid*) offer, almost by default, a qualified endorsement of new reproductive technologies; "we remain unconvinced that the solution to these concerns is simply to oppose all reproductive technologies, not least because this stance does not clearly identify what feminists should *do* to organize around these issues". Stressing that there is an urgent need to challenge science, Birke *et al.* look to the future in the hope that a different political terrain will provide the opportunity to develop more appropriate technologies and, although they issue an implicit challenge to radical feminists to come up with constructive strategies based upon their opposition to new reproductive technologies,[14] Birke *et al.* do not themselves offer much in the way of specific proposals for bringing about such change.

In summary, Birke *et al.* (1990) and Stanworth (1987a, 1987b, 1990) present a liberalized strand of socialist feminism which emphasizes women's individual reproductive rights

[14] Chapter Five discusses the implications of particular strategies which feminists are proposing and utilizing. However, it is important to note that the Feminist International Network of Resistance to Reproductive and Genetic Engineering has been highly successful in organizing around a strategy of opposition.

and autonomy rather than the collective consequences of the use of new reproductive technologies. In particular, Birke *et al.* and Stanworth reflect a measured confidence in women's abilities to use this technology in beneficial ways. As such, the longterm implications of women's collective use of these reproductive interventions do not appear to be of immediate concern and, as a consequence, they do not offer a far-reaching critique of the ways in which technologies rapidly become "normalized" (Burfoot 1990); the new "choices" which they present becoming increasingly fixed in the design of particular tools, techniques and equipment, patterns of economic investment, changing social expectations and behaviour (Winner 1980).

4.6 Anti-interventionism

Most radical, and many socialist feminist critics of new reproductive technologies are best described as "anti-interventionists". Based on the view that technology is political, they argue that patriarchal and capitalist values are embedded in the design, development and use of new reproductive technologies. Further, because biology is a socially constructed phenomenon women's liberation must involve reclaiming the ability to define the meaning and experience of reproduction. In the short term, therefore, anti-interventionists have adopted a strategy of organized and articulate opposition to new reproductive technologies.

Anti-interventionists envision a future in which the possibility of the unassisted or "natural" process of women's child-bearing becomes redundant as it is deconstructed and eventually reconstructed in the laboratory. Assuming that eventually the success rates of *in vitro* fertilization will improve and the health risks will decline, anti-interventionists argue that more and more women will turn to technology not to overcome infertility, but rather to ensure that all off-spring are screened and selected for "desirable" characteristics before implantation in the womb. Through this process of expertly controlled and increasingly

technologized reproduction, "new" choices which are presented will become coercive as social behaviour shifts in accordance with the view that technological reproduction is the preferred mode of reproduction for all women. Through this shift in expectations, old choices, including the choice not to choose (that is, simply to let "nature" run its course), are lost. In the long run, new reproductive technologies will jeopardize rather than enhance reproductive choice as the decision to adopt one technology snowballs into the adoption of a whole series of technological interventions, each of which seems to prescribe the use of yet another. In a worst case scenario, men, the medical profession and the state will exercise increasing hegemony in all forms of reproductive decision-making.

Anti-interventionists suggest that while men's desire to control women's procreative abilities may partially explain increasing technological intervention in reproduction, we must also consider the powerful conglomeration of capitalist interests represented by new reproductive technologies. As such, anti-interventionists do not couch their resistance to new reproductive technologies in "allusions to their supposed unnaturalness". Rather, anti-interventionists "profound sense of dis-ease" about technological intervention in reproduction arises from concern that techniques such as *in vitro* fertilization further consolidate power in the hands of those who purport to speak for women while at the same time undermining women's control of their own reproductive decision-making (Donchin 1986:134).

The anti-interventionist position, therefore, renounces the supposed neutrality of technology, particularly as this way of thinking is manifested in liberal and some socialist moderate interventionist positions. New reproductive technologies, as the embodiment of patriarchal values, are inherently biased toward the continued and increasing exploitation of women. This is expressed frequently in the work of many contemporary radical feminists[15] and, to a lesser degree, in the work of some "breakaway" socialist feminists who combine

[15] See Mies (1989, 1985), Crowe (1985), Klein (1989, 1988, 1985), and Raymond (1990, 1989).

their analysis of capitalist patriarchy with a rejection of scientific socialism's tendency to regard technological change as inevitable and ultimately progressive.[16] However, as subsequent discussion indicates, radical and socialist feminist anti-interventionists part company with respect to several important features of their analyses. In general, radical feminists give first priority to the analysis of patriarchy as it is manifest through universal male control over women and women's bodies, while socialist feminists emphasize class and gender as dual sources of oppression which manifest themselves in specific historical and social contexts.

4.6.1 Radical Feminist Anti-interventionism

Central to the radical feminist anti-interventionist position, is the view that women's everyday and direct experience of technology must be reflected in theorizing about what this technology may mean for women, both now and in the future. Drawing upon research centered on the experiences of women in an *in vitro* fertilization program, Christine Crowe (1985:547) argues against the view that, "it is the use/abuse of reproductive technologies by males which is the most decisive factor in its exploitation of women". The technology of *in vitro* fertilization is "socially shaped and as such contains values implicit in its design". Hence, new reproductive technologies cannot be described as empowering for women under present, or potentially changed social circumstances. "Control of the procedure by women would not alter motivations for participation; nor would this control alter the social relations arising from women's participation in the program" (*ibid*:547).

Likewise, in her extensive research on women who have undergone *in vitro* fertilization, Renate Duelli Klein (1989:280) concludes that such reproductive interventions are examples of "woman-hating and inherently eugenic, profit- and fame-seeking 'science'. The machine logic of dissection and commodification runs at full speed, as does its propaganda machine that coerces infertile people into trying the 'miracle fix-up' and fertile people into getting a

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[16] See Rothman (1989), and Hubbard (1990). Mies (1989, 1985), although self-identified as a radical feminist, also draws upon the socialist critique of capitalism.

'quality-child'." Further, the dangers that these "failed" technologies pose for women indicate that nothing less than a total ban on *in vitro* fertilization and embryo experimentation will do.

In agreement with Crowe and Klein, Maria Mies (1985:553-554) clarifies the radical feminist anti-interventionist position when she states that, "it makes absolutely no difference whether it is men or women who apply and control this technology ... this technology is *per se* political, because it deprives us of control over events, or centralizes them in fewer and fewer hands". Rejecting "a whole battery of arguments which are wheeled out by men and women, in particular by those traditionally thinking of themselves as left-wing and progressive", Mies (*ibid*:557), in common with other radical feminists such as Janice Raymond (1989), seeks to place considerable distance between radical feminists and left-thinking feminists who espouse the view that the effects of technological change are contingent upon the social system in which the technology is employed.[17]

> Technological progress is not neutral. It follows the same logic in capitalist-patriarchal societies and socialist-patriarchal societies. This logic is the logic of the natural sciences, more exactly of physics, and its model is the machine. It is *always* based - not just in its beginnings - on exploitation of and domination over nature, exploitation and subjection of women (original emphasis).

Mies (1989:8) has little patience for the consensus emerging "among women from the left and from a liberal perspective [who believe] that the colonization of the female body, even within a global context, can be overcome by the progress of science and technology, or, in Marxist terms, by the advancement of productive forces". As a consequence, Mies argues that our only hope of halting and then redirecting science and technology, lies in the recognition that we do not need expert-controlled procedures such as *in vitro* fertilization. Opting out of "the capitalist-patriarchal technology of annihilation" we should begin individually, and follow collectively, "a liberation movement from consumption" (*ibid*:559). Such a campaign should initiate widespread public debate culminating in efforts to establish a moratorium on research

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[17] In particular, this notion is reflected in statements that workplace or reproductive technologies which are alienating under capitalism might be different under socialism.

in, and funding of, reproductive and genetic engineering. Complicity with "techno-patriarchy", whether evident in women's participation in, or compliance with, the use of new reproductive technologies, must be ended for as Klein (1989:288) argues,

> If we keep quiet, we too are in collusion with the promoters of reproductive technologies. To decide in favour of the technologies on an individual level alone and neglect their larger impact on women as a social group is to opt for a dangerously short-sighted option.

Further, women must initiate a "movement of winning back autonomy over our bodies and lives in as many contexts as possible" (Klein 1989:560). As prominent advocates of this radical feminist position, Gena Corea,[18] Jalna Hanmer, Renate Duelli Klein, Janice Raymond and Robyn Rowland (1987:11) argue, in the prologue to Made to Order: The Myth of Reproductive and Genetic Progress[19] that,

> By rejecting these technologies, we take a woman-centred stand. We are *with* infertile women and not against them. We should not forget that as women we do have one incredible asset: the "technodocs" need our bodies (or parts of them) to continue their work. If we deny them our bodies and speak out angrily against them in public, then perhaps they will be forced to stop. We owe this determined resistance to our generation of women and even more so, to the next. If we do not expose the issues and make our voices heard, the next generation of women may be even more mutilated and oppressed than our own.

Resistance, as the only viable and immediate strategy for effective feminist intervention in "the global proliferation of new reproductive technologies" (*ibid*) is, as Noble (1983) suggests in reference to shop floor responses to new management-imposed workplace technology, a "strategy for the present" which allows activists to buy time in order to develop other alternative strategies for the future. Recognizing that it is very difficult to alter the trajectory of developing technology, once established, radical feminists argue that technological

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[18] Corea's non-interventionist stance melds here, with the voices of other Feminist International Network of Resistance to Reproductive and Genetic Engineering women.

[19] Most of the chapters in this book come from the "Women's Emergency Conference on the New Reproductive Technologies", held in July 1985 in Sweden. This international feminist conference developed a position on the connections between reproductive technologies and genetic engineering which resulted in the Feminist International Network on the New Reproductive Technologies (FINNRET) changing its name to the Feminist International Network of Resistance to Reproductive and Genetic Engineering (FINRAGE).

developments must be halted at the point of their inception. Only when alternative social conditions prevail, will we be able to consider the creation of new technologies which are non-exploitative and "friendly to people, women and nature" (Mies 1989).

4.6.2 Socialist Feminist Anti-interventionism

While the need for feminist activism on new reproductive technologies is evident to socialist feminist anti-interventionists, some, such as Barbara Katz Rothman (1989), believe that the costs of implementing a complete moratorium on reproductive and genetic engineering seem to fall disproportionately on the infertile. Thus, tempered by a less strident position on women's participation in infertility treatments such as *in vitro* fertilization, Rothman locates her "anti-technology arguments" in a critique of how the ideology of technology contributes to the increasing alienation of motherhood.

Isolating the ideology of technological society as "a way of thinking about the world in mechanical, industrial terms", Rothman (1989:49) argues that "technological ideology encourages us to see society as a collection of parts" and that ultimately this is dehumanizing in the sense that we come to see ourselves through a "mechanical self-image" (*ibid*:64). Further, "when we look at what happens as a result of the combined ideology of technology and patriarchy, we find a depersonalized mother-machine being manipulated to efficiently produce babies out of valued sperm" (*ibid*:59). As inherently reductionistic techniques which perpetuate a mechanistic view of the self and of bodily processes, new reproductive technologies are alienating to the human psyche and will only serve to further remove from us the possibility of actualizing a more humane and feminist world in which our relationships to each other are of greater importance than the efficiency and rationality of production. Thus, infertility treatment "embodies all that is bad in our medical care" (*ibid*:148).

In alliance with the radical feminist way of thinking about technology, Rothman (1989:253) argues that "of all the feminist theories, the radical feminists are the clearest on

rejecting the linearity, the mechanistic thinking of technological society, replacing it with a sense of organic wholeness, roundness, interconnectedness". Nonetheless, Rothman (*ibid*) also locates difficulties inherent to radical feminist analysis, the primary one being that for radical feminists, women's oppression is theorized in the context of a universal experience of patriarchy. As a result, radical feminists do not distinguish between the compatible, but distinct, ideologies of technology, capitalism, and patriarchy.

> The radical feminists focus on patriarchy, and concomitantly deal with issues of technological society - though they rarely call it such. The radical feminists see technological society as entirely a construction of patriarchy. While that may or may not be true, there are patriarchal societies that are not technological ... [and] the radical feminists are largely lacking an analysis of class: that too, they seem to think is entirely a product of patriarchy.

As a result of these concerns, Rothman is unable to agree with the radical feminist conclusion that women must reject totally all "high-technology infertility treatments" (*ibid*:148). Parting company with Corea *et al.* (1987), Rothman's analysis is couched in the conviction that appropriate feminist responses to new reproductive technologies should center, not on resistance, but on the project of fostering a "vision of connection" through putting "motherhood back together again" (*ibid*:89). The technological grip on motherhood, which patriarchy and capitalism are able to exploit in the pursuit of control over reproduction, is to be challenged through re-establishing the primacy of human relationships, be they biological ties between parent and off-spring or social ties forged through shared experience. Thus, while not wishing to advocate the use of *in vitro* fertilization and related techniques, Rothman is an anti-interventionist who sets her sights on the longterm project of reshaping motherhood and challenging the ideologies which create and recreate the oppressive aspects of motherhood as a patriarchal institution. However, the process is as important as the end result; in particular, discussions of reproductive choice must accommodate infertile women who wish to use new reproductive technologies. "If we are to recognize and respect choice, we have to respect these choices as well: the choice to accept infertility and the choice to fight it" (Rothman 1989:142). More objectionable than women's actual use of these technologies, are

the gendered and class-based social relations which divide women in the wider struggle for a more equitable and feminist oriented world.

In common with Rothman, Ruth Hubbard (1990:145) states that "when I criticize the procreative technologies for their ideological content or their practical consequences, I do not mean to criti·ze, much less blame, the women who use them". Originally suggesting that "some strong, deep, feminist, consciousness raising might end up being far more therapeutic in the long run than broadening the scope of the technological fix", Hubbard (1981:261) has, over the last few years, moved away from an earlier and more rigid analysis of the social circumstances which may coerce women's participation in *in vitro* fertilization (Hubbard 1981). Focusing her recent critique on "the process by which decisions are made about what technologies to develop", Hubbard (1990:144-145) objects to the fact that "ordinary people cannot get access to" or "evaluate the risks" of complicated technologies (such as *in vitro* fertilization) "without the advice of trained professionals". This perpetuates the privileged access of a small minority of experts, while undermining democratic process. Thus, for Hubbard, power relations are embedded in the design of highly complex medical technology; technologies are not neutral and, thus, it is not merely the ways in which they are used that determine whether they are oppressive or liberatory.

Further, Hubbard (1981:260) draws upon extensive experience as a biologist to profess a deep distrust for the kinds of scientific models devised to explain how biological organisms work.

> I frankly view with incredulity and horror, the notion that one can "simply" remove an egg from a woman's ovary, put it in a culture medium in a dish, fertilize it, and let it go through the first few divisions, and then "simply" pick it up and re-insert it in a uterus that it is at the proper stage of preparedness, and have it implant and go through development, without these many manipulations having some effect on the process of development.

Based upon this distrust of extensive biological manipulation, coupled with the power relations which are embedded in the use of complex procreative technologies, Hubbard (1990) stresses

the need for "low-tech" interventions which can be used with minimal medical intervention. Putting accessible technology in the hands of ordinary people, however, requires a commitment to reshaping science as a social institution for "the problem is not that scientists practice their skills but that they have been allowed to constitute a priesthood" (*ibid*:209). Recognizing that science is "no more immune from ideological commitments than are other human activities", Hubbard (*ibid*:211) concludes that feminists must work toward the establishment of "better and more democratic mechanisms than we now have to decide what science needs to be done and how best to do it."

In summary, socialist feminist anti-interventionists, Hubbard (1981, 1990) and Rothman (1989), devote their energies to a critique of the social structures and values embodied by the institutions of science and motherhood. Rothman (1989) offers an extensive critique of the alienation and commodification inherent to the use and development of new reproductive technologies. Hubbard (1981, 1990) attacks the ideological nature of scientific enquiry through exposing problems with the models which inform the design and development of new reproductive technologies. Rejecting the individualization of what both perceive to be collective and global problems, Hubbard and Rothman offer differing, but compatible, analyses of the ways in which feminists should work toward social change. However, in keeping with an awareness of the gender, class and racial inequities inherent to contemporary Western societies, neither Hubbard nor Rothman is willing to universalize the impact of technological change.[20] Hence, in the final analysis, while both radical and socialist feminists reject the use/abuse model of technology and share an analysis of the bias or "valence" (Bush 1983) of technology, socialist feminist anti-interventionism diverges from radical feminist anti-interventionism on two significant points. First, based upon the centrality of a critique of the class-based relations of capitalism, socialist feminists make no underlying assumption of a

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[20] In particular, see Rothman's (1989) analysis of the class and racial exploitation inherent to "surrogate" motherhood contracts, and Hubbard's (1990) discussion of the eugenic and racist uses of reproductive and genetic engineering.

universal reproductive consciousness; in some instances women may legitimately conclude that they wish to "fight infertility" (Rothman 1989) by using new reproductive technologies. Second, the radical feminist strategy for resistance demands women's collective withdrawal from the use of new reproductive technologies as a necessary prerequisite to regaining the ability to define the meaning and experience of reproduction; whereas the socialist feminist strategy for resistance focuses upon and demands a change in thinking as a necessary corollary to changing women's relationship to technological intervention in reproduction.

4.7 At the Centre: Assessing Moderate and Anti-interventionism

Rothman (1989:53) argues that the only fundamental incompatibility between various feminist theories lies with liberal feminism, "the others are all evolving states of new feminist theory, coming to incorporate each other's insights more and more". Drawing upon the ideologies of patriarchy, capitalism and technology as the organizing framework for her analysis of new reproductive technology, Rothman believes that it is liberal philosophy which underpins "articulation of the technological ideology in the social order". Noting that "technological ideology encourages us to see society as a collection of parts" and that ultimately this is dehumanizing in the sense that we come to see ourselves through a "mechanical self image", Rothman (*ibid*:64) argues that "'rationality' has become the culprit. Technological control, dividing motherhood into parts, organizing and systematizing intimate relations, separating out menial physical labour from higher, rational, contractual intent - all of this becomes the very embodiment of reason for the benefit of all". Adding an important and, until recently neglected, dimension to the debate on new reproductive technologies, Rothman (1989:253) insists that the lack of a critique of the dominant ideology of technology undermines the strength of liberal and some socialist feminist analyses. Most clearly affected by this deficiency are liberal feminists who seem to "envision a non-patriarchal technological society".

Responding to what she disparagingly terms "socialist liberalism", radical feminist Janice Raymond (1989:133) views the "proreproductive technology position" of Stanworth (1987a, 1987b), Rapp (1988, 1985) and Andrews (1988) as a "recasting of a liberal feminist agenda, put forth mainly by U.S. and recently, by British socialist feminists". Noting the links between this "reproductive liberalism" and recent attacks on the feminist "antireproductive technology" and "antipornography movements", Raymond argues that this marriage between socialist feminism and liberalism is "held together by a commitment to individual rights, privacy, anticensorship, equal access, the 'liberating' facets of pornography and reproductive technology, and less abstractly, by real personal and political alliances with liberal and leftist men who have supported women's rights when they have benefited by them". In particular, Raymond (*ibid*:134) speaks for many Feminist International Network of Resistance to Reproductive and Genetic Engineering women who cannot condone the "balancing act of being both for and against" reproductive technology nor, in good conscience, conclude that "virtue lies in the middle" (i.e., moderate interventionism).

In common with Firestone's (1971) pro-interventionist position, liberal feminist moderate interventionists, such as Andrews (1989) and Menning (1981), view new reproductive technologies as technological advances which are, on balance, beneficial for women. However, while Firestone's revolution calls for women's collective social and sexual liberation to be forged through the creation of alternate means of reproduction (from *in vitro* fertilization to the artificial womb), Andrews and Menning seek only to maximize the range of choices available within the existing social order, while minimizing legal, social, and medical obstructions to women's individual abilities to act upon these choices. Derived from Andrews conviction that infertile women and surrogate mothers are as able as any women to make rational and well-informed choices, and Menning's sensitivity to the experience and needs of infertile people, the liberal feminist moderate interventionist position assumes that the collective social good is best served through the fulfillment of individual needs and rights. In particular,

women are best served by having improved access to both low and high technology infertility treatments with the provision that the health risks, and clinical effectiveness of techniques, such as *in vitro* fertilization, be monitored and made public. Depending upon the social, economic and political context, liberal feminists may, or may not, favour extensive state regulation of new reproductive technologies and may, or may not, argue that medical insurance should cover the cost of the full range of infertility services.

In contrast with liberal feminists, socialist feminist moderate interventionists, such as Stanworth (1987a, 1987b, 1990) and Birke *et al.* (1990), couch their qualified endorsement of new reproductive technologies in the faith that while these techniques may currently pose threats to some women's reproductive health and autonomy, these threats are over-emphasized in the anti-interventionist position. Further, while existing gender, class, and racial inequities are currently reflected in both who has access to highly sophisticated and more routine reproductive interventions, and on what basis, such disparities serve to illustrate that women do not share a universal reproductive experience or standpoint. In particular, reproduction and motherhood continue to be shaped not primarily by technology, but by existing gender, class and racially based inequities in access to health care and childcare. Thus, feminists should never underestimate the possibilities of women reshaping the use of technology such that its benefits are more equitably distributed and its costs minimized. In the interim, there is nothing to be gained from unduly penalizing infertile women who seek to use new reproductive technologies as one possible option for the resolution of infertility. Lacking strong commitment to a critique of how technology rapidly becomes normalized and solidified through financial investments, design specifications and changing social values, socialist feminist moderate interventionists remain cautiously optimistic that new reproductive technologies will not further entrench the existing power relations of capitalism and patriarchy.

Socialist feminist anti-interventionists, while sympathetic to the infertile and their desire to construct their own lives out of the available raw materials, cannot, in the end,

countenance such faith in the rational management of technology. Critical of socialism's tendency to accept, rather too uncritically, the view that science and technology will serve the interests of socialism as faithfully as they have served capitalism, Rothman (1989) and Hubbard (1990) locate, in new reproductive technologies, an inherent bias toward the replication of existing power relations. Technology as an ideology and science, as a social institution, are shaped by powerful vested interests which bend social values and practices toward acceptance of social inequities and a lack of true democracy. Nonetheless, once ordinary people recognize that science and technology are politically motivated, much can be done, even within existing constraints, to re-shape the projects and methods of science. Rothman tackles this project through a critique of the ideology of technology while Hubbard works within science to expose the political implications of its models, methods and aims.

Placed alongside the analyses of radical feminist anti-interventionists, socialist feminist anti-interventionists share the conviction that new reproductive technologies require organized and sustained feminist response. However, unlike radical feminists, Rothman and Hubbard are wary of disenfranchising infertile women who see it as in their interest to use new reproductive technologies. Rather than positing that these women are suffering from false consciousness, Rothman and Hubbard tread warily on the terrain of "choice"; on the one hand, concerned that the increasing demand for *in vitro* fertilization and related techniques supports small but incremental steps in an undesirable direction, and on the other hand, cognisant of the practical and theoretical implications of suggesting that feminism can provide a privileged epistemological standpoint from which women can see the reality of patriarchal oppression.

Finally, while radical feminist anti-interventionists remain susceptible to the inflammatory charges of technological determinism and biological essentialism, I suggest that they have largely outgrown their inheritance from these earlier tendencies in radical feminist non-interventionism. Recognizing the problems with orthodox Marxist and liberal thinking

about technology, Mies (1988, 1985) offers one of the most articulate versions of the technology-as-politics perspective. With a strong and uncompromised rejection of the view that technology is neutral, Mies is adamant that feminists understand the ways in which patriarchal and capitalist values become embedded in the design and use of new reproductive technologies. Further, radical feminist anti-interventionists have an urgency in their analysis which refuses to be placated by long-range visions of re-shaping science. Technological advances are moving so quickly that a "strategy for the present" (Noble 1983a) is essential in order to ensure that measures are taken to slow the worst abuses and enable women to organize further. However, despite the strengths of this position, radical feminist anti-interventionists have yet to move away from the tendency to universalize women's reproductive needs and experiences. As variables which diversify these needs, class, race, age, sexual orientation and fertility indicate that feminist analyses must clearly account for more than gender as a source of shared experience.

In their assessment of liberal, radical, and socialist feminist perspectives on new reproductive technologies, Beth Rushing and Suzanne Onorato (1987:2) conclude, in each case, that feminists locate the potentially liberatory effects of these technologies in two preconditions; 1) that women control the technology and/or 2) that there be a fundamental transformation of productive and reproductive social relations. This thesis, however, has stressed that, while these preconditions are necessary, they are not sufficient conditions for the elimination of the negative health effects and oppressive social biases embodied by the design and use of new reproductive technologies. As discussed in Chapter Three, an appreciation of Bush's notion of valence makes it seem almost self-evident that feminists who seek a more equitable form of social organization cannot simply expect that the transfer of control over existing technology will be sufficient to extinguish its social biases. Likewise, even within in a radically transformed social order, some technologies may continue to be incompatible with the values of a democratic and feminist world.

To this end, attempts have been made to define what appropriate technology might be and how women might achieve greater involvement in the design, development and use of such technologies. In Chapter Five, I conclude by examining briefly the question of how these projects can be used to unite, rather than divide women deeply concerned about similar issues.

CHAPTER 5

CONCLUSION: STRATEGIES FOR THE PRESENT, STRATEGIES FOR THE FUTURE

> In politics it is always essential to construct a compelling vision of the future and to work toward it, and this is especially true with regard to technology. But it is equally essential to be able to act effectively in the present, to defend existing forces against assault and to try to extend their reach. In the absence of a strategy for the present, these forces will be destroyed and without them all talk about the future becomes merely academic. (Noble 1983a:11)

The Luddites were the first to recognize that technological change was the vehicle for dramatic social changes to the industrial organization of work — changes which, far from being in the interests of ordinary working people, were in the interests of those who sought to manage labour and, in so doing, reap greater profits. Although much maligned for their anti-technology stance, the machine-smashing Luddites were resisting change in a way revisionist historians now understand as "quite rational, widely supported, and indeed successful — in both buying time for reflection and strategizing ... and in awakening a far-reaching political consciousness among workers" (Noble 1983:11). Luddism is, however, seldom evaluated from this perspective. As Noble (*ibid*:11) argues, cast in the light of abstract notions of technological progress, we have come to see the Luddites not as "courageous", but as "mistaken, pathetic, dangerous, and insane". Where capitalists maintain that technology will usher in conditions of prosperity for all, many socialists have posited that this progress "will have a double life"; serving the interests of capital while at the same time creating "the conditions for the eclipse of capitalism and the material basis for prosperity under socialism". Thus, Noble (*ibid*:16) concludes that capitalists and their critics have "come to worship at the same shrine and, as a result, to reject any opposition to technology in the present tense".

With respect to the feminist debate on new reproductive technologies, I propose that the anti-interventionist stance of radical and some socialist feminists conforms to the true spirit of Luddism, and as such, offers a strategy for the present; a strategy essential to formulating and acting upon strategies for the future. The realm of the present has, as

Noble (1983:10) argues, been annihilated by the ideologies of technological determinism and technological progress. On the one hand, technological determinism — or "the domination of the present by the past" — lends support to the view that technological change is autonomous and inevitable. On the other hand, technological progress — as "the domination of the present by the future" — consistently holds out a promise which is never realized. Both obscure the technological present as the immediate realm for assessment, decision-making and action.

Dismissed by liberal, and some socialist, feminists for their "anti-technology" stance, radical feminist anti-interventionists have, in particular, been criticized for attempting to halt technological change from the outside. For instance, Birke *et al* (1990:58) argue that such struggles are "a hopeless quest" because "science and technology are so clearly *not* in women's hands". Rather, Birke *et al* (*ibid*) propose that feminists must "engage in a struggle *with* science and technology, to make them more in tune with women's needs" (original emphasis). This struggle within science must focus upon the inclusion of women in the design and development of more appropriate technologies, while at the same time attempting to transform the methods, projects, and aims of science as a whole. These strategies, as espoused by socialist feminist anti- and moderate interventionists, are clearly long-term projects which build upon shared visions of alternatives to highly invasive and expert-controlled techniques such as *in vitro* fertilization, and embryo transfer. Some, such as Stanworth (1990) articulate suggestions to modify existing techniques in this direction. Other moderate interventionists, such as Andrews (1989), are less concerned to develop alternatives than to enact legislation which enshrines women's right to information about and access to existing new reproductive technologies.

5.1 Purpose and Outline of Chapter

Do the aims and methods of anti-interventionist strategies of opposition to new reproductive technologies work at cross purposes to those of more moderate or long range strategies for the future? Or, is it possible that, despite points of intense conflict, diverse feminist strategies may be understood as occupying different loci within a broad, but united, struggle?

Drawing upon the technology-as-politics framework, this chapter considers the various ways in which feminists have responded to new reproductive technologies — from organized political opposition to visions of an alternative scientific and technical practice. In particular, I compare strategies for the present with strategies for the future; arguing, in line with Noble (1983a, 1983b, 1983c) that a strategy for the present must not be sacrificed to a strategy for the future.

As summarized in Chapter Three, there are at least three possible levels at which feminists and other concerned citizens may intervene in the design, development and use of new reproductive technologies. These are: 1) the level of initiation (i.e., whether to build the thing at all), 2) the level of design (i.e., how it is built), and 3) the level of use (i.e., what you do with it once it's built). Specific strategies for feminist response to new reproductive technologies, which touch on all three of these levels, are illustrated briefly through reference to several examples of how feminists have successfully, or unsuccessfully, attempted to halt or re-direct the design, development, and use of new reproductive technologies. These examples and suggestions, while not intended as a comprehensive platform for feminist response to new reproductive technologies, merely indicate some of the many ways in which ordinary people, as well as experts, can begin to re-shape science and technology. Further, it is argued that feminist scholarship has much to contribute to this process. Smashing "the mental machinery" of technology empowers people to act and,

therefore, it is also a vital "strategy for the present".

In short, I conclude that while many of these diverse feminist strategies for responding to new reproductive technologies may in the long run be compatible, there is at least one area which currently presents an unresolvable dilemma for feminists seeking a more unified voice. Reproduction is irreducibly individual and social at the same time (Petchesky 1980). However, women do not share a universal reproductive consciousness or experience; hence, strategies based upon the presumption of such unity will always elicit conflict. This conflict is most evident in the clash between infertile women, who individually seek to utilize new reproductive technologies, and radical feminists, who claim that any such compliance perpetuates the collective exploitation of women.

In closing, this chapter reviews the major findings of this thesis and places them within the context of a developing feminist sociology of technology. In light of existing tensions between some feminists and infertile women, I conclude that feminist efforts to develop a more comprehensive analysis of infertility remain important to the larger project of enhancing women's reproductive autonomy and choice. At the same time, however, a critical framework for thinking about the relationship between technology and social relations encourages feminists and infertile women to consider unexamined assumptions about the nature of reproductive "choice". Do women exercise reproductive choice when simply choosing between existing medicalized options for infertility treatment, birth control or childbirth management? Or has the rhetoric of choice — especially with respect to a woman's right to choose to have an abortion — eclipsed the need to critically evaluate the ways in which the "choices" constructed by science and technology shape our thinking?

In agreement with McNeil (1990), I argue that feminist research and theorizing on new reproductive technologies has much to contribute to our understanding of women's relationship to technological change. Previous theorizing and research on technology has focused primarily

upon the productive sphere and hence, not as much is known about how technology shapes non-waged labour and domestic life. Through the study of the design, development, and use of new reproductive technologies, feminists reveal new lacunae for investigation and, because new reproductive technologies act upon and intervene in women's bodily processes, the study of new reproductive technologies reveals much about the gendered and embodied nature of social life. Finally, the study of new reproductive technologies focuses attention on our cultural propensity to accept rather too uncritically the increasing technologization of health care (Parker 1983). Hence, the thesis also suggests a number of areas in which further research is warranted.

5.2 Strategies for the Present

> To the dictum, you can't stop progress, we must learn to respond: of course you can. (Noble 1983c:90)

In the spirit of true Luddism, anti-interventionists reject the view that technological change is inevitable and ultimately progressive. Radical and socialist feminists who have adopted an anti-interventionist stance understand that technology is an inherently political phenomenon; technology both reflects and recreates existing power relations. Progressive change, therefore, involves a twofold process: in the long run, the existing balance of power must be shifted, and in the short run, everything possible must be done to halt the introduction of new technology (Noble 1983b). Without a "strategy for the present" (i.e., a slow down in the process of technological change), feminist critics of new reproductive technologies have little chance of developing, let alone implementing, proposals for more appropriate or alternative technologies. To do nothing now is to abdicate responsibility for the future — alternative visions, while important, will always remain just visions. Moreover, to assume that alternative technologies will, in and of themselves, shift existing power relations is to fall back on a version of the technological imperative; roughly stated, it is alternative or appropriate technology which can liberate us, just as it is capitalist patriarchy's technology

which oppresses us.

As Noble (1983b) argues, strategies for the present are valuable ways of buying time which enable further organizing and strategizing to occur. Strategies for the present are also effective as tools for mobilizing support and/or enhancing political consciousness. Indeed, with respect to the development and use of new reproductive technologies, feminist anti-interventionists rely upon the use of organized opposition both to arouse public debate and to inspire creative forms of Luddism.

Critical of the way that new reproductive technologies vest increasing power and control in the hands of men, medicine, and the state, anti-interventionists have been highly successful in focusing public attention on many of the social, political, and economic (as well as health-related) implications of such technological intervention in reproduction. As such, anti-interventionist concerns cover a wide agenda: the hazards of fertility drugs (Klein and Rowland 1988), the risks of genetic manipulation (Minden 1988, Bullard 1988, and Hubbard 1990), the emotional, physical, and psychic trauma of undergoing *in vitro* fertilization (Crowe 1985, Klein 1989), the increasing commercialization and commodification of reproduction (Rothman 1989, Mies 1988), the fragmentation of motherhood (Corea 1985, Vandelac 1988), and the alienation of women from the reproductive experience (Rothman 1989). Further, the Feminist International Network of Resistance to Reproductive and Genetic Engineering has begun to investigate some of the economic and political links between the development and use of conceptive technologies in the Western world, and population control techniques in Third world countries (Spallone and Steinberg 1987).

As the only international feminist organization responding to new reproductive technologies, the Feminist International Network of Resistance to Reproductive and Genetic Engineering monitors and responds to developments in reproductive and genetic engineering.[1]

[1] As well, the journal Reproductive and Genetic Engineering (established in 1988) is edited by some of the founding members of the Feminist International Network of Resistance to

Since 1984, when it was founded at the second International Interdisciplinary Congress on Women held in the Netherlands, the Feminist International Network of Resistance to Reproductive and Genetic Engineering has held a number of well-attended conferences, and members in various countries have distributed information, organized regional meetings and expressed locally their opposition to new reproductive technologies. At the 1985 Emergency Conference, held in Sweden, representatives from over 20 countries passed a resolution strongly condemning the development and application of reproductive and genetic engineering.

> ... We know that technology cannot solve any problems created by exploitative conditions. We do not need to transcend our biology, we need to transform patriarchal, social, political and economic conditions ... We call on women to resist the take-over of our bodies for male use, for profit making, population control, medical experimentation and misogynous science ... We condemn men and their institutions that inflict infertility on women by violence, forced sterilization, medical maltreatment, and industrial pollution and repeat the damage through violent "repair" technologies. (Spallone and Steinberg 1987:211-212).

This resolution (briefly excerpted above) has served as a basis of unity for the organization, and as a statement affirming the connections between all forms of technological intervention in reproduction.

Responding to the call for organized opposition, feminists have employed a variety of tactics designed to halt or slow down the development and application of reproductive and genetic engineering. One of the most widely endorsed has been a political and collective campaign against women's individual use of new reproductive technologies. A second and compatible strategy involves efforts to block the use of all public money (i.e., tax dollars) in the development and application of reproductive and genetic engineering (Mies 1985). This might involve calls for a moratorium on research or the with-holding of personal income tax. In particular, these strategies have been extensively discussed in Western European countries where the public is highly sensitized to the social and political implications of reproductive and genetic engineering.[2] Efforts to obtain the support of major political parties, such as the

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[1](cont'd) Reproductive and Genetic Engineering.

[2] Referring to the antisemetic, racist and homophobic experiments in racial engineering

German Social Democrats, have not however been entirely successful. As Mies (1985:560) argues, the left has yet to extricate itself from the dogmatic view that technological progress is both necessary and unstoppable.

Dedicated to a more radical strategy of opposition than that endorsed by the Feminist International Network of Resistance to Reproductive and Genetic Engineering, feminists in the West German women's guerilla network "Roten Zora" (Red Zora) have carried out a number of direct actions aimed at exposing and sabotaging state and corporate controlled institutions engaged in biotechnology and genetic engineering research. In particular, classified documents obtained through mysterious means and leaked to the press, have heightened public distrust of research being done in reproductive and genetic engineering. Further, a wave of bombings disrupted the activities of various biotechnology institutes and pharmaceutical companies in Germany (Resistance: Documents and Analyses of the Illegal Front, October 1988). After one of these acts of sabotage, an extensive and violent police raid resulted in the arrest of 23 women as well as the seizure of mailing lists, video and tape recordings, and scientific materials related to reproductive and genetic engineering. Despite a paucity of evidence against them, two of these women remain in prison as suspected terrorists; their imprisonment has, however, generated an outpouring of public support (Kinesis, April 1988). More recently, Roten Zora has claimed responsibility for laying a bomb at the Bio-Centre, a university institute involved in producing biotechnical equipment used for the decoding and isolation of genetic mutations (Resistance: Documents and Analyses of the Illegal Front, October, 1988).[3]

Saying no to "progress" in these organized and sustained ways may not bring the development and application of reproductive and genetic engineering to a complete halt, but it does serve to create a critical pause in thinking — a moment in which ordinary people may

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[2](cont'd) conducted during the pre and post World War II years, Hubbard (1990) provides a good discussion of historical events leading up to, and contributing to, a sustained wave of German protest.

[3] The reference cited does not clarify the exact location of this German institute.

realize collectively that the course of technological change can be slowed and, perhaps, eventually altered. Intellectuals, like political activists, have an important role to play in this process. Indeed, socialist feminists, such as Rothman (1989) and Hubbard (1990), have challenged popular ideologies of science and technology; prompting feminists to develop a more critical perspective on technology as well as patriarchy and capitalism.

Noble (1983c:89) argues that at least five tasks confront intellectuals who seek to smash the "mental machinery" of technological progress: "to shift the burden of proof; to create the space to say no; to develop the means of resistance; to develop an alternative future that is moored in the present; and to transcend the myth of the machine, the fetish for technological transcendence". To shift the burden of proof, feminists must articulate loudly and clearly the case against new reproductive technologies. Doing so raises doubts about the certainty of technological progress. Even if the risks, problems and negative social implications of new reproductive technologies are not enough to persuade the public and the powers that be, the onus must be placed upon advocates of these technologies to prove, rather than assume, the benefits of their development and application. To create the space to say no and to develop the means of resistance, feminist critics of new reproductive technologies could draw attention to other examples of cases in which societies have accepted and implemented restrictions upon the development and use of particular technologies. For instance, widespread opposition to the use of atomic energy as an alternative to the burning of fossil-based fuels provides a good case study in how ordinary people and experts have joined in saying no. Although confronted by a renewed and powerful lobby to reverse restrictions on the operation of nuclear power plants, the anti-nuclear lobby has instilled in people's consciousness the possibility of totally rejecting technology.

To develop an alternative future which is moored in the present and to transcend the myth of the machine, specific criteria must also be devised for deciding which technologies must be stopped. As Winner (1980) has argued, *inflexible* technologies have inextricable

tendencies to reinforce established systems of power and, therefore, such technologies are incompatible with the values of a democratic and feminist world. Noble (1983c:91) suggests that technologies which should be opposed are those which "degrade people", "diminish their freedom and control without any apparent economic or other compensating benefit", have ambiguous "technical and economic viability" while posing "serious social problems" or "are clearly viable in the narrow technical or economic sense but are nevertheless destructive for society as a whole". Further, Dickson (1987:8) has developed an extensive list of public interest criteria for new and developing technology. These criteria are based upon a set of explicitly stated values. For instance, technology "should be based on social need" not profit; technology "should be satisfying and self-fulfilling to work with" not "alienating or socially fragmenting"; technology "must help to increase the power of women over their lives" not "concentrate this power in the hands of men"; and technology should "distribute decision-making power as widely as possible in the community", not concentrate it "in the hands of a narrow elite or powerful sectional interests".

While there are many other criteria which might inform decision-making about which technologies to oppose, this minimal list makes a strong case for the rejection of many expert-controlled technologies. Indeed, many of Dickson's public interest criteria suggest the need to create a radically different kind of scientific and technological practice than we now have. However, as this brief discussion has suggested, a strategy for the present remains crucial. Efforts to slow or halt the implementation of inflexible technologies must not be sacrificed in order to develop alternative visions, otherwise the future will always remain in the future.

Anti-interventionist feminists have recognized the urgent need to develop strategies of immediate and sustained opposition; through the Feminist International Network of Resistance to Reproductive and Genetic Engineering women have organized globally and acted locally. Although these efforts to slow the development and use of new reproductive technologies do

not always have an immediately measurable or visible impact, it is safe to suggest that without such opposition, we might well be approaching with alacrity a Huxleyian brave new world.

5.3 Strategies for the Future

Strategies for the future include an alternative vision of more appropriate technology and scientific practice. As an organizing device, such a vision is necessary to "inspire, embolden, raise consciousness about political realities, and provide something to fight for rather than merely against, something to believe in" (Noble 1983b:79). In this respect, socialist feminists, both moderate and anti-interventionist in their stance on new reproductive technologies, suggest a number of strategies for the longterm re-shaping of science and technology; such strategies address the politics of expertise, the devaluing of lay knowledge and the need for a more democratic process of determining which technologies will be developed and what goals they will serve.

Also falling within the rubrick of strategies for the future are a number of moderate interventionist proposals designed to address problems arising from the ways in which new reproductive technologies are currently being used and/or regulated. Such proposals for the modification of existing technologies assume that for the most part, technology is flexible and can be adapted to the needs and motives of the user.

5.3.1 An Alternate Vision of Science

As Benston (1986) has argued, there is much that can be done to shift the balance of power between lay persons and scientific and technical experts. Examining three possible models for changing the methods, projects, and aims of science and technology, Benston indicates that experts themselves must assume a greater responsibility for this process. The

three models — science for the people, science with the people, and science by the people — provide a useful vision of how progress toward an alternate science might be achieved. Working with a "science for the people model", practicing scientists and technical experts "would try to come up with socially responsible kinds of applications or would make their expertise available where needed" (Benston 1986:72). This model is an improvement over current practice, although it does not challenge the separation between the expert and the lay person. Everyday "non-credentialed" knowledge is devalued while "the institutionalized areas of (white, male) expertise are defined ... as the only legitimate areas of concern: areas where non-scientists have special knowledge are dismissed" (*ibid:71*).

A second model, "science with the people", attempts to overcome the separation between experts and non-experts by valuing lay knowledge, as well as expert knowledge, and by providing lay people with the opportunity, resources and assistance necessary to learn more about areas of scientific and technical expertise. This model reduces the hierarchical relations of expertise and creates a spirit of co-operation. It does, however, assume that non-experts will have the confidence to challenge expertise, and that experts themselves will work this way. A third approach, "science by the people", attempts to reincorporate science into everyday life. To accomplish this task, it is necessary to discard the social role of the scientific expert. As Benston (1986:72) argues "removing the connection between knowledge and the exercise of power would open up these areas to the women and minorities now excluded". While the science by the people model is the most desirable longterm objective, scientific and technical experts can certainly begin to change science by working within either of the other two models.

Stressing the importance of applying these alternative visions, socialist feminist moderate interventionists, such as Birke *et al* (1990), argue that feminists concerned about new reproductive technologies should be working with science and technology not against it. Within the science for the people model, there are many opportunities for feminists to draw upon

the credentialed expertise of scientists and technical experts: clinicians could be whistle-blowers for the worst abuses of fertility drugs, physicians could publicize the low *in vitro* fertilization success rates and the ethical problems related to embryo experimentation, and medical researchers could refuse to conduct further research into the development of techniques in reproductive and genetic engineering.[4]

Building upon the science with the people model, feminist scientists, and researchers as well as physicians and clinical support staff could pool knowledge, experience and resources to revise the design and use of new reproductive technologies. Such shared efforts would incorporate women's needs and interests into decision-making about which technologies are to be developed, how they will be designed, and used. In particular, health safety standards and a concern for women's experiences of techniques such as *in vitro* fertilization might prove to be important focal points for modifying the use of existing new reproductive technologies. Arguing for the benefits of such an approach, socialist feminist Michele Stanworth (1990:296) suggests that a campaign "to limit the number of embryos that may be implanted (and thereby reduce multiple pregnancies, pressures for selective reduction, and so forth), or to regulate the use of hormonal stimulation, might do a great deal to reduce the possible risks to women and to their infants".[5] Such campaigns, aimed at improving the provision of infertility services make common cause with infertile women who are often highly critical of existing services.

Less inclined to advocate feminist strategies for working with science and technology, radical feminists sustain organized and articulate opposition to new reproductive technologies

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[4] For instance, Jacques Testard, a French biologist world-renowned for his expertise in *in vitro* fertilization and the freezing of human embryos, has called a halt to some of his own research in the hopes that there will be limits set on the "most worrisome" aspects of such investigation (Conseil du Statut de la Femme, 1987).

[5] Also targeting the improvement of infertility services, Barbara Eck Menning has used her own expertise as a nurse and infertile woman to set up the nationwide U.S. infertility support group RESOLVE.

from a perspective clearly outside of science. Challenging the "whole scientific enterprise, its purposes, practices, and functions", many radical feminists are, in Harding's (1989:278) analysis, "standpoint" feminists.

> From the standpoint perspective, intentionally or not, women scientists are ... complicitous with male domination since it (science) is a system that is inseparable from race and class domination for all women in the world except for white, Western, economically-privileged women ... So, on balance, adding women to science strengthens an institution that should be weakened.

Holding out for a revolutionary change in the practice of science, radical feminist anti-interventionists adhere to a statement of principle concerning their vision for the future; this statement, excerpted from a resolution passed at the 1985 Emergency Conference of the Feminist International Network of Resistance to Reproductive and Genetic Engineering (in Spallone and Steinberg 1987:212), does not encompass immediate strategies for the realization of an alternate science and technology.

> We seek a different kind of science and technology that respects the dignity of womankind and of all life on earth. We call upon women and men to break the fatal link between mechanistic science and vested industrial interests and to take part with us in the development of a new unity of knowledge and life.

As Harding (1989:281) argues, it is in the long run beneficial to have feminists working inside and outside the institution of science. From within science, feminists can offer a fresh perspective on aspects of nature and social life that have for so long been invisible to those schooled in androcentric and sexist bias. This fresh perspective may alter research projects, aims, and methods and therefore contribute to the growth and wise use of knowledge. In contrast, standpoint feminists (who criticize science from the outside) offer a critical examination of how the scientific enterprise — its practices, methods, politics, etc. — perpetuates existing power relations. This outsider's view is essential because it is often very difficult for those working within the culture of science to see the relationships between their own work and its origins or reflections in the larger social world. Further, these understandings of the politics of scientific activity may have a profound effect upon how those working within science think about what they are doing and how they are doing it.

5.4 Toward a Common Cause

Recognizing that feminist strategies for changing science appear to be in conflict, Harding (1989:282) argues that "feminists working inside and outside the sciences need to think of themselves as working together in spite of the occasionally contradictory aspects of their conjoined projects". In general agreement with Harding, I propose that her conclusion also indicates a way forward for feminists concerned to establish a common cause in responding to new reproductive technologies.

Thus far, this chapter has argued that a strategy for the present is as essential as a strategy for the future — without any means of slowing or halting the development and use of new technologies it will be impossible to shift existing power relations enough to enable the creation of more appropriate technology. Likewise, we cannot rely upon the creation of more appropriate technologies as a strategy for shifting existing power relations — to do so is to fall back upon the assumption that social change flows directly from technological change. Nonetheless, a strategy for the future remains an important aspect of any critique. Such alternative visions inspire and create the desire to work for, as well as against, something.

Many feminist critics of new reproductive technologies have adopted a platform of resistance as a strategy for the present; such organized opposition has not, however, been without its critics. Accused of propagating a naive form of anti-technology neo-Luddism, radical and socialist feminist anti-interventionists have borne the brunt of criticism from other more moderate feminists and from infertile women anxious to assert that some new reproductive technologies offer some women greater reproductive choice. Moreover, anti-interventionist feminists have been derided as hypocrites and "Big Sisters" only willing to grant women "choice" with respect to the politically correct technology of abortion (The

Globe and Mail, May 1991).[6]

There seems to be no quick resolution to this impasse. Infertile women, most immediately affected by the development, design, and use of new reproductive technologies have, in the present context, the most to gain and the most to lose from increased technological intervention in reproduction. As passionate respondents to even the murmur of a moratorium on new *in vitro* fertilization clinics or the elimination of *in vitro* fertilization from the rosters of treatments covered by health insurance, many infertile women have spoken out against the view that they are "guinea pigs" for medical science or that they are manipulated into using new reproductive technologies. Moreover, as Sandelowski (1990) has argued, feminists have only recently begun to acknowledge and examine infertility as an important feminist issue. As such, feminists who focus upon the new reproductive technologies have neglected to address the real suffering and loss of infertile women.[7]

As a feminist and as a woman who has experienced the pain of infertility, Anne Pappert (1989) is concerned about the way that feminist debate on new reproductive technologies has leaned toward dividing women into two categories: infertile women and feminists. Stressing that the current debate on new reproductive technologies would never have existed if it were not for feminists, Pappert is encouraged to see that many infertile women are now much more skeptical about the infertility treatments offered up as miracle cures. Nonetheless, the way in which some feminists have framed the debate has denied infertile women a voice. This Pappert attributes to two worrisome feminist positions. On the one hand, many feminists feel compelled to qualify any critique of new reproductive technologies

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[6] This editorial was written in response to a position presented by the National Action Committee on the Status of Women in their brief to the Canadian Royal Commission on New Reproductive Technologies. In their brief, NAC called for a moratorium on the opening of any new *in vitro* fertilization clinics.

[7] Stanworth (1987, 1990) and Menning (1981) are also critical of feminist anti-interventionism for this reason.

with the assertion that they are attacking the technology and not the women who use it. This Pappert notes, lends implicit support to the technology and prevents feminists from taking a strong stand. On the other hand, some feminists have tended to present the view that infertile women are desperate to have their own biological child because of strong pronatal social pressures. This view, reflective of earlier feminist analyses of the exploitative nature of motherhood, indicates to infertile women that feminists believe that all infertile women need is "to get over this desire for a child" and "their emotional trauma will be ended" (Pappert 1989:204). Believing that "feminists in general see them as inferior by virtue of their desire for children", infertile women are not receptive to feminist concerns about new reproductive technologies. To mend these fences and strengthen the feminist critique of new reproductive technologies, Pappert (1989:205) argues that feminists must re-evaluate infertility in light of the fact that infertile women, like fertile women, may wish to parent simply for the joy of being with children — whether that child is "by birth or adoption or other ways of social parenting". Further, Pappert stresses that infertile women "need a woman-centred debate that addresses how we want to deal with our infertility — without being abused by reproductive technologies. To put the power over what happens to our bodies, our health and our lives in our hands, it is vital that infertile women speak out about what is being done for 'their own good'". In the end, this may not stop the proliferation of new reproductive technologies, but at least it will foster the realization that these technologies are, not a solution, but "part of the problem".

As part of the problem, new reproductive technologies offer not more choices, but new choices which close off other more familiar choices — including *the choice not to choose at all* (Rothman 1989). Understanding that technology is an inherently political phenomenon helps feminist and infertile women alike to examine more critically, the still predominant view that new reproductive technologies are really about helping the infertile. However, as I have stressed throughout this thesis, women must look to more than gender as a source of shared

experience. Pappert's cogent summary of the divide between infertile women and feminists makes this abundantly clear. Hence, however much I would like to conclude that sooner or later all women will band together in the rejection of reproductive and genetic engineering, such expectations of a universalized response are unrealistic. Nonetheless, the progress being made toward finding a common cause between all women — whether fertile or infertile, feminist or not — is a source of optimism. Working at many different levels, and sometimes at cross purposes, feminists have articulated loudly and clearly the need to pause and re-consider the kinds of technologies which are developed and the purposes to which they are put.

5.5 Summary and Conclusions of the Thesis

In the introduction to the thesis, it was argued that new reproductive technologies are increasing human control over, and intervention in, the process of reproduction. Central to recent developments, the technique of *in vitro* fertilization has been expanded to include embryo transfer, gamete intrafallopian transfer and cryopreservation. The dangers, as well as the benefits of such intervention, have given rise to considerable debate amongst a wide audience. In departing from traditional medical, legal and ethical perspectives, this thesis set out to examine a diversity of feminist responses to new reproductive technologies. In particular, I was interested to locate and assess the ways in which various feminists understood the relationship between technological and social change. To facilitate the analysis of diverging feminist perspectives, I initially adopted the traditional categories of liberal, radical, and socialist feminism. Noting that liberal, radical and socialist feminist analyses of new reproductive technologies draw upon a critique of patriarchy and/or capitalism, the chapter stressed that an equally critical analysis of technology was lacking.

In Chapter Two, I reviewed the extensive feminist literature on the health risks, problems, and social biases of *in vitro* fertilization and related conceptive technologies. Given that much of this literature has been informed by the critique of medicine as social control, a brief review of several contributions to the field preceded discussion of feminist concerns about *in vitro* fertilization. Deconstructing the dominant therapeutic paradigm for new reproductive technologies, this chapter revealed that medical practitioners have increasingly defined infertility as pathological; such a definition medicalizes a problem which is overwhelmingly social in nature. Further, the pathologization of infertility legitimates the claim that a technological cure is required. In contrast to this medical view, the discussion of pronatalism and the ideology of motherhood substantiated the claim that the desire to parent is at least in part socially constructed. Various theories as to why it is so important to have one's own biological off-spring were also examined.

Feminist research on women's experience of *in vitro* fertilization confirmed that this technique is emotionally, physically and financially demanding. Further, evidence concerning the risks associated with the use of powerful fertility drugs indicates that there are numerous health hazards which remain poorly documented by the medical profession. In addition, a high rate of complications accompanying the gestation and birth of babies conceived through *in vitro* fertilization, indicates that even when "successful", such techniques have a range of adverse effects. Moreover, when unsuccessful, *in vitro* fertilization leaves women feeling as if their bodies have failed them — physicians may add to this by claiming that infertile women have not tried hard enough. In sum, these problems have prompted feminists to consider *in vitro* fertilization as research, not treatment.

Through technological intervention in reproduction, the male-dominated medical profession exerts increasing control over women's bodies and bodily states. Such control is exacerbated by a lack of publicly available information about the success rates and risks of *in vitro* fertilization. Further, medically indicated criteria for access to *in vitro* fertilization reveal that

physicians make normative value judgements about who is fit to mother and who is not. A focus on fetal rights, rather than maternal rights, also obstructs women's reproductive agency. Taken as a whole, feminists argue that reproductive and genetic engineering is conducive to eugenics; in particular, techniques in sex-preselection confirm the potential for abuse. Finally, reproductive products and services are becoming commercialized: babies are the commodities while women's reproductive labour is de-valued.

Based upon these concerns, the concluding section of Chapter Two examined briefly the contours of liberal, radical and socialist feminist analyses of new reproductive technologies. It was argued that liberal feminists believe new reproductive technologies will enhance women's reproductive choice as long as they are effectively regulated. In contrast, radical feminists tend to view new reproductive technologies as a threat to women's reproductive health and well-being, while socialist feminists argue that new reproductive technologies may alienate women from reproduction. Arising from this discussion was the central question of how technology is related to social relations.

Chapter Three undertook the task of reviewing popular ways of thinking about technology — as triumph, threat, or neutral tool. Noting the problems with each of these ideologies of technology, it was argued that both versions of the technological imperative (i.e., technology as triumph or threat) assume that technological change proceeds almost of its own accord and that we must merely adapt to such change. Neither view allows for the role of human agency in shaping technology. Alternatively, the neutral tool view emphasizes our ability to rationally manage technology in order to maximize its benefits and minimize its costs; such a view overemphasizes the voluntaristic character of technology and obscures the ways in which technological artifacts and processes reflect and shape existing social inequities. It was then argued that the technology-as-politics perspective provided a more useful framework for feminist analysis of technological change. This perspective, derived from the work of Noble (1977), Winner (1980), Bush (1983) and others, emphasizes the way that

technology may be valenced toward the perpetuation of existing social inequities. Further, it was argued that some technologies are inflexible and should be opposed because of their incompatibility with the values of a democratic and feminist world. Finally, it was suggested that there are a number of ways in which citizens can intervene in and alter the methods, projects and aims of new and developing technology.

Chapter Four brought together the typologies of feminism (i.e. liberal, radical, and socialist) and technology (i.e., as triumph, threat, neutral tool or politics) in order to develop a more nuanced understanding of how various feminist analyses of new reproductive technologies diverge in their assumptions about the relationship between technological and social change. To facilitate such a comparison, I built upon the work of Donchin (1986) to construct a spectrum of four feminist positions on technological intervention in reproduction — pro, non, moderate, and anti-interventionism. These were reflected in a table which compared the major characteristics of each position. On the margins of this table, I placed pro- and non-interventionism. Pro-interventionists, such as early radical feminist Firestone (1971), embraced the technology as triumph view; the central argument being that artificial reproduction will supercede natural reproduction and liberate women from their sex and class-based oppression. Non-interventionists, such as radical feminists Rich (1976) and Corea (1985), developed an equally strong conviction that technology is inherently threatening; the central argument being that new reproductive technologies allow men to wrest control of reproduction away from women, thus denying an aspect of women's essential being and self-identity.

More central to recent feminist theorizing, the moderate and anti-interventionist positions avoid such emphasis upon biological essentialism and technological determinism. Moderate interventionists, such as liberal feminist Andrews (1989) and socialist feminist Stanworth (1990, 1987), view technology as a neutral tool. While representing two different strands of moderate interventionism, liberal and socialist feminists adopting this position suggest that new

reproductive technologies can be rationally managed in order to enhance women's reproductive freedom. Moderate interventionists may or may not favour state regulation of new reproductive technologies, but overwhelmingly both argue against strategies of opposition to these technologies. Anti-interventionists, such as radical feminist Mies (1988, 1985) and socialist feminist Rothman (1989), argue from a more powerful perspective. Technology is inherently political and new reproductive technologies are to be opposed not on the grounds that they are unnatural, but because their design and use is biased toward the maintenance of existing power relations. Radical feminist anti-interventionists differ from socialist feminist anti-interventionists on two points: 1) radical feminists demand women's total rejection of new reproductive technologies while socialist feminists do not press this issue, and 2) radical feminists believe women's rejection of new reproductive technologies must precede women's re-claiming of the experience of reproduction while socialist feminists advocate the importance of changing our ways of thinking about technology as a necessary corollary to changing women's relationship to technological intervention in reproduction. In sum, it was argued that the anti-interventionist position comes closest to articulating the technology-as-politics perspective and, that anti-interventionism offers a strategy for the present which buys time for the development of more appropriate technologies and alternative models to the current practice of science.

In this chapter, I concluded the thesis by making a case for the importance of a strategy for the present. As argued in the preceding pages of this chapter, strategies for the present create a critical pause and allow people to recognize the possibility of saying no to technology. Also important, however, is a vision of how things could be. Such strategies for the future encourage creative thinking and provide something to work for, as well as against. Considering conflicting feminist strategies for change, such as working inside and outside of science to change its methods, projects and aims, I concluded that apparently conflicting strategies may, in the long run, serve a common cause. Nonetheless, there is at least one

wound that must be healed in this collective process: infertile women who are currently silent or marginalized must have a stronger voice in feminist debate.

5.6 Implications of the Research

New reproductive technologies have generated intense interest and debate within many contexts and from many perspectives: legal, medical, ethical, religious, as well as feminist. Few commentators, however, have couched their analyses in the context of a theory of technological and social change. Moreover, as this thesis has argued, politicians, academics and even those most closely and profoundly affected by technological change express ambivalent views about the meaning and impact of technology. The development and articulation of a critical way of thinking about technology — the technology-as-politics perspective — is, then, a powerful tool with many potential new audiences. While this thesis cannot lay claim to actually developing the technology-as-politics perspective, it is reasonable to suggest that, through this thesis, ways of thinking about technology have become, however slightly, a more important element in the construction of a feminist politics of reproductive choice. Given that technological intervention in reproduction is, by all accounts, likely to continue to proliferate, it is vital that feminists re-consider the ways in which reproductive choice is mediated by technology as well as politics.

The development of feminist debate on new reproductive technologies has much to gain from the sociology of technology: a strong theoretical framework encompassing the gendered and class-based relations of technology; an analysis of the corporate control of technological development; and a viable set of criteria for assessing new technologies from a public interest perspective. However, of equal benefit to the sociology of technology, is the emergence of a strong feminist critique of new reproductive technologies. Given that the sociology of technology has focused primarily upon technologies of the productive sphere, there is much

work to be done in the area of health care technology, technologies of domestic production and leisure to name only a few. In particular, the study of technologies which intervene in and alter the body and bodily processes provide fascinating terrain for furthering our understanding of the gendered and embodied nature of social life.

Finally, strategies "for the present" and "for the future" provide the basis for continued and effective feminist response to new reproductive technologies. As previously stated, the brief survey of strategies contained in this chapter does not pretend to be complete; rather it merely indicates that there is much that can be done by ordinary people and experts alike. It is my hope that feminists and infertile women will build together upon the work that has already been done. As Gramsci has stressed, "one must make a pessimistic analysis of the situation, but when it's time for action, one must act with hope".[3]

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[3] Loose translation, cited in Zimmerman (1981:365). The full passage from which this quotation emerges is given below.

> On daydreams and fantasies. They show lack of character and passivity. One imagines that something has happened to upset the mechanism of necessity. One's own initiative has become free. Everything is easy. One can do whatever one wants, and one wants a whole series of things which at present one lacks. It is basically the present turned on its head which is projected into the future. Everything repressed is unleashed. On the contrary, it is necessary to direct one's attention violently towards the present as it is, if one wishes to transform it. Pessimism of the intelligence, optimism of the will. (Gramsci 1971:175)

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