A NEW PROCREATION STORY: THE CONTESTED DOMAIN OF THE
IN VITRO FERTILIZATION PRE-EMBRYO IN BRITISH COLUMBIA

by

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ABSTRACT

The human pre-embryo is emerging as a new cultural category as a result of the processes of *in vitro* fertilization (IVF) technology. The principle purpose of this conceptive medical technology is to assist infertile couples produce their own biological children. I argue that three specific discourses, biomedicine, law and feminism, which have been selected for this research are generating conflicting and contested debates about the cultural values and meanings associated with the human pre-embryo.

The physical separation of the pre-embryo as an independent entity created external to a woman's body enhances its use in medical treatment, diagnosis and research. This phenomenon has facilitated the manipulation of the pre-embryo in the treatment of infertility, preimplantation diagnosis and research into genetically related diseases. The versatility of the pre-embryo for use in both research and treatment has resulted in a growing controversy about its potential for altering the natural relations and sequencing of biological family organization and about its part in a larger social engineering project leading ultimately to change in social structure.

A combination of anthropological methods demonstrate the centrality of the pre-embryo in the enlarging controversial debates about new reproductive technologies. The biomedical-technical practices of creating, cryopreserving and replacing pre-embryos, which were observed in an ethnographic study of an *in vitro* fertilization programme provides foundational data for analysis of the three discourses. A critical interpretive approach in medical anthropology situates IVF technology in its cultural and historical context as part of a continuing scientific fascination with understanding the beginnings of life. IVF technology is a gateway into a modern exploration of human genetics, using pre-embryos to probe the essential nature of human inheritance. The traditional debates in
anthropology about the cultural nature of parenthood and the juro-political aspects of rules and rights in and over people and things have current relevance. They provide a cultural understanding about the ability of IVF to re-arrange the biological, putative and social relations of parenthood. They reveal the methods whereby legal controls are exerted by groups with different vested interests in children born from IVF and its adjunct therapies, such as surrogacy arrangements and ovum donation. A feminist anthropological perspective explores a recent approach in symbolic anthropology about the cultural meanings of procreation stories, as expressed by women, based on a particular cultural ideology. It reveals the means by which the technologies associated with IVF have the propensity to fragment and devalue women's bodies, a strategy which is often endorsed by the culturally legitimated knowledge of medicine and law.

Four overarching unmediated oppositions are identified in the analysis of the three discourses: research science and clinical therapy; experimental risk and routine therapy; ownership (property) and autonomy (personhood); and technological reproduction (culture) and natural reproduction (nature). The controversies raised by the tension between polarities highlights problems of meaning. These are expressed in the discourses as a struggle over values, which in turn are converted into struggles over power. They represent the new cultural meanings and social consequences which are presently emerging in response to new conceptive technologies.
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PREFACE

CONCEIVING THE RESEARCH PROJECT

This research is the culmination of an on-going exploration, which has been in progress since the early days of the in vitro fertilization (IVF) programme in Vancouver, British Columbia. It predates the establishment of the Canadian Royal Commission on New Reproductive Technologies (hereafter referred to as CRCNRT). During this time, there has been a widespread transformation from use of simple IVF procedures to treat infertile couples to an explosion of conceptional and genetic screening applications. While I have been most interested in the Canadian experience, biomedical research is international in scope and impact. The dominant American developments and those of other industrialized countries, notably Britain, European countries and Australia, have contributed to the Canadian experience.

My interest in IVF has spanned the transition from a general Canadian lack of public awareness about reproductive technologies during the 1980s, to the development of mass media explorations of them. I have witnessed in press and in action a feminist ground swell from a limited, timid, but sometimes radical response, to a concerted, educated and provocative intrusion into Canadian social and political policy. It is probable that, if it were not for the persistent feminist lobby concerning NRTs, public and political interest would not be provoked at all.

1 New Reproductive Technologies is often referred to by the acronym NRT. It is a term which covers the whole range of conceptional and contraceptive technologies, pre-implantation and pre-natal screening technologies, embryo research, recombinant DNA and cloning. The medical community more often refers to the conceptional technologies by the acronym ART, assisted procreative technologies.
In 1982, the fledgling field of reproductive surgery, which included the development of an IVF programme, was being established in British Columbia. At the time, the developments in IVF treatment appeared to be reminiscent of mysterious science fiction "hi-tech". The concept that the "disability of infertility" was being culturally constructed to tie in with a new medical treatment, piqued my long-standing interest in various physical disabilities. Initially, I had intended to study infertile couples' responses to a new therapy, and I was naively unaware that the field of IVF was going to explode into a terrain fraught with so many social, cultural, legal and ethical implications.

However, even at this time some of the early feminist critiques of NRTs (Holmes, Hoskins and Gross 1981, Arditti et al 1984, Corea 1985) were being published. Members of the Feminist International Network for Resistance to Reproductive and Genetic Engineering (FINRRAGE)² were warning of the dangers of these technologies for women's health. These criticisms went largely unheeded and unheard outside feminist circles. In 1987, an international conference was organized by the Office of the Status of Women in Montreal, Canada. Even ten years later these concerns, whether published (Basen et al 1993) or presented in the media, mainly by the National Action Committee on the Status of Women (NAC), are frequently portrayed as "fringy", alarmist scare mongering in the face of continuing developments in well-funded techno-science.

² In 1984 a feminist network of international resistance, critique and analysis of NRTs known under the acronym FINNRET was formed and organized its first feminist conference against the technologies in 1985 in West Germany. The participants condemned much of the reproductive and genetic techniques as violating women's dignity and challenged their racist and eugenic ideology. Two months later at an emergency conference in Sweden, women from twenty countries met to devise strategies to resist the technologies. At this time FINNRET became FINRRAGE. A series of feminist conferences followed in Belgium, Australia and Austria. (Arditti et al 1989:xix-xx).
Ironically, it was these social activist Canadian women, mainly academics, who in the first place fought for the formation of CRCNRT, in order to explore the complexities of these technologies for Canadian society. This lobby did not include in its ranks any anthropologists, let alone feminist anthropologists. However, one anthropologist was included among the seven commissioners called to CRCNRT.

(i) Creating a Feminist Network

In 1989, when the Commission was formed, my nascent interest in feminism was fanned into flames when I became an active member of West Coast LEAF, the British Columbia branch of the Legal Education and Action Fund (LEAF). It was here that I was introduced to what seemed to me a revolutionary dynamic interaction between legal theories and practical action (Bayesky 1988). I discovered that law was not some remote field of knowledge for an intellectually brilliant few, but could be an action-oriented field of awareness about legal issues concerning women's lives. Attending LEAF's first

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3 A nation-wide intensive lobby by women's groups, the Canadian Coalition for a Royal Commission on New Reproductive Technologies, over a two year period, secured the creation of the Commission in October 1989. See notes 5 and 6 in Eichler 1993:218 for a list of the organizations involved and the politicians who supported the lobby.

4 A mixed blessing for anthropology has been that anthropologist, Suzanne Rozell Scorson was selected. She is a spokesperson for the Archdiocese of Toronto on family and women's issues, and is the Director, Office of Catholic Family Life. While she contributed a perspective on the complexities of kinship and family, subjects which have been salient to the discipline, her focus represents a traditional model of family relations. These are at odds with much of the feminist critique. See her commentaries appended to the Commission Report (CRCNRT:1053-1146).

5 Legal Education and Action Fund (LEAF) is a national, non-profit, advocacy organization founded in 1985 to secure equal rights for Canadian women as guaranteed by the Canadian Charter of Rights and Freedoms (1981). Its two-fold mandate is to argue test cases before the Canadian courts, human rights commissions and government agencies on behalf of women, and to provide public education on the issue of gender equality (LEAF's Speakers Kit 1990:3).
Conference on Women and Equality under the Charter of Rights, *Equality 4 Years Later* (April 14/15 1989), I saw how many women in so many diverse areas of life could come together to work on equality issues and to look for legal solutions by attempting to change laws that were gender discriminatory.

It was through LEAF's Speaker's Bureau that I came to represent LEAF's views and resources with the newly formed Vancouver Women's Coalition on Reproductive Technologies (VWCRT). This *ad hoc* group, representing a multitude of women's groups in Vancouver, was concerned with educating themselves and others about NRTs. It was primarily a self-help group, with an outreach programme to help prepare women to write briefs to present to the Royal Commission on NRTs when it met in Vancouver for three days of public hearings in November 1990. Along with other VWCRT members I assisted in the preparation and presentation of a submission on feminist issues, which we considered vital for the Commission to address. This submission was more moderate than had been intended originally, because the National Action Committee on the Status of Women's submission, presented in Ottawa ahead of the Vancouver hearings, had raised considerable public ire. It had called for a complete halt to IVF. Fearing that a backlash against Canadian feminists might result, our submission attempted to raise the issues in a less controversial manner. In retrospect it was not as useful as it might have been.

My interests in IVF, legal interpretations, feminist responses and the rights of the disabled matured to the point where I considered that representation of all of these discourses was important to understanding a new medical technology. I became concerned with finding a way to combine the practice of feminist activism with critical anthropological theory. While I realized that there were discourses, as well as "discourses within discourses" (Cannell 1990) that were important to a fuller understanding of all the
issues, I could not do justice to all of them. Thus I felt secure in concentrating on those discourses about which I had already gained some insights.

Over time and informally, I had established networks through a snowball effect with healthcare workers and academics in the field of IVF, with legal scholars, and in particular feminist legal scholars and feminist activists. I also came to meet through VWCRT, feminists who were interested in the concerns of the disabled about NRTs. Therefore a further focus to my study became a growing awareness of the ramifications of IVF not only for the treatment of infertility as a disability, but for its potential iatrogenic effects. It seemed that on occasion certain aspects of the technology could cause further disabilities for women and their potential children. So disability, infertility and risk seemed inextricably linked, such that IVF treatment could become both the cure and cause of disability.

(ii) Off to Foreign Fields at Home

The observation of medical procedures and most of the interviews with healthcare workers for this study was conducted at the University of British Columbia in vitro Fertilization (IVF) Programme. During the majority of my research, the programme was based at University Hospital, Shaughnessy site, in Vancouver. Further observations were made later at the new facility in Willow Pavilion, Vancouver Hospital, which opened on April 29th 1994.

My exposure to the practical world of hospitals and IVF procedures had been predated by my own training and practice in the field of rehabilitation medicine and my familial connections to the world of reproductive surgery. Through my marriage to an obstetrician/gynaecologist, whose clinical practice was focused on infertility problems and in whose office I worked on occasion, I came to the research with a detailed knowledge of
the tests involved in the infertility "workup". I also had some background familiarity about the IVF procedure and the formation of an IVF programme in Vancouver. I knew personally a few of the IVF staff and I had the opportunity to attend a number of Annual Conferences of both the Canadian Fertility Society and the American Fertility Society. I knew the British Columbia drug representative for Serono, the multinational company, which markets IVF drugs, and I had attended as a guest some of the no-expense-spared junkets put on by the company at major conferences. My fascination with the marketing strategies of Serono, its wealth and power and tenacious infiltration into all parts of the North American infertility business had led me down a dead-end lane, when I naively attempted to study the company's practices. The door slammed closed on what I thought was a realistic research project, when I attempted to obtain the Annual Reports of the company.

Another problem with access was that contrary to my expectations that my personal connections would facilitate my entry into the medical aspects of the research project, I found the reverse to be true. In my initial orientations to the IVF programme, I was greeted with cautious friendliness and my research proposal was treated with skepticism. Despite all of the formal ethical clearances from both the University of British Columbia Social Science and Humanities Screening Committee and the University Hospitals Ethics Committees, there was an implicit sense of ambiguity among the staff about my role in my wanting to observe the IVF procedures and to interview them.

A methodologically related problem of access was one familiar to feminist anthropologists. Early studies on the "anthropology of women" had shown how male bias is transferred to the field project, such that what men say is deemed important. I found from my research in a hospital setting, where men in senior positions of power were largely inaccessible to me, that it was the women who were more service oriented who
were more available to speak with me. Perhaps, the reason that it was easier for me to speak to female health providers rather than male physicians and administrators, reflects the value put on my research as a female researcher by those in powerful positions. Conversely, it may have been my own erroneous assumptions that these people would not want to take time to speak to me. In part, this problem relates to the bias which Moore (1988:186) identifies as inherent in Western culture, which assumes a hierarchical and unequal nature of gender relations.6

During my initial forays into the hospital, I experienced David Serber's dilemma of doing research in a government bureaucracy in that "the process of gaining access was a continual activity" (1981:79). A university hospital treatment and research programme is a type of bureaucracy. Like Serber, I used an interview schedule composed of 15 general questions, which "served as guides to the issues and areas studied as well as a means of redirecting often rambling and personal discussion by informants" (ibid). These questions were reminiscent of Spradley's (1979) "grand tour questions", which could be refined into "mini tours" later. Whenever possible I used focused observations of events, followed by interviews of the participants in order to obtain background knowledge and individual perceptions of what took place (Serber 1981:79). While the exploratory interviews technique was a successful strategy, the interview schedule proved to be methodologically more complex. I had devised a generic questionnaire, which I had adapted so that participants could address some of the topics, but not others, according to their specialized knowledge. Often I had to explain the reasons behind the questions, which on occasion led to illuminations for the participants about other points of view.

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The interviews with the other target groups, such as lawyers, feminist activists, disability rights activists and other interested health professionals, were all conducted in Vancouver. This fieldwork took place between June 1993 and May 1994. However, the documentary research was a cumulative project, which was started in September 1987, when IVF was just beginning to come into the public purview. I assembled materials from medical associations such as the Canadian Medical Association, the British Columbia Medical Association, Society of Obstetricians and Gynaecologists of Canada, and the American Fertility Society, in which I became an active member in 1990. I became an inveterate clipper of newspaper articles and a subscriber to feminist news sheets and journals, such as Kinesis, and the Journal of the National Association of Women and the Law (NAWL). As the publications proliferated, so did my files. I attended every meeting held in Vancouver with "reproductive technology" in its title. So my network of contacts grew commensurate with my files.

My original intention in the late 1980s had been to study patients' experiences of infertility and their participation in an IVF programme. However, the difficulty of gaining access to the opinions of clients became insurmountable, because they are often perceived as emotionally vulnerable and in consequence their experiences have been poorly documented. The medical director of the IVF programme, who subsequently left to work at Pacific Fertility Services in San Francisco, had made it clear to me that he believed I was asking to study an over-researched and emotionally fragile population.

This experience was reminiscent for me of studies in anthropology about getting past the gatekeepers (Hammersley and Atkinson 1983, Berreman 1962) and the discussion of the vested interests that people in positions of power in institutions often hold over what constitutes valuable research (Daniels 1967). In reality, the intended project could have been significant because so few studies on experiences of infertility and IVF
procedures had been done to date, especially in Canada, with the exception of those by
sociologists Williams (1988, 1989a, 1989b) and later Matthews and Matthews (1993), as
well as Eichler's (1988, 1989) critique of NRTs focused on the sociology of the Canadian
family. Currently, a few studies are being published which have been conducted by
Canadian anthropologists, which in one way or another relate to the Report of the
CRCNRT, now often referred to as the Baird Report, after its chairperson.
Anthropologist commissioner Scorsone has produced six dissenting opinions which were
appended to the Report. Feminist anthropological researcher, Tudiver's (1993b) study on
prenatal screening was commissioned by CRCNRT. The outline of a pioneer study on the
effects of Norplant in Canada (Tudiver 1994), a study focused on procreation metaphors
in CRCNRT briefs (McDonald 1994) and a combined anthropological and sociological
collaborative study (Habib and Weir 1994) based on research for the Canadian Advisory
Council on the Status of Women were all presented at a session of the 1994 Annual
Meeting of the Canadian Anthropology Society in Vancouver.

At the time of my frustrated effort to interview patients involved in the University
of British Columbia IVF programme, the clinic was preoccupied with establishing itself at
a new site and with the new director. Although the medical director was unwilling to
facilitate my research at this time, I did succeed in obtaining permission to conduct some
exploratory observations. I spent time in the IVF waiting room in Shaughnessy Hospital,
where patients arrived daily to give blood samples in connection with the pharmacological
superovulation protocols. These tests enabled both the critical timing of and conditions
for the oocyte retrieval process for fertilization. At this time I had some informal

7 I use the scientific term oocyte(s) or ovum(ova) throughout this text interchangeably.
(See glossary) If the word "egg" is used to describe these gametes, it is used in a
pejorative sense or in anecdotal quotes. I avoid jargon wherever possible.
conversations with IVF staff and shortly after I was able through a personal contact to conduct an in depth interview with a couple, who had successfully completed the IVF programme. Some of this preliminary ethnographic research informs this thesis.

With the passage of time and the swift changes in the institution of IVF clinics and their adjunct therapies throughout Canada, this project has presented more challenge that I could ever have envisaged. It has revealed accounts which I would not have uncovered in a more circumscribed project. These have led me to question the power differentials which are constructed on the basis of certain forms of intellectual property. I take the approach that anthropologists have always been interested in the perspectives and practices of marginalized peoples, and that a feminist anthropology is one critical way of addressing the gendered nature of inequalities, which percolate throughout all aspects of society. They have particular relevance to the gendered nature of IVF technology, which is played out on the controversial discursive terrain of NRTs.
Figure 1  Four Photographs of in vitro fertilization embryos

A. Two cell cumulus. Two cell embryo 16 hours post insemination (PI) with nucleated blastomeres and two polar bodies in fertilization droplet.

B. Two cell embryo. Same embryo as in A, 19 hours PI, after removal of excess sperm and corona cells. Optimal magnification 50 times.

C. Four cell embryo. Same embryo as in A and B. 34 hours PI.

D. Six to Eight cell embryo. 42 hours PI. Optimal magnification of C and D. 100 times.
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The funding for this research was made possible by University Graduate Fellowships, for which I am most grateful.
INTRODUCTION

(i) What is in vitro fertilization (IVF) technology?

This research examines the complex social and cultural understandings that are emerging from the medical and technological ability to create human preimplantation embryos, pre-embryos, through in vitro fertilization (hereafter IVF) technology. In vitro fertilization involves fertilization of human gametes, that is sperm and oocyte (egg), by placing them together in a petri dish (in glass). This is performed artificially outside the female body, in the laboratory, in contrast to in vivo, inside the body, where normally conception occurs through sexual intercourse. The term IVF treatment incorporates several medico-technical phases. First, the medical procedure involves altering a woman's hormonal system in order to produce multiple ova (eggs). Second, the surgical procedure entails retrieval of the ripe ova from her stimulated ovaries for the external fertilization procedure. Finally, the resultant embryo(s) are manually replaced into the uterus of the woman who plans to gestate the resultant fetus(es).

1 Throughout this thesis I use the term "pre-embryo" to describe the preimplantation embryo, which is produced through IVF technology, in order to distinguish it from the "embryo", which term is normally applied to a conceptus that has implanted in a woman's uterus. The term "embryo" is commonly used when describing the IVF embryo, so where this term occurs in the text, it is commensurate with the pre-embryo.
Initially, IVF was developed as a therapy to assist couples who were experiencing reproductive difficulties in producing their "own" biological child. It is one among a number of new reproductive technologies, often referred to as NRTs. Many of these adjunct technologies have been developed as refinements and as other options to the traditional IVF procedure, thus expanding the enterprise into a variety of complex choices for patients and practitioners. These options for infertility treatments beyond the simple model include third party parenting, such as surrogacy arrangements and gamete donation, research on preimplantation embryos and commercialization of reproductive products and services. These applications have developed far beyond that which could have been envisaged when IVF first became an option for infertility treatment. They present significant implications for the social realm and pose interesting questions for anthropological inquiry about the pre-embryo as an emerging social category and the complex social and cultural meanings surrounding its status. Analysis of the debates about artificial procreation offer a challenge for anthropological analysis. As Melhuus rightly points out:

there is evidence that values are being contested, and a struggle over values can be legitimately contested as a struggle over power....what is interesting in this struggle over values is the meanings given to the consequences of the new reproductive technologies (1992:306).

I pose the question: What does it mean for women that medical technology has developed to the point where pre-embryos now can be created and manipulated outside of

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2 New Reproductive technologies (NRTs) are rife with acronyms, to which I will refer and explain throughout this text. The alphabet soup of drugs, ART (Assisted Reproductive Technologies) or APT (Assisted Procreative Technologies), and diagnostic and conception procedures include HCG, HMG, GnRH (drugs) and procedures such as IVF, DI (AID), SUZI, GIFT, ZIFT, POST, PROST, and ICSI (see Glossary of Medical Terms).
a woman's body? Infertile couples\(^3\) and their health care providers, lawyers, ethicists and theologians, feminists of various persuasions and disability rights activists are producing contesting and competing discourses, which view NRTs, such as IVF, as individually enabling, or conversely, individually and collectively disabling. Dialogical processes are proliferating and creating NRTs as complex polyvocal representations.\(^4\)

The current social bias towards the technological imperative and the therapeutic "quick fix" in medical care have tended to efface the real experiences of infertile couples participating in IVF therapy. Sometimes, in their efforts to conform with social expectations of parenthood and the socially perceived importance of the biological family unit, infertile couples become complicit partners in a technology with poor success rates. They do this in the belief that it is a routine procedure, which is understandable since IVF technology has been institutionalized so swiftly. While ostensibly claiming to help cure infertility, IVF is in reality an arbitrary procedure, which on occasion provides babies for some infertile couples.

IVF has another important function beyond the provision of children for those who can afford an expensive health service, which in Canada is not covered under provincial medical plans. By the late 1980s, there was evidence that surplus embryos were being created and stored routinely through IVF. This almost limitless supply of pre-embryos can be used in an infinitely creative research environment for numerous projects. These

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\(^3\) Zola (1993) points out that people with disabilities should not be characterized as nouns, such as the "drunk" or "the welfare bum". Throughout this text I avoid the tendency to refer to people, who are unable to conceive a child as "the infertile". I qualify infertility with a noun as it appears less discriminatory.

\(^4\) Clifford discusses the representation of the conflictive domain of discourse in modern society where "many voices clamour for expression" (Clifford 1986:15). In this he uses Bakhtin's (1981) notion of dialogical processes proliferating at discursive sites such as ethnographies and novels.
projects seek to better understand how the processes of human fertilization and implantation occur, the generation of knowledge about the human genome, the possibility of eradicating some genetic disorders and finding treatments for diseases such as neurological disorders and cancer.

A fascination with the potential problem of what is going to happen to all those unneeded pre-embryos has led me to focus my thesis on the complex social relations surrounding the IVF pre-embryo itself. Therefore I wish to explore and to comprehend the variety of ways in which the pre-embryo is being constructed as a new cultural category through its reification as a legal, medical and social entity. What does the pre-embryo mean not only for the people who work most closely with it in providing IVF services, but to those people who engage with it or analyze it from varying degrees of abstraction?

(ii) The Three Discourses: Medicine, Law and Feminism

In this thesis I examine three selected discourses, biomedicine, law and feminism, which I believe to be representative of the polyvocality about the cultural values associated with the creation of extra corporeal embryos. These discourses are highly specific in their themes and orientations. I fully appreciate, however, that none of the discourses represented in this thesis is monolithic; that each discourse is composed of a variety of points of view, embraced under a single epistemology. To begin with I explore

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5 In this thesis I allude to other discourses, such as the experiences of infertile people and certain other theological debates, which are equally important, but which I have chosen not to discuss in depth. In particular I recognize the significance and range of intellectual reasoning about NRTs that might be delivered from the standpoint of the major religions, as well as some of the ethical debates posed by biomedical ethicists about personhood. These more rightly belong as the subject matter of other types of theses.
the professional, authorized discourses of medicine and law, which dominate and are legitimated in social institutions. Then I readjust the anthropological lens to focus on the diverse representations of feminism, endorsed by feminist activists, feminist scholars, legal feminists. I include that element of the disability rights' movement, that espouses a feminist approach, whose activities spurred the call for a Royal Commission on NTRs. Likewise I examine those discourses of IVF service providers, which are less often considered. While these may not be overtly aligned with feminist issues, they do represent a perspective which is particularly sensitive to women's health and social issues. In this manner I believe these discourses to best represent the marginalized views about the implications for women of pre-embryo production. The three discourses provide the empirical evidence which is necessary to demonstrate how power is manifested at many different levels of society. It reveals "the links between the competing discourses of church, state, the medical profession and feminists of various persuasions as well as those who, for whatever reason, are 'silent'" (Melhuus 1992:307).

The proliferation of artificial procreation techniques, of which IVF serves as a gateway technology to other applications, has raised uncertainty about the cultural values and meaning of these technologies. The ambivalence experienced in relation to their meanings calls into question our well-established notions of parenthood, the family, kinship relations, bodily integrity and the marketing of kinship through transmission of reproductive products and services.
(iii) **The Context: Infertility and the Reign of Technology**

The social construction of infertility as a disease in the developed world and the subsequent ability to create human IVF pre-embryos emerged at a historical moment that was ripe for the modern capitalist idea of "infertility-as-disease" control. This concept stands in marked contrast to the more pressing global problem of "fertility-as-disease" control (Arditti, Klein and Minden 1984). The trend towards acceptance of IVF and its corollaries has led swiftly to routinization of this form of treatment for an increasing number of infertility problems. The demand for a Canadian Royal Commission on New Reproductive Technologies (CRCNRT), specifically called to examine the social, political, economic and ethical challenges raised by a variety of new and not so new reproductive technologies in Canada, was a social indicator of a political and public awareness that the implications of these technologies were complex. It was evident that there were important ramifications for situating NRTs in the socio-economic context of Canadian health care and society in general. Furthermore, the cultural construction of "infertility-as-disease" opened the door to medicalization of what was previously a personal and social problem of the inability to produce children, which had social ramifications about the importance of traditional family life.

Paradoxically, a series of medical technologies such as the use of fibre optics in visualizing internal organs, the ability to capacitate sperm and provide a nutrient environment for *in vitro* embryos had all become possible in the 1970s. This enabled an innovative technical circumventory treatment to certain pathologies related to infertility, in particular, obstructed or absent fallopian tubes, to be surgically performed on women who

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6 I attribute this phrase to Reiser 1978.
were unable to conceive. In an arbitrary manner IVF quickly became the panacea for treatment of diverse pathological or unknown causes of infertility.

During this time frame other social developments had occurred, which favoured a growing clientele of Canadian people wishing to use IVF technology. Since the 1960s, birth control methods in the developed world had finally given women a degree of control over their reproductive bodies and the birth rate continued to drop. Birth mothers were increasingly deciding to keep their babies. The difficulties of raising adopted children had become apparent and the problems of cross-cultural adoptions, in particular First Nations babies and international adoptions, were shown to be fraught with cultural, social and ethical dilemmas. The overall result was a diminishing availability of adoptable babies, and in particular white babies.

These factors in conjunction with individualistic desires of infertile couples to produce their own biological children helped promote a technology which on occasion achieved this result, but which generated new unforeseen social issues. The consumerism, the individual enterprise that Strathern sees evident everywhere in the late twentieth century in the Enterprise Culture\(^8\) (1992b:10), is evinced in a new generation of would-be parents. The individualistic desires of these couples to produce their 'own children' is balanced by their intent to delay childbearing until careers and economic security are established (Crowe 1987). However, for many women increases in sexually communicable diseases (STDs and AIDS), unexplained, environmental and iatrogenic

\(^7\) The CRCNRT (1993) report has stressed that this diagnosis is the only one which it believes to be indicated for IVF treatment, which should then be funded by health provincial plans.

\(^8\) Strathern notes that the Enterprise Culture is a term used to describe the policies promoted by the Conservative Party in Britain in the 1980s, which was not only a political product tied to advertising but "it is as much constitutive of a cultural revolution as of the political will of an electorate" (1992b:199-200).
factors of infertility have been confounded further by a "biological clock" that threatens to limit their customary expectations (Modell 1989). The "try harder" (Phillips 1985), "work longer", "wish more" (Williams 1988) mentality has pushed infertile couples into demanding more medical services, even if it means paying for them privately.

II A CONCEPTUAL CONFUSION: DEFINING INFERTILITY AND THE CONCEPTUS

A perennial research problem encountered is that work can only proceed when certain terminological confusions have been resolved. Early on in the research process it became apparent to me that if I was to make sense of the IVF technology and its ability to create pre-embryos, I had to be clear about definitions and classifications. Both the terms "infertility" and "embryo" were used in different ways by legal, medical and feminist contributions to this study.

(i) Infertility as a Terminological Confusion

Infertility is a universal concept, which has been the subject of not only much personal anguish, but has on occasion changed the course of human history. Biblical and historical commentaries have chronicled myths, legends and accounts of infertile couples being blessed with children, then going on to found nations through God's grace; monarchs falling from grace and major constitutional upheavals ensuing; and even whole cultures having suffered from historical periods of sub-fertility (Mullens 1990:21).

In its modern sense, infertility is a confusing term, because it is unclear as to whether it is referring to a disease, an impairment, a disability, or a handicap. The term "infertility" is generally understood to mean the biological inability of a sexually cohabiting
couple to produce their own genetic children to form a social family. The nature of its classification as disease, illness, disability, impairment or handicap is, however, more problematic.

In North America, the commonly accepted medical definition of infertility is one year of unprotected coitus without conception in non-sterilized couples (Speroff et al. 1984). The World Health Organization suggests two years as a more realistic timeframe. The distinction between primary (never having conceived or given birth) and secondary infertility (having some condition which has reversed a proven ability to procreate) is an important one to make. Likewise, there is a difference between the inability to conceive and the inability to maintain a pregnancy, due to recurrent pregnancy loss. The overall gloss of the term denotes the inability to produce live children and in modern Western society, there is incontrovertible evidence that there is an expectation by newly married couples that they will have children.

In the last forty years the term infertility has increasingly entered the Western lexicon. It is what Lakoff (1987) would call a prototypic term, which can be understood differently in different circumstances. Whether infertility can be classified as

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9 I am grateful to Dr. Mary Stephenson, a gynaecologist experienced in the treatment of recurrent pregnancy loss, who advises the use of IVF in long-standing persistent cases, for pointing out this distinction for me.

10 A United States' study (Glick 1977), for which no Canadian equivalent exists, demonstrates that 95% of newly married American couples expect to have children. Jane Gaskell's study of British Columbia adolescents suggested similar responses (Gaskell 1988).

11 Lakoff's (1987) theory of natural categorization, describes how the human mind creates human categories in terms of prototypic cores of meaning, which he calls "idealized cognitive models" (ICMs) or cluster models. These may have fuzzy boundaries as the prototypic features become more ambiguous the further outwards the shared features extend. He examines the category "mother" in English as a prime example.
a disease, a disability, a handicap or an impairment depends both on the circumstances and on who is speaking.

Medical anthropologists would agree that disease is culturally constructed and that belief systems in Western biomedicine, such as reproductive beliefs and practices, are situated within the power struggles of the broader society. Currently, Good (1994) has been examining the problems of the semantics of the term "belief" in anthropology, from the late nineteenth century to the present. He argues that the analysis of culture as belief both reflects and helps to reproduce an underlying epistemology and a prevailing structure of power relations (1994:21). He explains how medical anthropologists have subscribed to this practice by using "beliefs" as a category in two contradictory ways in their cultural accounts. Most often they label as cultural beliefs those medical conditions for which biological theories have the most authority and least often for those where biological explanations are subject to challenge. He points out how commonly medical anthropologists have understood the cultural variation in beliefs about disease, that is "illness behaviour", but have been counter-intuitive about disease itself as a cultural domain because:

Disease is paradigmatically biological; it is what we mean by Nature and its impingement on our lives. Our anthropological research thus divides rather easily into two types, with medicine, public health, and human ecology providing models for the study of disease and its place in the biological system, and social and cultural studies investigating human adaptation and responses to disease. Its takes a strong act of consciousness to denaturalize disease and contemplate it as a cultural domain (ibid:2).

Kleinman has used the explanatory model (EM) construct as a means of making coherent sense of the cultural features that affect people's health behaviours. He has explained the dichotomy between illness and disease and how medical treatment becomes rationalized in this way:
Disease refers to a malfunctioning of biological and/or psychological processes, while the term illness refers to the psychosocial experience and meaning of perceived disease. Illness includes secondary personal and social responses to a primary malfunctioning (disease) in the individual's physiological of psychological status (or both). Constructing illness from disease is a central function of health care systems, a coping function and the first stage in healing (Kleinman 1980:72).

The identification of a specific physical impairment or health condition as a "disability" or "handicap" will likewise vary from one culture to another, as well as between social classes and ethnic groups within a single society. The World Health Organization 1980 (hereafter referred to as WHO) has made a classificatory distinction between impairment, disability and handicap and thereby has promoted "the growing tendency to view disablement as a social phenomenon which exists on a continuum" (Williams 1991:517). Williams envisages this universalization of disablement as a response to a number of health care changes, among which are an aging population and attendant chronic morbidity and a choice of technological fixes. According to data from a 1986 Canadian census, it is estimated that 4.2 million Canadians have a classified disability of some sort.12

WHO (1980) defines an impairment as "any loss or abnormality of psychological, physiological or anatomical structure or function". A disability then is "any restriction or lack (resulting from impairment) of ability to perform an activity in the manner or within the range considered normal for a human being". A third gradation, handicap, is "a disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfillment of a role that is normal...for that individual". Wendell (1989) has criticized these distinctions and suggests the use of the term "disability", because it is a

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12 Census published by The Globe and Mail in a supplement New Attitudes: The changing lives of people with disabilities (December 3 1993:C1).
phenomenon socially constructed from biological reality. For the purposes of this thesis, I refer to infertility as a disability.

(ii) Mixing our Meanings: Redefining the "Embryo"

The cultural construct of the "embryo" also raises categorical problems. One of the early issues that arose with the technological ability to create pre-embryos in vitro was the choice of term that should be used to describe this new entity. If it was to become possible to categorize the pre-embryo, then it had to be uniformly classified. Whereas one person might refer to an "embryo" as an early fetus, another person might be describing a just created zygote. It is important to be clear at the outset about the subtle distinctions that a term can make. The term "pre-embryo" is the one adopted by the Ethics Committee of the American Fertility Association (hereafter referred to as AFS) in a recent supplement on ethical considerations (AFS 1994). The retired Chairperson of CRCNRT has cautioned against inappropriate use of terms to describe early developing human tissue and advocates the use of the strictly biological term "zygote" to describe the preimplanted embryo (Baird 1994).13

Any discussion of the pre-embryo must take place within the context of the social relations that surround it. For practical purposes, or at least without the aid of a high resolution microscope, the pre-embryo is non-existent. Only in relation to certain people and in certain circumstances does it take on a reified existence of its own. It means nothing to itself, but it evokes multiple meanings to those with an interest in it. The

13 In a recent lecture in Applied Ethics at UBC, Baird explained the importance for ethical purposes of calling the preimplantation embryo by its correct embryological term "zygote", because of its totipotentiality. Any cell in a zygote up until about 14 days after fertilization has the potential to become the "true" embryo and subsequent fetus (Baird 1994).
perspective taken by different interest groups has ascribed this conglomeration of human tissue with or without certain vested interests and rights.

Any conceptual analysis about the pre-embryo must identify the information conveyed by the word, whether in a scientific or non-scientific context (Regan 1980). A variety of terms have been used to categorize the cluster of human cells, whether created in normal conception or technically through IVF. These include the embryo, fertilized egg, pre-embryo, pro-embryo, morula (a microscopic raspberry), conceptus, zygote, blastocyst, pre-implantation embryo and fetus. However, the term "embryo" has been commonly used to refer to all stages from the time of fertilization on, at least since the introduction of the teaching of practical embryology at the University of Cambridge in 1883. Authors of many renowned textbooks have adhered to this practice (Biggers:1990). I also found it to be the term most commonly used by participants in this research, as well as by contributors to *Proceed with Care* (1993), the report of the Canadian Royal Commission on New Reproductive Technologies.

The words *embryo* and the closely related term *fetus* have been in use since the fourteenth century, but it was not until 1986 that the compound words *pre-embryo* and *pro-embryo* were introduced independently to describe human cells, during the first fourteen days of development (Biggers 1990:1). Biggers argues from his archival research of relevant medical texts, that the definition of these terms alludes to phases in a

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14 Biggers argues that the words *embryo* and *fetus* have been used in four ways; synonymously (1594 Oxford English Dictionary), categorically to identify two successive disjoint phases of prenatal life (Webster 1828), to identify a subclass of embryo called fetus (Shorter Oxford Dictionary 1947) and to identify a subclass of fetus called embryo (Mayne and Mayne 1875). All four usages implied that an embryo existed from the time of conception or, since 1879, from the time of fertilization (1990:1).
continuous process called the life cycle, which are arbitrary, and have been coined not on scientific grounds but for public policy reasons.

The term pre-embryo was adopted simultaneously in 1986 by the Ethics Committee of the AFS and the Voluntary Licensing Authority for Human in vitro Fertilization and Embryology (hereafter referred to as VLA) in Britain. In Australia, in 1985, the term pro-embryo was suggested to the Australian Senate Select Committee on the Human Embryo Experimentation Bill. Whereas the term pre-embryo was a new term, the term pro-embryo was an old botanical term. Both, however, referred to the phase prior to the development of the primitive nervous streak at fifteen days and the stage normally associated with implantation in the uterus. During this phase each cell in the cluster is totipotential, meaning that it can develop into either a "real" embryo on implantation, or part of the extra-corporeal support to the embryo, such as placenta. Only on implantation will the cells begin to differentiate.

Both the terms pro-embryo and pre-embryo had been arrived at on a moral basis by the Warnock Committee in 1984 and the Ethics Advisory Board of the U.S. Department of Health, Education and Welfare in 1979, respectively. The reason was to ensure that no human pre-embryo created through IVF should be maintained beyond fourteen days, or used as a research subject beyond that point. This marks the time at which differentiation begins to occur with the development of the primitive nervous streak (Biggers 1990:3).

While both the VLA and AFS ethics committees agreed that prior to fourteen days after fertilization, the human prenatal organism should be accorded a different order of moral value than at later stages, they did so for different reasons. The VLA's reason was to enhance communication with non-scientists and to clear up the sloppy practices of using the word embryo for the entire product of the fertilized egg (McLaren 1986). The
AFS wanted to accord special moral status to the pre-embryo during "the special and unique biologic era" up to fourteen days post-conception (Jones and Schrader 1989:189). Jones and Schrader (1989) and Grobstein (1988) base their arguments on a scientific inference, which asserts that the pre-embryo has reached a special place in biology and also in the scale of increasing moral status, that they believe is contiguous with human development. Biggers (1990) rejects this assignation of moral values on arbitrary terminology. He suggests preimplantation embryo as a less ambiguous term to recognize the phase prior to implantation. In this case the pre-embryo has only existed for about two days and will only be at the two to eight cell stage. It is smaller than a grain of sand or the period at the end of this sentence.

I have chosen to use the term pre-embryo for the purposes of this thesis, not for any moral reason, but to make it clear that I am referring to the fertilized egg during the *in vitro* fertilization process, prior to its transfer back to the woman who will gestate it. While I agree with Baird that zygote is a suitable term to reflect the stage of development, I wish to distance myself from this biological determinism and therefore use the term pre-embryo to imbue it with significance as a cultural as well as a biological construct.

III THEORETICAL PERSPECTIVES

This thesis integrates some aspects of the critical interpretive medical anthropological approach with discourse analysis viewed through the lens of a feminist anthropology, which reframes kinship theory in terms of new procreation stories. This strategy keeps women central to the analysis, while presenting the technology of IVF in a historical and cultural context. The contested debates surrounding the application of IVF
technology and its adjuncts is represented by the analysis of the three specific and salient discourses of techno-medicine, law and feminism.

Together the three theoretical approaches provide a framework from which to examine the complexities of IVF technology and its creation, the pre-embryo, as demonstrated by a Western Canadian IVF programme associated with the University of British Columbia. A critical medical anthropological approach focuses the debates on the politico-economic aspects of provision of a delisted medical service, which despite its costs is becoming the treatment of choice for infertility problems. The description of the short and little understood physical world of the pre-embryo, during its extra uterine phase is presented through an ethnographic account of the Vancouver IVF programme. As an example of an ethnography of science and technology, it situates the pre-embryo within a particular cultural and historical context. The discourse analyses expresses a variety of opposing interests about the cultural values of creating pre-embryos. It places the pre-embryo within a network of social relations constituted of those people with a vested interest in its creation. While the discourse analysis makes explicit the fundamental differences in relations of power and hierarchy, a feminist anthropological perspective examines the gendered dimensions of the phenomenon of separating a pre-embryo from its "natural" relations in a woman's body. Despite its physical invisibility, it is reified and can be culturally constructed as a valued entity in its own right.

(i) Critical Interpretive Medical Anthropology

The critical interpretive approach which has been embraced by mainstream anthropology is concerned with social life as "fundamentally conceived as the negotiation of meanings" (Marcus and Fischer 1986:26). This approach has been taken up by some medical anthropologists, who have begun to analyze beliefs and practices of medical
systems in terms of "the way in which all knowledge relating to the body, health and illness is culturally constructed, negotiated and renegotiated in a dynamic process through time and space" (Lock and Scheper-Hughes 1990:49). This theoretical positioning provides a research framework which can incorporate elements of political economy, social constructionism and phenomenology.

Health care has frequently been discussed within the framework of political economy (Navarro 1976; Doyal 1979). The latter according to Ortner first emerged in the United States in the 1970s (1984:139). Medical anthropologists have used political economy to discuss class relations and the capitalist system in relation to studies of biomedicine's effects on other cultures healing systems (Taussig 1980; Singer, Baer and Elling 1986). Scheper-Hughes and Lock(1986) and Lock and Scheper-Hughes (1990) have suggested the critical interpretive approach as a possible unifying paradigm, because it reconciles the polemicism between culturological and political-economic perspectives within medical anthropology (Johnson and Sargent 1990).

A critical as opposed to a clinical perspective is advantageous in order to understand the distribution of power and wealth and its effects on health and healing (Morgan 1990). It explains the mechanisms of social control, capital accumulation, systemic legitimation and reproduction of class, racial and gender inequalities (Baer, Singer and Johnson 1986). It also stresses the importance of remaining grounded in geographic, historical and cultural specificity, especially because the Western scientific endeavour is itself a product of such contexts (Mulkay 1979; Toulmin 1982; Baer 1982; Lock and Gordon 1988).

Furthermore medical anthropology's critical interpretive perspective rejects the hegemony of positivistic science and replaces it with a focus on negotiated meanings, in an attempt to explore the notion of what Turner (1986:2) refers to as "embodied
personhood". This is the way in which the relationship of cultural beliefs connects with health and illness in the sentient human body (Lock and Scheper-Hughes 1990:50).

My research heeds Young's warning about the research bias that facts are often uncovered as a result of the interaction between the researcher and the researched. The tendency for epistemological scrutiny to be suspended for Western social science and medicine has to be addressed (Young 1982:260). Therefore, in this research I have had to deal with my own cultural assumptions about family construction as being preeminently biological and the place of infertility in that scheme; as well as preconceived notions that medical interventions, however technological and experimental, will provide solutions to problems and lead to cures.

This study incorporates the critical interpretive approach in order to make sense of a western health care phenomenon, the technological treatment of infertility and its by-product the human pre-embryo. It also enables the union of the otherwise disparate threads of the personal experiences, economic, legal, biomedical and feminist issues about pre-embryos, which have been assembled through my ethnographic explorations and documentary research. In other words, I contextualize the "local knowledges" I have collected in this research within the historical context of national and international developments in NRTs. The Euro-American cultural imperative to create biologically connected families appears rational in a society that values individualistic consumerism, even to the point of gaining status from assets, such as children. This may seem illogical in contrast to the majority of the world's population which has hardly started to get to grips with fertility problems; a world that is full of children living in dire poverty, who appear by Western standards to be neglected. But paradoxically, the point that is sometimes missed by well-meaning aid agencies is that large families with many children, in the developing world are valued for other reasons - for example children's contribution
to the family economy, their support for parents when elderly in societies without social welfare nets and for a variety of religious reasons.

The motives behind promotion and provision of IVF babies appear comprehensible when a "hi-tech" infertility therapy in located within the political economic framework of the self-serving complicity of the industrial medico-techno-pharmaceutical complex. Given the gendered, racial and classist aspects of NRTs, it becomes apparent why only the rich in the developed world have access to such technology, and conversely, why it is the poor and racially disadvantaged of the third and fourth worlds, who provide the raw materials (ova, sperm, embryos, organs etc.) and the services (experimental bodies for human contraceptive drugs and device trials, gestational surrogacy), which make these technologies possible. Corporate consumerism in the case of NRTs shifts from the retail trade sweat shops of Asia to the fragmented medicalized bodies, who happen to be predominantly women, especially poor women.

Anthropologists have been noticeably absent until very recently from the critique about the paradox of "infertility-as-disease" control in the developed world and the more critical "fertility-as-disease" control in the developing world. In the 1980s some studies examined cultural adaptations to infertility problems in Africa (DelVecchio-Good 1980; Boddy 1988); and studies published in the economic and ecological development literature addressed issues concerned with women's health and lifestyles (a few examples are Hill 1988; Mies et al 1988; McCormack 1988 and 1989, Raikes 1989). Currently anthropologists are beginning to focus on issues of overpopulation and "fertility-as-disease" control in global studies, noting that "infertility-as-disease" control is a particularly advanced capitalist concept (Inhorn 1994). Combining ethnography with epidemiology has produced a few studies on cultural responses to infertility in Egypt (Inhorn 1994; Inhorn and Buss 1994). Of course, Turner's (1969) symbolic analysis of
infertility practices among the Ndembu is still a useful anthropological classic. In Britain, in response to the Human Fertilization and Embryology Act 1990 (hereafter referred to as HFE), a number of anthropological responses (Wolfram 1987; Strathern 1992(a), 1992(b)) have been documented, which link the English kinship system with the recommendations of the Warnock Report and HFE Act. As yet little attention has been given to anthropological interpretations of the complex kinship dimensions, and in particular the gendered aspects of the new reproductive technologies.

Finally, the critical interpretive approach in medical anthropology brings together not only the contributions of social constructionists and neo-Marxist political economists, but phenomenologists also. The bodily experiences of women through the life cycle, often seen as medical metaphors, have been the subject matter of studies by anthropologists and sociologists (Sontag 1978; Martin 1987; Beyene 1989). The silent pain of infertility, particularly for women, is projected through metaphor (Sandelowski 1986) and the symbolism of monthly grieving as a ritual process (Williams 1988). Often for infertile couples the negotiated meanings result from ambiguous responsibility in the doctor/patient relationship on couples undergoing infertility treatments (Becker and Nachtigall 1991). The lived experience of a physical and emotional roller coaster for women who undergo the IVF procedures project the personal anguish of repeated desperate attempts to achieve a pregnancy (Modell 1989; Sandelowski 1991).

The use of a critical interpretive medical anthropology in its fullest sense is limited in this thesis in that, as I explain in the preface, I was unable to gain access to those silenced voices so important to the negotiation of meaning, principally those people undergoing IVF technology. Firsthand, rich subjective accounts of personal experience not only would have helped overcome subjective/objective dichotomies, but would also have contributed to a fully rounded ethnographic account of a medical technology. In this
thesis, I have attempted to include other unauthorized voices - those of women who, while not personal participants in the technology, have very real concerns about it for the health and welfare of women. This view acknowledges issues for women, based on race, class, disability and sexual orientation, which as yet have received little attention in the anthropological literature in relation to new reproductive technologies.

(ii) From an "Anthropology of Women" to Feminist Anthropology

The subject "woman" is largely ignored in the cultural fascination with IVF technology and the production of pre-embryos. This thesis attempts to give recognition to the ways in which reifying pre-embryos often leads to the marginalization of women's problems and to the disappearance of "the woman in the body" from the accepted symbiotic relationship between a woman and her pre-embryo/fetus. The development of a feminist anthropology has provided a method that ensures women are kept central to the analysis.

Feminist anthropology emerged out of the "anthropology of women" in the early 1970s, in an attempt to give recognition to the problems whereby women were represented in anthropological texts (Rohrlich-Leavitt et al in Reiter 1975). "The 'anthropology of women' was part of this process of questioning theoretical categories, and of emphasizing the way in which theoretical suppositions underpin data collection, analysis and interpretation" (Moore 1988:186). The early feminist anthropologists had found that the initial solution to eradicating male bias in the discipline by simply adding women into the traditional equation simply did not solve the problem of women's analytic invisibility. This bias would not go away, because anthropologists were themselves heirs to the sociological tradition of treating women as essentially uninteresting and irrelevant (Rosaldo 1974:17). Defining sex/gender roles was viewed as the necessary step to rework
the universal category "woman" and thereby to construct women's topics as essentially as interesting as men's topics. MacCormack and Strathern (1980) and Ortner and Whitehead (1981) have demonstrated how "woman" as an empirical category has to be analyzed, not assumed, in the same way as categories such as "marriage", "family" and "household", all of which are culturally and historically specific. In this manner the theoretical trajectory of the "study of women" was shifted to the "study of gender".15

Anthropology and feminism have both had to cope with the concept of "difference". As feminist anthropology developed, the problems of identifying the real differences between women's situations, experiences and activities globally had to be faced. New theoretical constructs were required to recognize "otherness", based on the differential experiences shaped by gender, class and race. Researchers, who are "women of colour", are now challenging the western bias, the ethnocentrism of anthropology's colonialist past and point to the racist assumptions of much anthropological theorizing and texts. All too often there is an assumption that the anthropologist is white, in the same way as in the past it was assumed that the anthropologist was male.16 Thus, exclusion by omission is still exclusion.

Moore (1988) advises that we need to reformulate the privileging of the female ethnographer and the power relations of the ethnographic encounter, because although women in all societies share similar problems and experiences, these are camouflaged by

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15 A useful volume edited by M. Strathern, *Dealing with Inequality: Analyzing gender relations in Melanesia and beyond* (1987), takes a number of theoretical perspectives, including feminism, to approach the concepts of inequality and agency in gender relations.

16 This same point was explained to me by Sunera Thobani, the first woman of colour president of the National Action Committee (NAC) on the Status of Women, in that feminist assumptions about women's inequality have reflected that of white, educated, middle-class feminists, thereby excluding by omission the variety of discriminations against women based on race, class and sexual orientation. These assumptions are beginning to be related to the differential use and access of NRTs.
different experiences worldwide with respect to race, the colonial experience, the rise of capitalism and the effects of international development projects. She maintains that the feminist anthropology of the future will therefore not only be involved in reformulating anthropological theory, but also in reformulating feminist theory. She advocates that the feminist critique in anthropology has been, and will continue to be, central to theoretical and methodological developments within the discipline as a whole. The basis of the feminist critique is not the study of women, but the analysis of gender relations, and of gender as a structuring principle in all human societies (Moore 1988:vii).

In this research I make explicit the gendered dimensions of a critical interpretive medical anthropological approach in relation to the creation of the pre-embryo.

(iii) A Feminist Approach to Discourse Analysis

A feminist approach to discourse analysis focuses on the manner in which power is produced through processes of knowledge acquisition. This is accomplished through a plurality of discursive practices. These practices often make "scientific" claims to "truth", which have the effect of excluding, marginalizing or constructing as deviant other discourses of human activity and thought (Boyd 1991). Therefore, dominant discourses always have the effect of silencing suppressed ones.

Foucault's scholarship on discourse analysis has been instrumental in revealing the link between knowledge and power, as well as the politics of knowledge (Foucault 1980). It is commonly accepted wisdom that some powerful discourses, such as law and medicine, claim to speak the truth and thus exercise political power in a society that values that notion of truth. Smart claims that this is the case for law, because law does not, nor need not, make scientific claims to truth (Smart 1991:195-198). It can disqualify "subjugated knowledges", such as women's knowledge (ibid:196). Boyd explains how
discourse theorists stress that power is constructed in and through language because language as discourse always embodies a standpoint or claim to truth. In reality, we are always in the "process of absorbing and filtering the various discursive fields we encounter, which introduce to us the competing ways of giving meaning to the world (Boyd 1991:326). We are always trying to make sense out of what Soper calls "a hierarchy of discourses" (Soper 1990:241).

Critical comparison of multiple sources of evidence provides a method for uncovering the common ground of events and experiences which are recognized and validated in disparate discourses. Therefore the collation of such discourses provides an ethnographic or "thick" description, regardless of the fact that the articulation of competing discourses may result from significantly different understandings of the cultural event, behaviour or category in question. Tyler has explained in his postmodern approach that contemporary ethnography can act as "a superordinate discourse to which all other discourses are relativized and in which they find their meaning and justification" (Tyler 1986:122). This study explores the knowledge claims of the three highly specific discourses I have selected by means of giving voice to those complex and contested understandings which are being constructed about the pre-embryo as a newly emerging cultural category.

Within each of discourses I examine there is no one monolithic discourse. Nurses use knowledge frames that are different from doctors, whose knowledge is different from biologists, social workers and so on. Lawyers who use critical legal theory may well construct the law in a different way from mainstream practicing lawyers. Feminist lawyers formulate their understanding from a critical approach that espouses feminism. Feminists may subscribe to a number of theoretical approaches, socialist, liberal, radical, humanistic, critical race theory. Some may be scholars, others social activists. Each view tints the
understanding of cultural issues in a slightly different hue. However, regardless of the subtle persuasions, each of the major discourses subscribes to a common epistemology, be it biomedicine, jurisprudence or concerns about gender inequalities. Each is bound by its epistemological umbilical cord to its major profession, discipline or view of the world. In this sense anthropologists are no less suspect, as Whittaker's (1981) discussion of the nature of ethics and the disjunctures of the collection and interpretation of fieldwork data suggested

Perhaps it is enough to say at this stage that, to acquire knowledge and to interpret it with humanity seem to be ethical requirements of the human endeavour. A beginning answer may lie in developing further the anthropology of anthropology (Jarvie 1975, p.264), and in assuring that 'the epistemological and ontological presuppositions be made explicit' (Salomone 1979, p. 57). An ultimate answer may lie in a consensus on an epistemology sympathetic to the ethos and responsibility of anthropology. Perhaps, meanwhile, the only adequate answer lies, as it does for Kierkegaard, in indefinite and continual questing (Whittaker 1981:449-450).

Foucault's concept of discourse based on the knowledge/power nexus is being used by many feminist scholars as a means of opening up ways of thinking about power and privilege in society in terms of discourse analysis. Recently, Canadian feminist legal scholars, Gavigan (1988) and Boyd (1991) have adopted this approach in order to replace ideology with experience. In looking at some of the ways in which the law discriminates against women, they take up the postmodernist challenge to the assumption that ideology masks the variety of experiences in women's lives, many of which are largely unrecognized. 17

17 Gavigan (1988) explains that the notion of ideology of motherhood hides the true experience of mothering, while Boyd (1991) examines this in relation to child custody and suggests that in thinking about multiple experiences and possibly multiple ideologies, we would do well to examine wider ranges of discourses. Their argument is that all the
Foucault's work has also informed the work of feminist scholars such as sociologist, Dorothy Smith and philosopher, Nancy Fraser, who have developed novel ways of looking at dominant and oppositional discourses. They link feminist activism and analysis of expert discourses, in order to create new hybrid publics and arenas of struggle (Fraser 1989:11). They believe that by synthesizing theory and practice, this is a potential means of empowering women. Perhaps there is no better way to view this strategy than in the proliferating feminist and feminist disability rights discourses which combine feminist theory with the gendered aspects of daily living. In the context of NRTs, the power struggles between dominant and subjugated discourses are made clearly apparent.

Fraser has constructed a model of social discourse, which is designed to bring into relief the contested character of "needs talk" in social welfare societies (1989:160). She situates power in "the institutional fabrication and operation of expertise" (ibid:11), using Foucault's (1980) concept of knowledge/power. Similarly, Smith envisages power as embedded in the "ruling apparatus" (1987:160), such as government, law and professional organizations, as well as the discourses of texts, which interpenetrate multiple loci of power. Thus power percolates "capillary-like", to use Foucault's term, through our everyday experiences. She calls this strategy "institutional ethnography", which explores the social relations that peoples create through their daily practices. This research subscribes to a feminist ethic (Whittaker 1994a) which explores the power relationships implicit in the authorized discourses of medicine and law. Through their colonizing intellectual knowledges and institutionalization of commonly accepted practices, they have

voices of parenting, beyond the legal model built on the nuclear, heterosexual, stable, middle-class, white model need to be heard.
the capacity to subsume and repress those other discourses, such as feminist and disability rights discourses, which struggle to be articulated and heard.

**IV THE BRITISH COLUMBIA IVF PROGRAMME**

There is only one IVF programme in British Columbia, the most western of the Canadian Provinces. The mountainous terrain broken up by long valleys of rivers and lakes accommodates many remote communities with limited medical facilities. Therefore many British Columbians receive specialized medical care in Vancouver, the largest city, which is located in the most south-westerly corner of the Province, forty miles north of the Canadian/United States border. The majority of the tertiary referral services in British Columbia are based in the University of British Columbia teaching hospitals complex, which serves a provincial population of approximately four million people. The IVF programme is a unique infertility technology service within the Division of Endocrinology, and among a number of specialized tertiary referral services, which are included within the University of British Columbia Department of Obstetrics and Gynaecology.

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18 The use of the term programme describes the protocols, the processes that a patient undergoes to produce multiple ova and that the gametes undergo to become pre-embryos and their subsequent transfer back to the woman for gestation.

19 In the summer of 1995 a new private IVF is scheduled to open in Vancouver, close to the Vancouver Hospital. Its medical director is a reproductive surgeon, who has run a successful Ontario programme. Some of the specialized staff presently working at the University programme have decided to work for the private clinic, which will offer more innovative infertility treatments.

20 Artificial donor insemination (AID), a relatively low technology service, is also available through one programme offered by a Vancouver obstetrician/gynaecologist working in conjunction with an andrology laboratory at the University of British Columbia. Other obstetrician/gynaecologists also provide the service with frozen sperm distributed by
The Vancouver programme is among only fourteen in existence in Canada,\(^{21}\) the same number of IVF clinics that are available in the San Francisco area. Although the population base per facility may be similar, the Canadian reality is one of enormous geographic spread. For example, there are no programmes available in New Brunswick, Prince Edward Island, Newfoundland and Manitoba. The British Columbia facility was founded in 1982, in response to the growing interest in infertility technology, with the intent of provision of services under the auspices of the University of British Columbia as an experimental programme. It claimed the distinction of producing the first IVF baby in Canada, a boy, who was born on Christmas Day, 1983. This was the only success during the early phase of the programme, as the programme closed for more than two years in 1983, while it reorganized and relocated. It commenced services again, in May 1985, in new premises at the University Hospital, Shaughnessy site, where its treatment facilities were spread out again in different locations within the hospital.

In its thirteen years of existence, the programme has never possessed a permanent integrated location; it has changed hospital facilities three times, has been administered by three medical directors and three nurse co-ordinators. However, throughout its uneasy

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sperm banks outside of the province. The Department also provides sexual medicine and recurrent pregnancy loss programmes.

\(^{21}\) In Kyoto, Japan, in September 1993, the International Working Group for Registers on Assisted Reproduction reported that in 1991, 10 Canadian clinics reported to the Canadian IVF Registry, which is co-ordinated by Dr. Arthur Leader, professor of Obstetrics and Gynaecology at the University of Ottawa. 175 clinics reported to the United States IVF Registry (Fluker and Ho Yuen 1993:883). There are 50 registered programmes in the United Kingdom, according to the Interim Licensing Authority (1991).
existence, the composition of the medical staff and the laboratory director has remained the same. The majority are university appointed geographic full-time professors.22

The director of the gamete laboratory is also a full professor in charge of research and graduate students in embryology. He receives a retainer for his responsibilities in overseeing the laboratory and its staff. Two women physicians were appointed later to the core of male physicians. The remainder of the staff, IVF and operating room nurses, laboratory biologists, social worker/counselor are all female employees. In general, most of them have been with the programme for many years. The head biologist and the social worker were employed when the programme moved to the Shaughnessy Hospital site in 1985.

Interestingly, one of the main competitors for the growing number of British Columbians seeking infertility services is Christo Zouves, who was the first permanent medical director and who moved to Pacific Fertility Services in San Francisco in 1990. This clinic offers many innovative services and since many of the patients on the waiting list for the University of British Columbia IVF programme knew Zouves, he had no difficulty in luring them to his programme through a number of sophisticated marketing strategies. Similarly, two new programmes in Washington State have adopted similar marketing strategies. Despite these competitors, the University programme has remained faithful to its mandate of providing IVF in its most conservative form to heterosexual couples, living in stable relationships, using their own gametes, and with the resources to pay for a medical service, which is not provincially funded.

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22 A geographic full-time (GFT) professor is a designation given by the university to physicians whose primary responsibility is teaching students and conducting research. They are permitted to provide restricted services to patients, for which they are remunerated through the provincial Medical Services Plan.
In Chapter 2, I discuss how anthropologists are no strangers to the ways in which cultures construct understanding about the meanings of the beginnings of human life. While comparative studies preoccupied earlier generations of scholars interested in traditional kinship patterns, since the sixties the focus has turned towards an examination of how Western, so-called developed societies, understand their kinship arrangements. More recently, with the emergence of feminist anthropology, a methodological corrective has taken place to factor women's experiences into the picture. This reappraisal in gender studies has produced accounts of procreation stories, which demonstrate how women make sense of their reproductive capacities; and how their cultural ideologies to a large extent direct their lives, including their procreative lives. The new procreation stories which are emerging from the use of new reproductive technologies, have profound implications for the category "woman".

In chapter 3, I show how the innovation of IVF technology has not just suddenly become significant, but rather is a link in an ancient and tenacious chain of fascination with human fertilization and conception by generations of predominantly male scientists. I present a chronology of infertility treatments which have emerged from simple IVF technology, as well as some of the new genetic screening technologies which are on the research horizon. An account of the prevailing medical discourses about definitions of infertility and success rates in relation to problems of diagnosis and cure are followed by an historical overview of the only infertility programme in British Columbia. I contextualize the Vancouver IVF programme as I experienced it against a backdrop of provincial health care reforms and hospital disruptions.
In Chapter 4, the medical discourse of IVF is represented in a "thick description" of the typical IVF processes of the particular programme I studied, from superovulation to oocyte retrieval, to pre-embryo creation and often to the stage of deep freezing. As an attempt at an ethnography of a medical scientific technology, the research conducted during the summer and fall of 1993 in the University of British Columbia Hospital, Shaughnessy site, and later at Vancouver Hospital and Health Sciences Centre, provides a close up view of medical procedures that are little understood and seldom observed.

Grounding in the medical discourse forms the basis for the legal discourse that is discussed in Chapter 5. It focuses on the social and historical place that law has played in attempting to designate an appropriate status for the pre-embryo. The socio-legal construction of it as either potential person or property has resulted in interesting legal cases in the United States. In Canada, the status of the pre-embryo is emerging through decisions in other jurisdictions and the value that Canadians put on their health care system and the decisions of numerous committees and commissions that have attempted to regulate the use of pre-embryos.

The challenges to the mainstream legal rhetoric are presented in Chapter 6 by legal feminist commentaries which identify how the law often misrepresents the effects of assisted procreative technologies for women's health and welfare. A polyvocality of opinions about the effects of NRTs for women are expressed in a feminist discourse, which makes women central to the analysis. Given the unsavoury Canadian history of manipulation of women's bodies and eugenic policies targeted at certain groups in society, feminist and feminist disability rights discourses are cautionary about the effects of reifying the pre-embryo at the expense of women's autonomy.

In Chapter 7, I conclude that there are four overarching issues which link the three discourses. These issues are framed in terms of tensions between polarities, which is
a common tendency in Western thought. The situation of the pre-embryo as a newly emergent cultural category highlights these oppositions which have been previously hidden. When the status of the pre-embryo is viewed from the standpoint of a vacillation between opposing cultural constructs, it make evident the reason for cultural debate.
CHAPTER 2

MEANINGS OF CONCEPTION: FROM TRADITIONAL KINSHIP STUDIES TO NEW PROCREATION STORIES IN ANTHROPOLOGY

The new procreation stories which are emerging around IVF technology may be examined along two axes of anthropological thought. One direction has demonstrated a change of interest from traditional kinship studies towards new inquiries into procreation beliefs. The other direction has illustrated a reorientation of structural studies emphasizing the juro-political aspects of society. Even today, the long-standing ideas and debates that anthropologists have argued under the rubric of kinship and family studies have relevance for modern studies concerning beliefs and practices about medically assisted procreation (Strathern 1992b). They challenge us to rethink our preconceptions about kinship relations and the structure of the family, which is "not a concrete institution designed to fulfill universal human needs, but an ideological construct associated with the modern state" (Collier, Rosaldo and Yanagisako 1982:25). If the state's interest in family formation relates to ensuring social stability, then it must be argued that it must also have an interest in regulating the complexities of family arrangements. The permutations of family relations produced by the expanded applications of IVF are becoming increasingly more complicated and as such represent a challenge to government and law.

Ideas about symbolism and procreation beliefs, concepts of parenthood, kinship relations, definitions of family, the rights, obligations and duties vested in the property and personhood aspects of people, all represent cultural constructs that anthropologists traditionally have channeled into kinship studies. The value of studying these ideas has given kinship a privileged place in anthropology. It explains, in part, why anthropologists studied what they did and why sometimes they wore blinkers, which made them culturally
blind to their ethnocentric biases. It also explains in part why until the 1960s anthropologists' approaches to biology and kinship have been predominantly juro-political, rather than focused on the cultural variations in procreation beliefs. A change in direction can be seen along two avenues, one stemming from Schneider's work on the cultural meaning of kinship, which led to comparative studies of conceptualization theory and the other a re-assessment of the distinction between public, juro-political domains in which men are the dominant actors and the domestic sphere, traditionally treated as women's sphere of activity.

I CONCEPTION THEORIES: TRADITIONAL DEBATES ABOUT PROCREATION IN ANTHROPOLOGY

Anthropological debates about the cultural understandings of the significance of how human life begins have littered the historical anthropological landscape since the nineteenth century debates on the nature of kinship and the possible evolution of social organization from matriarchy to patriarchy. The early theorists (Bachofen; Morgan; McLennan and Engels) in reaching a consensus that ignorance of paternity was a feature of primeval society, had brought a closure to any empirical confirmation. In the early twentieth century, conjectural history began to be replaced by cultural relativity, and the debates re-emerged from the discoveries of some ethnographers (Sharp, Malinowski, Kaberry and Austin) of contemporary peoples, living in matrilineal societies, such as the Australian Aborigines and the Trobrianders, who appear not to recognize paternity.

(i) Virgin Births and Concepts of Paternity

By the late 1960s another round of debates emerged about the significance of kinship and the relationship between scientific biological knowledge and the cultural construction of biological processes. These controversial debates which raged through the
pages of *Man* between 1967 and 1969 were ignited by Leach's provocative paper published in 1967 (reprinted Leach 1969), in which he discussed whether or not "primitive peoples" were ignorant of the facts of physiological paternity. The spirited discussion interchanged by Leach and Spiro, aided and abetted by Powell, Dixon, Burridge, Schneider, Douglas, Needham, Wilson and Schwimmer, attempted to resolve within their own ethnocentric frameworks some of the strange cultural practices and ideas of the people they studied.

Leach (1969) claimed that rather than 'primitive peoples' being ignorant of the facts of physiological paternity, it is anthropological ignorance and not the Frazerian contention of "native's childish ignorance" (Frazer 1914:5:102). Leach argued that

(d)octrines about the possibility of conception taking place without male insemination do not stem from innocence or ignorance; on the contrary they are consistent with theological arguments of the greatest subtlety... they constitute a set of variations around a common structural theme, the metaphysical topography of the relationship between gods and men" (Leach 1969:86).

He focused on Trobriand Islands' society, as a cultural example of beliefs that disavow physical paternity. Here, a *baloma*, a matrilineal ancestor, who decides to return to the substantial world, impregnates a woman through her head. Both Malinowski and Powell had recorded confirmation by informants that matrilineal dogma asserted that male semen was a quickening agent and therefore the male contributes physically to the forming rather than the genesis of the wife's offspring (ibid). In matrilineal societies, such as the Trobriands, formal dogma of kinship denies the father any status as genitor, therefore physiological paternity, whether it is understood or not is irrelevant (Powell 1968:651). This is in direct contrast to Judeo-Christian doctrines of genitor, as I shall explain shortly.

Leach has pursued the argument that common-sense determines that it is improbable that genuine ignorance about physiological paternity should be a cultural fact anywhere. Furthermore he wonders why alleged "ignorance" of physiological paternity
should be deemed "primitiveness" in early ethnographic studies, while miraculous birth of divine or semi-divine heroes is a characteristic of "higher" civilizations. Dionysus, son of Zeus, is born to a mortal virgin, Semele, and Jesus, son of God, is born to a mortal virgin, Mary, are but two among numerous examples from the pantheons of gods. Frazer (1914) and Hartland (1909-10), while viewing these as survivals from an earlier primitive stage, considered investigation of theology of higher religions, including Christianity, as not amenable to anthropologists. The discussants in *Man* seemed to exhibit a similar inability to compare the limitations of their own ethnocentric Christian belief system.

II KINSHIP AND BIOLOGY

(i) Cultural Constructs of Biological Processes

Anthropologists have had difficulty maintaining a theoretical distinction between *kinship* and *biology*. Channeling folk beliefs into kinship studies to the exclusion of the biological facts of life may in part be explained by the discipline's past domination by legal aspects of kinship. "Procreation was felt to be a fact of nature or biology and kinship was felt to be the social recognition and structuring of these 'real' true biological relations as they were known or knowable" (Delaney 1986:505).

The theoretical position that the roots of kinship were located in the biology and psychobiology of reproduction were asserted by Goodenough (1970) and Spiro (1977). However, Schneider (1968(1980)) in his symbolic approach to kinship provided a cultural account of kinship as a system of symbols and meanings. He focused his concern on the definitions of the units and rules which make up the culture of American kinship, rather than the description of patterns of behaviour. He identified sexual intercourse as America's central symbol of the culture, which can be seen both as a set of biological facts, as well as cultural notions and constructs about those biological facts. These constructs
include not only the cultural system of the formal life sciences which explicitly examine those biological facts, but also the informal ethnoscientific construction of beliefs about biological facts. Both are models of the reality based on the biological facts. But Schneider makes the further distinction that certain cultural notions are expressed or symbolized by those cultural constructs which depict the biological facts. He states that "Sexual intercourse and the attendant {psycho biological} elements which are said to be biological facts, insofar as they concern kinship as a cultural system, are of this order. Kinship is not a theory about biology, but biology serves to formulate a theory about kinship" (Schneider 1980:115, his emphasis). Thus meaning is given to biological facts, such that they are transformed into cultural constructs, which then constitute a model for commitment, which Schneider calls diffuse and enduring solidarity (ibid:117).

Clearly there has been a lack of consensus by anthropologists in defining kinship, and it becomes even more problematic to juxtapose it with biology. Different societies define "consanguinity" in various ways. In modern Western societies there is a notion that certain relationships are biological as well as social, expressed through the sharing of common blood. In North America, Schneider found that kinship could not be discussed without the symbolic representations of "blood relations".

(ii) Genitor/Genetrix::Pater/Mater: Problems of Parenthood

A major contribution of kinship theory has been the illumination of the distinctions made not only between descent and filiation, but also between pater and genitor. Although the paternity controversy on a superficial examination seems to be about conception, it is not; rather it is about patrilateral filiation. This is a cultural strategy used

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1 See Chapter 8 in Barnard and Good (1984) for a discussion of the various approaches. The authors concur that "(k)inship is not mere biology...it is a phenomenon of an entirely different order" (1984:184). They define kinship as "a systematic body of categories, of rules expressed in terms of these categories, and of behaviour described in terms of these categories and assessed with reference to the rules" (ibid:186).
as a means of keeping descent lines straight and ensuring that social rights and obligations are preserved. It defines how marriage recognizes the obvious biological association of the progeny of a woman with her affines, her husband's kin. It is about legitimizing offspring and legal paternity. It is about the cultural variety of ways that rights and obligations are institutionalized across generations (descent) and between lineages (alliance). For example, in the case of Australian Aborigines, patrilateral filiation is about "the relationship between the woman's child and the clansmen of the woman's husband (which) stems from the public recognition of the bonds of marriage, rather than from the facts of cohabitation" (Leach 1969:87).

Similarly the debates about the definition of family and marriage have centered on the legal recognition of children rather than on the procreation relations. Gough (1971) noted the limitations of the classic anthropological definition of marriage as "a union between a man and a woman such that children born to the woman are recognized legitimate offspring of both parents" (Notes and Queries 1951 quoted in Gough 1971). For example, the Nayar institutionalized the concepts of marriage and paternity, which were probably significant factors in political integration, by giving ritual and legal recognition to both concepts (Gough 1971). She found the same to be true for the Toda, who used the pursutpimi ceremony, through infant marriage or payment of cattle, to establish legal paternity, because marriage rites were insufficient for this purpose (Prince Peter cited in Gough 1971).

In the early years of anthropological fieldwork Rivers' (1914) insights into studying the genealogies of the Murray Islanders led him to make the distinction between biological and social paternity. Later comparative kinship studies (Barnes 1964, 1977; Schneider

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2 Gough (1971) uses the example of talirite and sambandham among the Nayar. The former, the ceremonials marriage of a pre-pubescent girl to a man, with whom she does not necessarily cohabit or engage in sexual relations links matrilinages through interpersonal relationships and affinity. The latter ensures legal recognition of paternity for a woman's children regardless of whether or not their paternity is known.
1984) addressed this paradox of conceptualizing parenthood and how it related to kinship terminology. Barnes extended River's classification, in order to make the triple distinction between pater, genitor and genital father. This strategy reveals how social ideology at the politico-jural level defines the status of "fatherhood" and "motherhood". Whereas it is commonplace to distinguish between pater, the social father, and genitor, the putative physiological father, it is also necessary to distinguish genitor, the person who is believed to be the physical father of the child from the genital father, who actually "supplies the spermatozoon that impregnates the ovum (Barnes 1964:297). Also Barnes (1977) was the first to investigate this contrast between cultural interpretations of motherhood and fatherhood. He showed how the category motherhood is shaped by fatherhood, and not vice-versa, through clearly interpretable events in nature. Strangely, or perhaps not so surprisingly, this effect continues to be replicated in the value placed on fatherhood over motherhood in the confusion about parenthood with new reproductive technologies (Stolke 1986; 1988). Riviere's axiom perhaps sums up the situation best "genealogies are social and cultural constructs, and not biological pedigrees" (1985). Anthropological understandings about parenthood and kinship as they relate to NRTs could have provided useful insight for all the commissions and committees that have attempted to address these complex cultural constructs.

(iii) **Categorizing Parents: Some Cognitive Models**

Theoretical insights into human categorization, based in cognitive science, psychobiology, as well as sociology are beginning to help clarify some of the paradoxes

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3 The same distinction may be made for the category 'mother', in the case of a gestational surrogate. She is a woman, who gestates the child of another's woman's embryo and therefore has no genetic connection with her offspring. Socially, it is assumed that she is the genetic mother because she is pregnant with the fetus.

4 Studies in psychobiology discuss the primary bond between a child and its mother or mother-surrogate. Currently Fox's (1993) study of surrogacy and the Baby M case argues
in Western thought. Keesing's cognitive psychology and cognitive science model maintains that "what we have called kinship represents cultural glosses placed by different people on the bonding that they have recognized as fundamental to and constitutive of our nature as humans" (1993:4).

Human categories have been described by Lakoff's (1987) complex, semiotic model (ideal cognitive model), which Keesing has extended to the category "mother". He develops a convergent model of mother (birth mother, genetic mother, nurturing mother, marital mother and genealogical mother), which forms an experiential cluster. However, base models in the prototypical case also increasingly diverge as Keesing shows by examples in modern science, as well as institutionalized adoption and fosterage (Keesing 1993:7). Real mother, stepmother, surrogate mother, adoptive mother, foster mother, birth mother, donor mother, are all mother, because of their relation to the ideal case. Using this logic of prototypy, he similarly defines "father" by the example that "the conical 'father' is genitor and pater and authority figure and mother's husband" (ibid:10). Currently, McKellin (1994) is applying similar models of cognition and culture to the prototypic term "brother" in Managalase society, in order "to account for the deviations from classical logic [which] will help us understand the ways individuals generalize and create images of others" (1994:26).

The complexities of parental relations are drawn out by the redefinition of the people who perform different aspects of the roles of fathers and mother, which are now made possible by some of the new reproductive technologies (see Appendix A). They add to those complex arrangements already established through blended families, adoption and fosterage. When reproductive brokers and clinics also get involved in this venture, the

for the primary bonding of the mother-child relationship, expressed by gestation, birth and early nurturing.
legal and social situations become even more complicated, as can be seen in some of the American legal cases about control of pre-embryos and children born from surrogacy arrangements.5

III PROCREATION STORIES: RECONSTRUCTING KINSHIP AND FAMILY

Recently, anthropologists have been examining the procreation beliefs of different cultures within the context of specific cultural world views. It has been argued that some of the earlier debates about virgin births and paternity by anthropologists, as we have already seen, might have reached a different conclusion had they focused on the symbols, meanings and beliefs about procreation and about how life is thought to begin as "embedded in and integrated with an entire system of beliefs about the world" (Delaney 1986:306). Nevertheless, earlier arguments do reveal some interesting ideas about the conceptual problems about social and biological parenthood.

While Delaney (1986) does not contest Leach's distinction between physical and metaphysical realities about paternity, she argues that he fails to see the consistency between them and thereby misses the fundamental issue that "(T)he anthropologist's task is to try and understand what the concept of paternity is" (ibid:501, my emphasis). For her the significance is that paternity is about begetting, and maternity means bearing, and therefore paternity means that the male role in the production of children is understood as the generative and creative one (ibid).

5 The case of Baby M is the best known example. A vicious and protracted legal battle raged over who were the rightful parents of a baby born from a contractual surrogacy arrangement between the Sterns, with Mr. Stern being the biological father, and Mary Beth Whitehead, the "surrogate", who was both the biological and gestational mother. At birth she wished to become the social mother, which led to problems of breach of contract with the Sterns (Fox 1993).
Unlike the matrilineal societies discussed earlier, in Western and Middle Eastern societies that subscribe to a monogenetic meaning of paternity, a child is believed to be the result of "one father, one blood". Collier (1986) and Delaney (1986, 1991) have demonstrated this in terms of the relation of rights and obligations to cultural ideology in modern Turkish and Andalusian societies. The child is thought to originate from the father's seed planted in his wife, who is then symbolized as the nurturing field. For example, rural women's folk ideas about procreation are essential for understanding every aspect of Turkish cosmology. They affect not only the structure and meaning of family, marriage and kinship, but also village society and national identity. These ideas are expressed through the communal and fundamental understanding of the distinctive differences between male and female roles in procreation:

The important distinctions between inside and outside, open and closed, encompassed and encompassing, close and distant, are symbolically integrated in the conceptual model of the female body, which represents and expresses the lateral, spatial, and material dimensions of existence. The male role, conceptualized as generative, originating, essential, and linear, defines these various dimensions. Who you are is related to where you came from. Identity is a function of origin, and origin is the source of legitimacy. This is as true at the social level as at the personal, for the social order is felt to be dependent on and legitimized by the founder-father (ata) (Delaney 1991:283).

A monotheistic theory of human creation, as exemplified by Islam, Judaism and Christianity, underpins a monogenetic theory of procreation. In this view men produce the divine spark of life, which is carried on from Adam through generations of fathers and sons. Men are symbolized as flames, women as embers. "Procreation is a "sacred mission" , but the divine life-giving element is transmitted in the seminal emission" (ibid:288). This line of thinking continues to be substantiated even in some modern
The monogenetic theory connects kinship and biology, whether Islamic or Christian, by symbolizing the persistent assumption in western thought of male control over the children of the women to whom they are married. It ignores the meaning of procreation for women and the cultural scripts which make sense of their experiences. It also explains the tenacious hold of paternal rights in connection with fetuses and pre-embryos. It presents a clear symbolic message about who owns the conceptual moment of human life.  

Studies by feminist anthropologists (Collier 1982, Delaney 1986, 1991, Luker 1984, Ginsburg 1987, 1989, Rapp 1989), which construct procreation beliefs based on specific world views have appeared in the anthropological literature in the past decade. They have focused on some of the contested domains of reproduction, such as abortion, adoption, recurrent pregnancy loss, infertility and amniocentesis, a prenatal screening technology.

Luker (1984) and Ginsburg (1987, 1989) have used strategies, such as life histories, to show the emergence of new social movements and personal narratives. Both authors show how the dissonant moral views on abortion are constructed on certain ideas about sexuality, individuality, child care and family life. Each faction in the abortion debate draws on cultural discourses to engage popular support. Other new procreation stories about pregnancy loss, infertility and adoption are also beginning to appear in the anthropological literature. Some of these accounts demonstrate how conventional and conservative notions of parenthood and family continue to be reinforced. Modell's studies

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6 "The flesh, the bones, the muscles, the blood, the brain, and indeed all the faculties and the whole complicated and yet wonderfully coordinated machinery of the human body is all potentially contained in less than a millionth part of a drop of (seminal) fluid" (Muhammed Khan 1962:186-187 quoted in Delaney (1991).

7 Notions of power and control are inscribed into language and images, such as when the pioneers of IVF, Steptoe and Edwards are called the "fathers" of the first IVF baby and are seen holding Louise Brown in the first moments of her life. The British Government filmed the birth on August 24th 1978. (National Film Board of Canada, 1992)
(1986; 1989) on adoption and infertility found little challenge to the accepted cultural interpretations of parenthood and family, despite the use of an advanced medical technology. In the case of infertility treatments, she describes the interpretations of parenthood by both patients and physicians, framed in terms of "odds" of a pregnancy when enrolling in an IVF programme in the United States. She discovered that "(U)nlike other technological and social accommodations to infertility and involuntary childlessness, IVF upholds cultural values about the family, sexuality, and the proper relationship between parents and child" (Modell 1989:135). While she reserves the conventional meanings of IVF to the simple model of a technology assisting biological reproduction for married couples, she concludes, and I agree with her, that the "challenge of IVF to conventional meanings will come on other issues: the definition of a pregnancy and of a person" (ibid) in the context of its other expanded applications, such as surrogacy arrangements, ovum donation and genetic research.

IV THE POLITICO-JURAL APPROACH IN ANTHROPOLOGY

In today's political climate of controversial reproductive issues, it is impossible to discuss NRTs without contextualizing them in their political and legal regulatory framework. In general, the power of law reinforces powerful discourses such as medicine. Emerging critical legal, feminist legal and race theory scholarship is attempting to produce legal reforms which may correct some past injustices. Gendered inequities have exerted and continue to exert social and legal control over women's reproductive bodies and practices. Likewise, critical legal and feminist anthropologists, interested in the politico-jural aspects of cultures for the purpose of ensuring social stability, are attempting to refocus the vision of traditional anthropologists. The relevance of anthropologists' past interests in thinking about categories of people as either persons in their own right or as
someone else's property is significant in considering how the pre-embryo might be socially and legally categorized as more like person or more like property, or as something of an entirely different order. It may provide new illuminations for thinking about pre-embryos in relation to women's bodies both in terms of bodily autonomy and the persistent genetic assumption that because "one-half of the biogenetic substance of which the child is made is contributed by the genetrix, and one-half by the genitor...fifty percent comes from his mother and fifty percent from his father at the time of his conception, and thereby is his "by birth" (Schneider 1968 (1980):23). "His by birth" implies all of the attendant legal rights and responsibilities to a man's offspring.

(i) **Rights in Rem, Rights in Personam**

Since Sir Henry Maine and Henry Morgan's early works on ancient law, anthropologists have long understood that the western legal system is based on the rights of ownership, that is the interests that people place on what they own. The idea that status (personhood) is conflated in the social character of property has been well examined in kinship studies. A.R. Radcliffe-Brown (1952) early distinguished the relationship between rights in and over persons and rights in property:

(a) Rights over a person imposing some duty or duties upon that person. This is the *jus in personam* of Roman law. A father may exercise such rights over his son, or a nation over its citizens.

(b) Rights over a person 'as against the world', i.e. imposing duties on all other persons in respect of that particular person. This is *jus in rem* of Roman law in relation to persons.

(c) Rights over a thing i.e. some object other than a person, as against the world, imposing duties on other persons in relation to that thing.

The rights classified under (b) and (c) are fundamentally of the same kind, distinguished only as they relate to person or to things, and are of a different kind from those classified under (a) (Radcliffe-Brown 1952:33).
Henrietta Moore puts a more modern slant on Radcliffe-Brown's characterization of marriage as the acquisition of rights in women by the husband's kin group. "These rights can be of two kind: in personam (rights in the wife's labour and domestic duty) and in rem (rights of sexual access)" (Moore 1988:64-65). In rem equates with total ownership in a person or an object, which is Radcliffe-Brown's (b) and (c). Thus men are presumed to have the right to ownership and control over their wives' bodies.

Through these concepts Radcliffe-Brown explained succession and the transmission of property, with reference to the laws and customs of non-European peoples, in terms of transference of certain rights. Associated with rights are obligations and duties that descent group members exert over each other, towards the group as a whole, as well as over other sorts of relatives and objects (Barnard and Good 1984:72). These jural strategies have the effect of keeping patrilineal and matrilineal succession and inheritance records straight, in the absence of coded laws.

Historically, the Western legal system has made a clear distinction between what is considered "person" and what is considered "property". Over time through a process of inclusion, certain groups of non-persons, who were considered someone's property, have attained personhood status; for example, slaves, women, children and the mentally challenged.

(ii) Twin Universes: Persons and Things

A fundamental problem which has arisen in discussion about the pre-embryo is the difficulty in categorizing it as "person" or "property". Such attempts to categorize have led to varying degrees of cultural ambivalence. Not only are there misunderstandings about how to label the developing human entity through its different biological processes (as discussed in chapter 1), but also about the very nature of what it is and therefore about how it might be treated. Is it more like property or more like person, neither or should it fit some as yet undesignated in-between category? Is it an entity that may be given away,
orsold, or does it have some inalienable quality that makes either of the aforementioned irreconcilable. These are some of the complex problems which have challenged legal thinking and led to complicated court cases (see chapter 5).

Fundamental notions about "person" and "property" have remained extremely tenuous in Western thought and in the intellectual pursuits of generations of anthropologists interested in law and society. The approach in social anthropology to marriage was heavily influenced by jurisprudence, as anthropologists made the connection between property and marriage (Bloch 1975, Goody 1976, Goody and Tambiah 1973 cited in Moore 1988:64). Levi-Strauss (1969) envisaged women as a form of property which members exchanged in marriage arrangements between descent groups, with the express purpose of forming ties of alliance through the practice of exogamy. Kopytoff (1986) is among a long distinguished lineage of anthropologists, who have explored notions of rights in and of people and rights in things. Their roots are based in the ancient past of Roman Law as disseminated by Sir Henry Maine in Ancient Law (1861). This text was widely read and influential in informing generations of anthropologists, and "even in the mid-twentieth century his formulations of social and legal evolution continued as a touchstone for new integrative theories" (Starr 1989:346).  

The twin concepts of "persons" and "property" are fundamental to our understanding of the radical disjunction between the "individual" and the "thing", between the "subject" and the "object" in the western tradition. The fact that these terms are culturally and historically entrenched in this tradition and not universals has been pointed out by a number of anthropologists writing in the early 1980s about the place of women as objects in non-European societies (Hirschon 1984, Strathern 1984, Whitehead 1984). A

re-examination of their assumptions led them to revise their views to see the women whom they studied as agents of their actions.

Anthropologists (Appadurai 1986; Kopytoff 1986), who have examined the cultural perspective of the social biography of things, have also questioned the bipolar thought processes of what constitutes person or property, subject or object, in Western society as a cultural phenomenon, which is alien to much non-western thought.

In contemporary Western thought, we take it more or less for granted that things - physical objects and rights to them - represent the natural universe of commodities. At the opposite pole we place people, who represent the natural universe of individuation and singularization. This conceptual polarity of individualized persons and commoditized things is recent and, culturally speaking, exceptional (Kopytoff 1986:64).

Kopytoff has pointed out that there is a predisposition in Western thought, intellectually based in classical antiquity and Christianity, to separate "things", through a process of commoditization, and "people", through a process of individuation or singularization. Anthropologists, of course, have realized that this conceptual dichotomy is by no means a universal. Kopytoff concurs with Durkheim in that what is individuated or singularized is sacred.

And if, as Durkheim (1915; original publication 1912) saw it, societies need to set apart a certain portion of their environment, marking it as "sacred", singularization is one means to this end. Culture ensures that some things remain unambiguously singular, it resists the commoditization of others; and it sometimes resingularizes what has been commoditized (ibid 73).

The most blatant example in the early modern European state was the neglect of this distinction in the practice of slavery. Only with the abolition of slavery in the West were slaves, in particular male slaves, resingularized to the status of persons. But it was to take until the early twentieth century through the struggles of the suffrage movement for women to be fully included into Canadian society as "persons" in 1929 with all the
contingent individual rights. Earlier they were considered, as were their children, the legal possessions of their husbands, without the right to control ownership of property, or retain custody of their children on divorce. The legal status of children is even changing nowadays as laws are recognizing certain children's rights as separate from parental control.

However, for "(W)hatever the complex reasons, the conceptual division between the universe of people and the universe of objects had become culturally axiomatic in the West by the mid-twentieth century" (ibid 84). Kopytoff sees the abortion debate as the best example of this polarity between the universes of people and things:

It is best exemplified in the cultural clash over abortion, which has raged on throughout the twentieth century than it ever was in the nineteenth, and that this clash should be phrased by both sides in terms of the precise location of the line that divides persons from things and the point at which 'personhood' begins (ibid).

V GENDER STUDIES AND REPRODUCTION IN ANTHROPOLOGY

(i) Moving Reproduction from "Off-Centre"\(^9\)

The proliferation of gender studies in anthropology, since the 1970s, has served to revitalize feminist scholarship on reproduction. Often considered as "a "woman's topic", the study of reproduction by anthropologists has never been central to the field" (Ginsburg and Rapp 1991:311). Up to this time, previous research had addressed comparative studies focused on the variety of beliefs surrounding a wealth of reproductive behaviours worldwide. However, Ginsburg and Rapp (1991) point to the trend in anthropology towards a political economic approach, which incorporates the central insight about "the

\(^{9}\) Off-centre is Franklin, Lury and Stacey's (1991) term.
many ways that power is both structured and enacted in everyday activities - notably, in relations of kinship, marriage, and in inheritance patterns, rituals and exchange systems" (1991:312). In this way attention is given to both local and global politics of reproduction, including state and other powerful institutional controls, such as multinational corporations and international development agencies. The authors claim that by examining the multiple levels on which reproductive practices, policies, and politics so often depend...such a synthesis {of local and global} can reframe the way anthropologists study this subject, and move the investigation of reproduction to the centre of anthropological inquiry (ibid:313).

Situating IVF therapy within the global and local political economy of health provides an overarching framework for examining the current 'local' and 'global' struggles over defining the pre-embryo's emerging status through the discursive practices of those with different vested interests. New versions of modern procreation stories are emerging from these discourses, which add to those other stories, which have been identified recently by anthropologists. They make explicit how issues surrounding IVF and pre-embryos often reinforce the old stereotypical ideas of male control over reproduction and how in privileging previously marginalized voices, that feminist cautions about the consequences of assisted procreation for women are beginning to be given legitimacy. This study attempts to validate those unrecognized, subordinated views.

Some feminist anthropological studies (Collier, Rosaldo and Yanagisako 1982) have suggested that we rethink the traditional ways that anthropologists have thought about kinship and family. In the past, because procreation beliefs were subsumed within kinship studies, which theories were given a privileged place in anthropology, procreation stories were poorly represented. Here exists an interesting analogy between the dominant legal-jural focus in the discipline as represented in kinship studies, and the under-represented power dimensions of women's interpretations in procreation stories. Currently, we are witnessing a similar pattern with male-dominated interest in the science
and technology of artificial procreation and embryo research. The research oriented focus rests on providing an ideal environment for creating embryos, which then can be manipulated in a variety of ways. This strategy has the facility to eclipse the gynaecentric story of women's repeated attempts to reappropriate control over their reproductive capacities, which reinforces the symbiotic relationship between a woman and her embryo/fetus. Metaphorically, the male nurturer becomes "technology" (culture), while the female nurturer remains "woman" (nature), waiting to be tamed, or rather controlled, by culture. Thus paternity and maternity continue to be socio-legally constructed with NRTs in a particular form of power struggle in western society.

As noted earlier, there has been a long tradition of debates in anthropology about the meanings of paternity and maternity. They have largely been constructed in terms of juro-political factors, rather than the historically and culturally situated meanings. After nearly a century of myths and misrepresentations about conception issues, gender studies in anthropology are now providing a corrective, which provides significant insights into the power relations within assisted procreative technologies.

(ii) Legal Anthropology and Relations of Power

A new generation of anthropologists (Starr and Collier et al 1989) interested in legal studies have taken up that challenge and advocate treating "law as the symbolic representation of interests of particular groups, especially those groups in power" (Starr and Collier 1989:24). They do not subscribe to the claim that law maintains order in society. They conceptualize "law as a historical product rather than as a universal category" (ibid). Along with their colleagues in mainstream and medical anthropology,10

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10 These medical anthropologists include those who attended the symposium sponsored by the Wenner-Gren Foundation for Anthropological Research in Portugal in 1988. They reflected on the past and present historical developments in medical anthropology and collaborated on a volume edited by Lindenbaum and Lock (1993), in which they linked three previously unrelated domains of anthropological inquiry; human biology, the cultural
legal anthropologists are taking up the challenge to examine the circumstances, which according to Polier and Roseberry's (1989) illuminations, have created a world that appears to be ahistorical and without structure.

Over thirty years ago, J.A. Barnes' argued that social anthropology should take the political struggle as given and examine how in that struggle various institutions including the law are used (Barnes 1961:194). Recently, legal anthropologists have breached subdisciplinary boundaries and have revitalized the field of legal anthropology by conceptualizing law and legal forms as historical products "embedded in and created both by particular historical circumstances and by interrelationships between local, national and international events" (contributors to Starr and Collier 1989:24). In recognizing the asymmetry of power relationships and temporality, Starr and Collier (1989) no longer isolate the "legal" as a separate field of study. Instead, they refocus their analysis to wider systems of social relations, which elucidate the relationship between social action, cultural ideology and economic conditions.

June Starr argues that "Anthropologists should never have let the ancient Romans speak to us for so long in the accents of nineteenth century Europeans" (Starr 1989:365). In her re-examination of Maine's scholarship, she maintains that he extrapolated often mistakenly from Gaius' text Institutes to assume that Roman women had a considerable degree of control over their persons and their property in the second century A.D. Coveting a position in the Indian civil service, Maine seemed less aware of the continuing perpetual tutelage of women in his own country. 11

construction of knowledge and power relations. Some revisionary accounts were produced, which uncovered "the processes by which certain forms of knowledge achieve a moral legitimacy and appear to be part of the natural order" (ibid:xiii).

11 Starr footnotes that "Before 1881, British women could hold property only in the form of a trust, so that male trustees and guardians had the true decision-making power concerning sale, investment, and so on. Thus in Great Britain in that period there were
Ancient law knows next to nothing of individuals... The Roman distinction between the Law of Persons and the Law of Things... though extremely convenient, is entirely artificial... The separation of the Law of Persons from that of Things has no meaning in the infancy of the law... it is more likely that joint ownership, and not separate ownership, is the really archaic institution (Maine 1861:152-153 quoted in Starr 1989).

However, he makes a strange reversal in thinking by going on with the patriarchal claim:

... On a few systems of law the family organization of the earliest society has left a plain and broad mark in the life-long authority of the Father or other ancestor over the person and property of his descendants, an authority which we may conveniently call by its later Roman name of Patria Potestas (ibid).

This thesis examines the part which is being played presently by law in building a legal understanding about the pre-embryo by privileging it as a new independent social category, divorced from its universally perceived symbiotic relationship with the gestational "woman". I question how it is that law has unknowingly become the accomplice to a set of circumstances which by raising the profile of the pre-embryo as in need of regulation, has both submerged and polarized the previous symbiotic relationship with a gestational woman. How has this affected the control that a woman had over her bodily integrity in relation to her conceptus? In reifying the pre-embryo to give it a "life of its own", how has this assisted the trend towards shifting the pre-embryo from potential person to circulating property?

certain parallels to times in classical Rome. Between 1881 and 1887 the Married Women's Property Act became law in Britain, giving female British citizens the right to hold property directly in their own name and to make decisions concerning sale, alienation, purchases, and the like" (1977:358).

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CONCLUSION

A variety of issues that anthropologists have studied throughout this century have relevance for a modern study of the pre-embryo as a new social category. Traditional debates about concepts of paternity, which later led into symbolic studies about cultural constructs of biological processes have a particularly modern application in how to interpret the underlying cultural significance of paternity and NRTs. Kinship studies have revealed that juro-political statuses in societies without coded laws conflate personhood with the social character of property. Along with the transmission of certain rights (succession) and property are rules and duties that people exert over each other. The social structure is maintained and the social relations are expressed as responsibilities among relatives. In complex modern, Western society built on individualistic and nuclearized family ideals, there is a tendency for this cultural construct to become buried. But I argue that the fundamental values have consonance with the continued preoccupation about the relevance of biological connections. In terms of some of the conceptive technologies, and moreover because of them, it is important to know who is responsible for whose children.

Studies in symbolic anthropology undertaken by feminist anthropologists have taken an approach that shows how procreation stories told by women are an integral part of a culture’s cosmology. Procreation beliefs are constitutive of all aspects of a society. Similarly, reinterpretation of the juro-political by feminist legal anthropologists suggest that law be viewed as historically and culturally situated. The law is a symbolic representation of the vested interests of particular groups of people, most notably those in power. Thus the marriage between the institutions of medicine and law is a particularly powerful and persuasive one. This study takes from the intellectual treasure troves of anthropology’s past in order to discuss a very modern and perplexing problem in Canadian society. How should we interpret the pre-embryo created through a conceptive

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technology, IVF, in terms of its status as person or property, its own rights or others' rights over it?
CHAPTER 3

THE MEDICAL DISCOURSE: THE HISTORY OF EMBRYO RESEARCH
AND THE BIRTH OF IVF TECHNOLOGY

The human embryo has a long history of use in medical science. It has not just "suddenly become morally significant through the innovation of in vitro fertilization" (Yoxen 1990:28). A fascination with understanding the beginnings of life has involved generations of researchers obtaining access to embryonic and fetal materials, which until very recently has been limited by their enclosure within women's bodies, except on rare occasions of abortion and still births. In this thesis, I argue that experimental curiosity about embryos has led to a technological imperative to manipulate women's reproductive capacities, often to the detriment of bodily autonomy. Increasingly, while embryos have become subjects, imbued with potential personhood, women's bodies have become objects, reproductive research sites. The old research goals live on in the new technologies with an advancing level of technological sophistication and finesse. The medical construction of infertility as a disease has provided an avenue to the use of an array of new technological innovations, and has created not only "last chance babies" (Modell 1989), but more importantly an endless supply of supernumerary pre-embryos for new research programmes aimed at solving the ultimate questions of DNA structure and gene expression.

Medical commentaries about the mysteries of conception reiterate a theme that has been well documented since classical times. Indeed there has been a long tradition of theoretical and empirical medical discourse about human embryological development. This discourse is thousands of years old. According to encyclopedic sources
magical beliefs about fetuses in many primitive cultures also appear in the European alchemical tradition and in cabalistic writings, and the extensive discussion of embryology in early Chinese and Indian natural philosophy and medical theory, before describing the ideas of Greek biologists like Aristotle and Galen, which retained their influence until at least the sixteenth century (Needham 1934 cited in Yoxen 1990:30).

The next wave of medical interest in embryos were the conception models, which occurred with the preformation theories of the late seventeenth and eighteenth centuries. By the early nineteenth century these were giving way to empirical scientific research on female ovulation and embryo development, based largely on animal studies. This led into the most recent explorations into the origins of life, heralded by the new way of making babies with IVF and embryo transfer. It has proceeded in short order to a chronology of infertility treatments, which have become increasingly available in Canada as elsewhere, mostly in the developed world over the past fifteen years. They are based on a concern for providing treatment for people with a number of medical problems resulting in inability to produce children. The medicalization of infertility and the availability of technological treatments has resulted in the escalating use of contraceptive technologies, some with very poor success rates. However, fascination with embryological research has continued, while little attention has been paid to environmental or social causes of infertility, let alone a thorough scientific evaluation of the potential iatrogenic effects of those infertility treatments presently available.

The current medical discourse about pre-embryos can be seen most clearly in the practices of an IVF programme. In this research an ethnographic component is presented of one such programme, offered by the University of British Columbia, in Western Canada. It is located at the tertiary referral centre in the University Hospital, Shaughnessy site in central Vancouver. It is the only IVF programme available in the province and
provides a unique example of a stable programme, which has been in effect since 1982. It represents the most traditional model of IVF therapy, offering only standard IVF procedures to couples living in stable heterosexual relationships. It has continued to exist despite a crumbling health economy, represented by hospital closures, health personnel layoffs and the rebuilding of a community based health model. The description of the IVF programme's structure and service delivery, as it existed in 1993 at the time of this research, forms the basis for later discussions of more innovative technologies.

I FROM "FAILURE TO GENERATE" TO "CONCEPTION IN A WATCH GLASS"

(i) Classical Greek Models of Procreation

Aristotle's largely unknown and recently translated treaty On Failure to Generate was devoted to the subject of human fertility. Aristotle has been considered one of the world's first students of human fertility. However, he subscribed inconsistently to a number of conception theories. He refuted the prevalent view held by most Greek scholars, such as Plato, Hippocrates and Anaxagoras, that women were merely the nutritive receptacle for the developing fetus, which was created entirely from the male seed (Temple 1994). This belief reinforced the lineage structure that there could be no descent from the mother.

Aristotle also refuted the prevailing theory on "pangenesis" proposed by Hippocrates that sperm derived from all parts of the body. Instead he believed that women as well as men were responsible for conception and also "contribute seed".

1 In July 1995 a private clinic, Genesis, opened in Vancouver.
Aristotle's logical, yet unsubstantiated beliefs had been preceded by the eccentric views of the mystic poet-philosopher Empedocles and by Democritus. Empedocles believed that while each parent contributed to the heritage of the child, the two portions had been torn apart and the bits reunited in the womb. Democritus compared sexual intercourse to an epileptic fit and that conception was like a "collision of seed" from both males and females (ibid:33).

Aristotle's logic was flawed in that he also entertained the folk theories of his time, such as the notion of parthenogenesis (see glossary). This idea was imparted to him by midwives with whom he fraternized and was based on the Egyptian cult of Osiris. Therefore a virgin birth was labeled "an osiris". Aristotle took this phenomenon no less seriously than the later Christian ideas that arose from the same Egyptian source. These ideas have been much discussed by anthropologists (Leach 1969, Delaney 1986, 1991).

Aristotle also theorized that the retroverted uterus impeded conception. Although he did not subscribe to Plato and Hippocrates' beliefs in a wandering uterus, which "gets discontented and angry and wandering in every direction closes up the passages of the breath and obstructing respiration drives them (women) to extremity" (Timaeus quoted in Temple 1994:35), he did think that the uterus might be capable of some movement.

The dominant procreation model that still had currency up until the Renaissance was a theory of simultaneous development of all parts of a new human life, labeled epigenesis. It was subscribed to by Aristotle, Hippocrates and Galen, but refuted by Plato and Aeschylus.

The weakness of the theory was that it did not satisfactorily explain how such a complicated process as the creation of life took place. A rival theory to that of epigenesis was that of preformation. Some early writers like Plato and Aeschylus argued that a miniature embryonic life was already in place within the parent - like an egg - and embryological development only consisted of growth, not creation" (McLaren 1984:22).
(ii) Preformation Theories

By the late sixteenth century the model of epigenesis was being challenged by preformation theories. McLaren (1984), in his study of the perceptions of fertility in England from the sixteenth to the nineteenth century, recounts how these theories imagined a single parent, a homunculus, already in existence. It was not created, but rather started to enlarge on conception. However, it was to take more than a century for this paradigm shift to occur.

Firstly, William Harvey, physician to Charles I, sought in vain to discover the human egg. He has often been called the founder of embryology with his work *De generatione animalium* (1651). A committed Aristotelian, Harvey subscribed to the view that if an embryo was the result of the mixing of menstrual blood and semen on coitus, then it should be possible to find an embryo in the uterus soon thereafter. Neither finding the homunculus or semen in the uterus, Harvey returned to epigenetic theory, resolving that the egg was the product and not the cause of conception. He rationalized "that the formation of embryos occurred through some sort of non-material influence of the male semen that eventually caused the appearance of a fertilized egg in the uterus" (Yoxen 1990:31). This belief was to persist in Albertus Haller's later claim that the ovum became modified in the uterus and not on its journey through the oviduct (Bodemer 1971).

The lengthy paradigm shift to the preformation theories of the late seventeenth and eighteenth centuries, emerged on the Continent in the light of new empirical medical evidence. The human reproductive system, particularly the female system, was coming under intense scrutiny with the growing interest in the study of human anatomy and dissection. The breakthroughs came in the mammalian research. Marcello Malpighi developed a more sophisticated view of conception based on his work on chick
embryological development. Renier de Graaf discovered the follicles, later known as Graafian follicles, which he erroneously identified as mammalian eggs. However, the mammalian egg was not to be found for another one hundred and fifty years, until discovered in 1827 by Karl von Baer. During all this time there was a growing scientific consensus that a woman's body contained her miniature offspring.

The preformation theories took two forms, both of which implied a monogenetic (monoparental) idea of a miniature contained in either sperm or mother's egg. The Ovists' arguments related by analogy to egg-laying animals, while animalculists subscribed to the discovery by Anton van Leeuwenhoek in 1677 of microscopic beings in semen (McLaren 1984:23). Thus Ovists held that the miniature was contained in the female egg, while the animalculists argued it existed in the spermatozoa.²

The historical variations on the ovist theory are numerous:

Thus in John Case's *The Angelical Guide* (1697) are references to the human egg being shaken by the sperm into the fallopian tubes; John Blondel went so far as to refer to semen as mere manure for the ovum; Alexander Hamilton in 1871 declared that the child existed in the ovaries and the act of generation was 'only the means intended by providence to supply it with life'; and William Cullen's edition of Albertus Haller while reviewing conflicting theories on generation held that the foetus was only excited into life by the 'seminal worms' (ibid).

(iii) Theories of Ovulation and Embryo Development

The birth of modern embryology began in the second decade of the nineteenth century. Von Baer discovered that ovulation in mammals (in this case his friend's dog)

² McLaren footnotes "a third and even more bizarre school of thought, that of the "panspermists", who argued that all beings were created by God at one moment in time, that such tiny beings were suspended in the atmosphere and that they past from the air into the man and then into the woman and then were born" (1984:159). There is a marked similarity in belief here with the Trobriand Islanders belief in the air or water born child spirits, *baloma*, described by Malinowski (1932).
results in a mature egg in a fluid-filled sac on the ovary's surface. But it was to take nearly another century until American physician, E. Allen and colleagues in 1919 linked ovulation with the menstrual cycle, when they recovered a human ovum.

Meanwhile during the mid-nineteenth century, an interest in how embryos developed and continually reorganized their structure had led to experimental research on mammalian embryos, particularly rabbits. In 1880 Walter Heape, a Cambridge physiologist had transferred rabbit embryos from one animal to another on a needle tip (Steptoe and Edwards 1978). This contradicted a commonly held view in animal breeding and proved the function of the uterus to be a nurturing structure, unrelated to "hereditary impressions". At this time research on agricultural animals and medical research on human reproduction were making similar connections, particularly in understanding the action of hormones on reproductive physiological processes.

The growing collections of embryos, both mammalian and increasingly human at various stages of development, provided an inexhaustible supply of research material. These collections were stored in hospitals in both Europe and the United States in the latter half of the nineteenth and early twentieth centuries. They aided researchers in understanding fetal development and tissue differentiation. These research collections have parallels in the present proliferation of banks of cryopreserved pre-embryos, which are not needed for embryo transfer. They present tempting sources of undifferentiated human pre-embryonic tissue, which may provide researchers with less complex access than that recounted by Yoxen:

However, the important point at this stage is to note that, although experimental embryology expanded significantly in the second half of the nineteenth century with dissections and investigations of animal and amphibian embryos, and although slightly later work in reproductive physiology threw light on ovulation and gestation, work on human embryos was necessarily limited to the dissection of dead or dying
specimens obtained in hospital. It was in effect an extension of comparative anatomy (Yoxen 1990:33).

By the beginning of World War 1, the strategy of embryo collections funded by endowments had the effect of both systematizing and centralizing the sub-specialty of embryology through access to post-implantation embryonic specimens. A modern research institute was established in Baltimore based on Franklin Mall's embryo collections and funded by the Carnegie Institution. In Mall's (1913) plea for an Institute of Human Embryology, he argued that a large collection of embryos, competent staff and the best equipment would help solve problems in many areas, including physical anthropology (Mall 1913 cited in Yoxen 1990:34). Later this collection was transferred to the Medical School at the University of California at Davis.

Within half a century, researchers such as Corner, the first director "could draw upon unrivaled archival and technical resources in human embryology to develop his interests in the interactions between the physiology of reproductive hormone secretion, uterine function and human development" (Yoxen 1990:35). These discoveries provided the background knowledge that would be preparatory to the development of the technological intervention, which was to become IVF.

(iv) The Egg Hunt: The Access to and Ethics of Embryology Research

It has been conjectured (McLaughlin 1982; Corea 1985; Yoxen 1990) that access to embryonic material was assisted by the loose guidelines about informed consent from patients and ethical research practices. Morals of the new systematic embryonic research appeared to treat as irrelevant the circumstances, such as miscarriage, surgery or still birth, whereby human fetuses or post-implantation embryos had been retrieved. In particular the research practices of gynecologist, John Rock and pathologist, Arthur T. Hertig were
suspect. In the late 1930s, they retrieved fertilized ova from women, upon whom Rock operated for surgical sterilization and hysterectomy. In what they termed the "egg hunt", they scheduled the time of surgery to occur a little later than the time the patient would ovulate, in the hope of retrieving an embryo from the fallopian tubes or uterus. In some cases surgery was "delayed for several months whilst the women returned to the hospital as charity patients bearing temperature charts, from which the date for surgery was computed" (Yoxen 1990:36).

Procuring embryos from "volunteer" poor women, who were receiving charity medical care at the Free Hospital for Women in Brookline, Massachusetts, occurred under dubious circumstances (Corea 1985:101). Although they had consented to surgery, it is doubtful whether they were aware of the destined use of their unfertilized or fertilized ova by researchers whom Corea refers to as "pharmacrats".3

At the time, a journalist, Loretta McLaughlin revealed the reason why prestigious doctors were given admitting privileges at the charity hospital and did not charge their patients any operating fees. A hospital appointment "provided almost absolute research freedom, far less interference than at the larger, Harvard-affiliated hospital in Boston proper" (McLaughlin 1982 quoted in Corea 1985:101). In this way researchers obtained carte blanche to experiment on human ova, which they hoped might be fertilized, as patients were asked to keep a record of when they had engaged in sexual intercourse prior to surgery.

This surge of experimental research activity reached its zenith in the late 1930s with an interest in extra-uterine fertilization, known as in vitro (in glass) fertilization. In

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3 Corea catalogues a long list of scientific articles, which report on attempts to retrieve and experiment on women's ova. She comments that in these studies there is little evidence that women consented to the retrieval of their eggs, or even knew they had been removed (Corea 1985:135).
an article in the New England Journal of Medicine (1937), by Anon, "Conception in a watch glass", there was an implication that Rock and Pincus's research might lead to a cure for infertility caused by obstructed fallopian tubes. It was believed that Rock was the author of the article (Yoxen 1990:36).

In the early 1940s, Rock and his assistant Miriam Menkin were "attempting to fertilize human ova, obtained from Rock's hysterectomy patients, using semen from Rock's junior doctors" (ibid). Rock, a devout Roman Catholic met with criticism from Boston society, leading him to abandon his research in favour of work on the development of oral contraceptives, which proved to be equally controversial research.
In the post Second World War years research took off in a variety of directions, which culminated in the successful application of IVF to treat some forms of infertility. Research on concocting a culture medium for ova to mature and a means of capacitating sperm was a necessary prelude to extra-uterine fertilization. While Hertig investigated uterine and embryonic abnormalities, physiologist Gregory Pincus, who had worked in England on animal studies, was involved in hormonal regulation and the maturation of ova prior to ovulation (ibid:35). Along with other researchers, Hertig went on with the research, reporting that success had occurred in fertilizing thirty-four human ova, retrieved from two hundred and ten women (Hertig 1959:202-211). In the same year, 1959, Chang described an experiment in which he fertilized mammalian ova in vitro (Adams 1982).

Also in the fifties, successful freezing of sperm, retaining fertilization ability, had become possible in the United States. Access to inexpensive, anonymously donated sperm provided both a source of sperm for studies of capacitation in in vitro fertilization research, and also led to the opening of sperm banks for artificial insemination by donor (AID) (Achilles 1988). In England these banks derived from altruistic donations, whereas in the United States they soon reverted to a profit motive. Increasingly it became a means of economic subsistence for impecunious male students and welfare recipients (Titmuss 1971).

Chang's success at fertilizing ova was not replicated for another decade. The ova extracted from female mammals, namely rabbits, mice and rats were frequently immature

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4 Capacitation of sperm usually occurs in the female genital tract, where the sperm's surface acquires the ability to penetrate the zona pellucida, the outer layer of the ovum.
and research into various culture mediums was necessary to mature the ova prior to fertilization (Adams 1982).

Edwards, a British physiologist, who later worked with Steptoe to produce the first IVF baby, conducted research in the mid-1960s in the United States. He did this in response to his frustrated search for research ova in England (Edwards and Steptoe 1980). Feminist critic, Corea (1985) exposes what she maintains was Edwards' true preoccupation with maturing human ova and how he used women in his unquenchable thirst for developing new fertility procedures. She narrates how this concern is often revealed in his collaborative book A Matter of Life (Edwards and Steptoe 1980).

First, as a graduate student, he had worked with mice. After he had "bombed" their ovaries with hormones, he had learned a good deal about the way eggs ripen. Later, while researching in another field, "the eggs were always there in the background beckoning me on to my real work". Occasionally he dreamed of eggs.

He arranged for various gynecologists to call him when they thought they might have ovarian tissue to "bequeath" him. He would go to the hospital. While the physician cut into the woman's body, he would stand, masked and gowned, holding his sterile glass pot "the receptacle for the precious bit of superfluous ovarian tissue".

Dr. Edwards needed more eggs. He never had enough. He "scouted around" for them and tried to rally more doctors to his cause." He "came away empty handed". His sources "dried up". Human eggs were slow coming my way, he wrote "despite the fact that I had struck up friendly relations with some of the gynecologists at Cambridge's Addenbrookes Hospital" (Corea 1985:105).

Between 1960 and 1965, Edwards worked on a time sequence for human ova maturation, finally reporting that early fertilization of human ova in vitro had been achieved, with all the necessary tests for procedural safety against chromosomal abnormalities (Edwards et al 1969). Between 1966-1967, he worked in the United States
on two occasions conducting a number of experiments on capacitating sperm. On the first trip he used husband sperm collected post-coitally to place in culture with human ova. On the second visit he persuaded female patients to volunteer for further bizarre experiments in capacitation, this time using donated sperm. Thus in collaborating with American gynecologists

(he) collected bits of ovarian tissue, extracted eggs from the tissue, ripened the eggs, collected sperm (from whom he does not say, but in other experiments, he had used his own), put them into porous chambers, and found women volunteers who would allow the chamber to be inserted in them at night and removed in the morning" (Corea 1985:106-107).5

All this experimental research on capacitation and nutrient media paved the way for a breakthrough to provide him with a reliable source of ovarian material to test his methods of in vitro fertilization with human ova. A new surgical procedure provided him with unfertilized ova directly retrieved from ovaries removed from female patients during routine gynaecological operations. No longer would he have to hunt for sources of ovarian tissue or fertilized donated ova. After reading an article by Steptoe, a British gynecologist, who had pioneered the use of the laparoscope to visualize the female reproductive tract in surgery, Edwards launched his collaboration with Steptoe in 1968. Steptoe gave Edwards the ova that he removed surgically. Within a year the first success with fertilizing human eggs in vitro was claimed.6

Edwards and his student Bavister had found the right fluid medium, dubbed "Barry's magic culture fluid" (a mixture of the pair's own sperm) in which the ova would

5 When Edwards had spent sleepless nights over this experiment, his wife had questioned him about whether the sperm could escape from the membrane. But he thought not!
6 Corea comments in a footnote that results in this field are always contestable. An American, Pierre Soupart, working with fertility specialist Howard Jones in Baltimore {where coincidentally Edwards had worked in 1966} has also been credited with having been the first to fertilize a human ovum (1985:138).
continue to grow for a few hours (ibid:108). When Edwards, Bavister and Steptoe (1969) published their early results, the first round of ethical controversy ensued with the experiments being condemned by the Archbishop of Liverpool (Singer and Wells 1984:15). Ethicists Singer and Wells describe the early problems encountered as the technology was applied to women, who were prepared to undergo IVF treatment.

It took four years of fiddling around with hormones, before the first pregnancy occurred - and then this turned out to be an ectopic pregnancy; that is, the foetus was not growing in the womb but rather in what remained of the patient's Fallopian tube. In this situation, the foetus has no room to grow and it can burst the wall of the tube, threatening an internal bleeding which could be fatal for the mother. The pregnancy had to be terminated.

Further work produced a second pregnancy, but it spontaneously aborted in the first few weeks. It was not until 1977 that tests confirmed the successful transfer of an embryo to a patient named Lesley Brown" (ibid).

The ten years of Edwards' marathon commuting back and forth between Oldham Hospital in the Midlands, where Steptoe had his surgical practice, and his research laboratory in Cambridge eventually paid off (Edwards 1990:43). The pair had their first success with IVF technology in a naturally occurring menstrual cycle with the birth in 1978 of the world's first IVF baby. Louise Brown was delivered by caesarian section, following a medically, if not socially, uneventful pregnancy.

The alleviation of infertility was merely one of many potential studies the pair could have pursued. Other possibilities existed, as Edwards points out "depending on the availability of human eggs and embryos for research, including a study of the causes of chromosomal imbalance, the pre-implantation diagnosis of inherited diseases, relationships between cancer and embryonic cells and many others" (ibid: 43-44). These research
domains are presently providing fertile research territory for current reproductive researchers.

This miraculous birth was followed shortly after by one in Australia, where a Melbourne team had begun work in 1970. Carl Wood had tried unsuccessfully to develop an artificial Fallopian tube for a patient with diseased tubes. Researchers, who had been influenced by experiments in animal reproductive biology, discovered that the number of offspring from pedigree sheep and cattle could be dramatically increased by giving the female animal superovulatory drugs. This regime caused the production of multiple ova. After insemination and fertilization in vivo, the embryos could be flushed from the uterus and transferred into less valuable livestock, surrogates with no genetic connection, who could gestate the "quality" embryo (Singer and Wells 1984:15-16).

Wood had reported this research at a conference of the Australian Society of Reproductive Biology in Melbourne in 1979. He had suggested an application of animal husbandry, which could be used in humans. The fallopian tubes could be by-passed in women with tubal damage by creating embryos in vitro (in glass) and then returning them to the woman. Unlike the selective breeding in animals, the woman would be both the biological, gestational and social mother of her embryo/fetus/child. This was precisely what Steptoe and Edwards had already achieved. Of course, "No one was, at that stage, suggesting the use of selective breeding or surrogate mothers for humans - although in view of the origins of the procedure, there were always possibilities, once IVF succeeded in humans" (ibid:16). Inadvertently or not, the specter of a eugenic policy in relation to IVF was on the way to materialization.
When Patrick Steptoe, often referred to as "the father of IVF", said "we're at the end of the beginning - not the beginning of the end" (1978), following the first IVF birth, his words were proved to be prophetic. At that time he was referring to that long history of research, which had preceded this milestone. His prescience was timely, however, as in the next fifteen years, an explosion in contraceptive technologies and genetic screening technologies were about to develop from on-going research.

The Voluntary Licensing Authority (1991) in the United Kingdom has catalogued many of the more recent milestones in new and not so new reproductive technologies (such as artificial insemination). As noted earlier, in Britain in 1969, the first fertilization in vitro of a human oocyte occurred, followed ten years later by the first IVF birth and within seven months another one by Steptoe and Edwards's technique. In between an IVF birth occurred in Calcutta, India. In this case the doctors had used a different technique; "after the mother's egg had been fertilized in vitro, it had been frozen and stored for fifty-three days before implantation in her uterus" (Scott 1981:215). Shortly after a birth was reported by the Australian team of Wood and Trounsen. The first IVF birth in Canada occurred in 1983 as a result of IVF treatment at the University of British Columbia IVF programme.

These early successes were swiftly followed by multiple births using IVF; twins and quadruplets in 1983 and triplets in 1984, all in the United Kingdom. A technique that allows for embryos to be fertilized in one woman, then "flushed" and implanted into an infertile patient first took place in 1983 (OTA 1988:298). By that year, a deep freeze human embryo storage programme had been developed and a year later, in the Netherlands, the first baby was born resulting from the transfer of a frozen, then thawed
human pre-embryo. In 1986, the birth of the second frozen embryo "time-warped twin" was born (Brinsden and Rainsbury 1992:23). It is believed that the first embryos to be frozen in North America occurred at the Mayo Clinic in 1982. Carolyn Coulam, with the assistance of an animal scientist, froze seventeen fertilized eggs, which were among twenty she had retrieved from a patient, who did not wish them to be discarded. Due to the Mayo Clinic's disapproval and demand that the frozen embryos be destroyed and out of respect for her distraught patient, who had consented to the experiment, Coulam left her long-standing appointment at the clinic and removed the seventeen embryos to Pittsburg. The patient who had a baby from the initial replacement of three of her embryos, subsequently had another child from one of the fateful frozen embryos.7

Following the first wave of IVF successes, new technologies and practices were developed to help those with other sorts of infertility problems, such as women, who were anovulatory and men with oligospermia (see glossary), poor sperm motility or abnormalities. In 1984, the first birth from an "egg donation" occurred in Australia. By the early 1990s, amid considerable controversy, ova donation was extended to include post-menopausal women, who could now gestate a fetus and become mothers from oocytes donated from younger women.

In 1990, the first birth occurred in Italy, following subzonal insemination (SUZI), which involves the micro-injection of several sperm into the perivitelline space of the human egg, in order to overcome male factor infertility. In 1993, the first baby was born through a refinement of the SUZI technique, intra-cytoplasmic sperm injection (ICSI). This technique was pioneered in Belgium by Van Steirteghem, who reported to IVF Congresses in Brussels and Montreal in 1994 that data from 1300 ICSI treatment cycles

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7 Personal communication from Dr. C. Coulam of Genetics and IVF Institute, Fairfax, Virginia, May 1995.
showed that more than two-thirds of the oocytes injected by the micro-technique had fertilized. 439 children had been born by August 1994, and there had been a 3.6 per cent major malformation rate, although it was too early to assess longterm consequences (IVF Congress Magazine 1994:4).

The human genome project has resulted in some early advances in isolating some of the genes responsible for inheritable diseases. IVF technology is proving to be a useful adjunct to the research into diagnosis and elimination of certain genetically diseased embryos prior to a pregnancy being initiated. In what is call preimplantation diagnosis, pre-embryos created through IVF have become valuable "commodities" in a new generation of pre-embryo screening technologies. These technologies are heralded as a triumph for families stricken with family histories of severe inheritable diseases, as they offer affected couples the opportunity of parenting children, who are unaffected by a "defective" gene, such as the cystic fibrosis gene. Pre-implantation diagnosis, the first in the line of pre-embryo screening research technologies, is conducted at the eight cell stage, three days after fertilization, by removing one cell and using it for genetic testing. It uses a hybridization technique to speed up the screening process, so that normal pre-embryos can be replaced in time to develop normally. Nothing is known yet about what it means for future children to be born from pre-embryos, which have been invaded and divested of one of their totipotential cells, then "kept on ice" awaiting the go ahead for implantation or destruction.

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8 The human genome project involves mapping the 3,500 million base pairs that comprise the complete set of genes which humans possess. (See genome in glossary).
9 Since extra-uterine embryos develop more slowly than in vivo embryos, their growth does not keep pace with developments in the uterine wall leading to problems in implantation. It is critical, therefore, that in diagnosing a genetic disorder, that the pre-embryo's viability is not compromised for its later gestation (Newell 1995).
In 1990, the first baby was born following pre-implantation genetic diagnosis (see glossary), as a result of the work of Robert Winston's team at the Hammersmith Hospital, London, England. This centre uses tests for sex selecting X-linked recessive diseases, such as cystic fibrosis. With its combined research and treatment facilities it is on the cutting edge of several experimental techniques on humans, which includes the use of deliberately engineered patient-specific DNA probes to check the pre-embryos of a woman known to be a carrier for a genetic defect which could cause the syndrome in a male child. Yet another newly pioneered technique aptly named FISH - fluorescent in situ hybridization - is also being applied to humans, in order to sex early pre-embryos, as well as genetic defects. Winston's team is now working to develop better means of investigating genetic illnesses such as fragile X syndrome, myotonic dystrophy, Kennedy's disease and Huntington's disease. In the future new treatment options will include the direct treatment of "diseased" pre-embryos or their indirect use in treating other life threatening critical human diseases, such as cancer or Parkinson's disease (Newell 1995:21). The new techniques on the horizon will probably involve embryonic surgery to replace defective genes.

Research clinicians are increasingly undertaking much of this primary research in their dual roles as clinicians and research scientists. One research clinician axiomatically justified the union this way: "Today's research is tomorrow's medical practice, so it is

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10 A recent example of this is the disclosure by Bernard Hedon, president of the organizing committee of the fifteenth International Federation of Fertility Societies' congress to be held in Montpelier, France in September 1995, that his work as head of the department of reproductive medicine in Montpelier is "primarily that of a hospital clinician, responsible for a team of clinicians. Teamwork is essential to achieve anything. I also head a small research group which is currently working on embryonal implantation and endometriosis...Embryonic co-cultures and assisted hatching are among the most promising techniques in this area " (Hedon quoted in Dorozynski 1995:7-8).
important that we know the direction research is taking" (Dorozynski 1995:8). The ethics of the close connection between pure scientific research and clinical application occurring with these pioneer experiments is frequently treated in a cursory manner as exemplified by Winston, one of England's foremost researcher/clinicians in the field of preimplantation genetics. He is frequently in the media limelight. On the one hand he maintains that there is considerable cross-fertilization of ideas between his research group and his treatment group, and on the other hand he says he has deliberately kept them separate.

I have confirmed from my own experience that you don't do good research if you practice medicine part-time and science part-time...The aim is to give the scientists as much freedom as they want, not to structure their existence. They have to find what intrigues them rather than follow a collective goal (Winston quoted in Newell 1995:21).

He maintains that in a democratic country such as Britain, that regulations can effectively curtail any effects from the potential socially harmful nature of pre-implantation technologies. IVF pioneer physician, Jacques Testart in France, is far less optimistic and sees the eugenic threat of pre-implantation technology as not one which can be entrusted to democratic governments (National Film Board of Canada 1992 hereafter NFB).

Since 1990, approximately eight clinical preimplantation diagnosis programmes have been set up worldwide. In June 1994, a global estimate assessed that from 149 completed treatment cycles that twenty-nine children have been born from this technique. (Nisker 1995:247). There is one in Canada, named EPICS (early pre-implantation cell screening), at the University of Western Ontario in London, which is affiliated with a research component, funded by the Ontario government. The treatment arm is directed by Geoffrey Nisker and the research arm by Robert Gore-Langton (NFB:1992) Their approach appears to be consistent with Winston's justifications for collaborative scientific and treatment ventures.
IV THE MEDICAL DISCOURSE OF INFERTILITY AND SUCCESS:
PROBLEMS OF DIAGNOSIS AND CURE

In the fifteen years since the inception and proliferation of IVF services worldwide, there has been a two-pronged approach to creating pre-embryos. One relates to the diagnosis of causes of infertility and attempts to alleviate these problems by a variety of medical means; the other concerns the detection of genetic disorders and attempts to find solutions to the bringing into existence babies predisposed to certain inheritable diseases. This study is primarily concerned with the former, although it is placed in the historical context of a wider scientific interest in embryo research. This section examines the prevailing medical discourses that have been designed to establish a definition of infertility and which have then been used to classify infertility as a disease. The prevalence of infertility in the Canadian population has been largely based on only three small demographic telephone surveys (CRCNRT 1993:194-197). Once a population of people are established as infertile and in need of infertility services, such as IVF, the next problem is to define the criteria for what constitutes successful treatment.

(i) The Discourse of Epidemiology (Population Studies)

Defining infertility and looking for causal relationships is a fairly recent preoccupation in biomedicine. As with other current health problems, such as AIDS, infertility has multifactorial causes, which are currently poorly understood. However, the epidemiological literature about infertility has begun recently to address social and medical practices which result in known risk factors (Mueller and Daling 1989).

In the mid 1980s, population studies started to collect global data relating to human infertility. An extensive World Health Organization (WHO) study was conducted between 1979-1984 in thirty-three centres in twenty-five countries worldwide. This WHO
investigation represents the largest data base ever assembled on the characteristics, clinical findings and results of 5,800 couples seeking evaluation of their infertility. Among the findings was the fact that bilateral obstructed fallopian tubes and other infections were related to a woman's history of sexually transmitted disease (STDs), pelvic inflammatory disease (PID) and pregnancy complications (WHO 1987:964-965). Statistics compiled for one of the WHO studies projected that approximately 30% of couples in parts of Africa may be infertile.

It is estimated that infertility affects about 2.3 million couples in the United States (Mosher and Pratt 1990). In Britain, some 50,000 new cases of infertility are diagnosed each year (Pfeffer and Woollett 1983), an inevitable underestimation, as not all people will seek medical attention or they may present themselves with other symptoms. Conversely, as one Canadian physician points out "nowadays many couples seek advice or wish treatment long before a reasonable "trial" has occurred - they have unrealistically high expectations". (interview with infertility specialist, September 1993).

In Canada, infertility statistics still remain inadequately defined, despite the Canadian Royal Commission on New Reproductive Technologies (CRCNRT) conducting three limited telephone surveys between December 1991 and March 1992. The results of these incredibly cursory studies, provided from commission contracts with Canada Health Monitor and Decima Research, have been challenged by the Social Science Federation of Canada (1992) and feminists (Basen, Eichler and Lippman 1993), who have criticized their research practices. However, the results add to a growing public perception that

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11 One detailed study of a single District Health Authority in England concluded that at least one in six couples needed specialist attention at some point because of an average of two and a half years of infertility (Hull et al. 1985, cited in Doyal 1987:177) This patchy information on the extent of infertility services was recognized in the Warnock Report (Warnock 1985:13).
procedures like IVF are a necessary and successful service for the 250,000 couples who CRCNRT believe are experiencing prolonged infertility problems (CRCNRT 1993:194). The first of these Canadian surveys sought to determine the prevalence of infertility in couples in which the female partner was aged 18-44 years. Then CRCNRT assessed the prevalence of infertility in Canada in two ways: by conducting three national surveys and then synthesizing their results and through secondary analysis by examining three other surveys carried out in the 1980s for other purposes. It concluded that 300,000 Canadian couples (eight and one half percent), who had cohabited for at least one year, at the time of the survey, were infertile. After two years of cohabitation, 250,000 (seven percent) remained infertile (ibid:180). As long as forty-five years ago a study had placed the permanent infertility rate of Canadian couples at ten percent (Whelpton and Kiser (1948) cited in Bryant (1990)).

Since most of the infertility studies have focused on female infertility, it has been well recognized that female fertility decreases with increasing age and in an inverse relationship to socioeconomic status (Henshaw and Orr 1987). Similarly, Strickler (1992) indicates that social factors such as sexually transmitted disease, general levels of health and age patterns of child-bearing all have a part in determining these patterns.

(ii) The Numbers Games

The justification of therapeutic intervention has plagued the reproductive medicine field during the 1980s. A major problem has been both in defining infertility within population studies and what constitutes a definition of "success" in infertility treatment.

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12 See Appendix 1: The Prevalence of Infertility in Canada - Surveys conducted for the Commission and Appendix 2: One-Year and Two-Year Calculations of the Infertility Rate in Proceed with Care (CRCNRT 1993:194-197).
Bryant, in a study commissioned by the Canadian Advisory Council on the Status of Women, has identified this problem in that the numbers chosen to define "infertility" affect both the perceived magnitude of the problem, and the apparent cure rate. This must be borne in mind whenever infertility rates and therapeutic success rates are discussed" (Bryant 1990:2).

In its report, CRCNRT also acknowledged this common misperception and gave assurances of its intention to use the estimates it collected in the Canadian population as a baseline for tracking infertility rates in Canada in the future, as well as for comparison with other countries. 13

The CRCNRT in its approach based on medical evidence considered three factors as to how it defined and measured infertility for population surveys (CRCNRT 1993:181-186). Firstly, it measured the endpoint, whether pregnancy had occurred, as opposed to failure to carry a pregnancy or failure to give birth to a healthy child. Secondly, it addressed the time period to define a couple as involuntarily infertile, which is arbitrary, and chose the World Health Organization (WHO) time frame of two years. 14 Thirdly, CRCNRT addressed the population who would be counted, and focused upon infertile

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13 Caution has been advised by several groups (e.g. National Action Committee on the Status of Women (NAC) and the Social Science Federation of Canada) in accepting the accuracy of the data collected by the Commission. Intense criticism of its research practices throughout its turbulent four year research period has been presented in media and feminist publications, such as McTeer 1992, Social Science Federation of Canada 1992, 1993, Basen, Eichler and Lippman 1993.

14 This time period is based on the evidence that failure to conceive naturally after two years, generally indicates a low chance of conception without intervention. Research suggests that a normally fertile, sexually active couple not using contraception has an average monthly chance of conceiving of twenty to twenty-five percent, counting pregnancies that result in live births (Hull et al. 1985).
couples who were cohabiting (married or common-law). It noted that unlike prevalence\textsuperscript{15} research methods the United States, it was not possible to include in the survey the forty percent of women, between ages 18-44, who do not live with a male partner. Thus it also excluded same sex couples from the population of the study.\textsuperscript{16} Implausibly, the CRCNRT justified this exclusion on the grounds that methods could be refined in future studies, but that infertility estimates in the United States did not differ significantly from those reached by the Commission. As feminists well know, exclusion by omission is no defense.

(iii) "A Take Home Baby": Measuring the Rhetoric of "Success"

Problems about defining infertility not only relate to who is counted, but what is counted. The categorization of the term "success" in IVF therapy has been both confusing and misrepresentative. For example, national indicators about the success of a treatment such as IVF is based on the individual reports of physicians and clinics providing the services. Some reporters have termed an IVF cycle as "successful" when gametes fuse at fertilization (a technical success). Others register success when a chemical pregnancy has occurred, which is established through an immuno-assay test of maternal urine or blood. A positive human chorionic gonadotrophin (betaHCG) will occur approximately two weeks after embryo transfer (an implantation success). In other cases a clinical pregnancy, established by a sonar scan to detect a gestational sac at about three and a half weeks after

\textsuperscript{15} An important distinction is made between "prevalence" and "incidence". Prevalence refers to the number of cases at a point in time, while incidence refers to the occurrence rate over a period of time (Dorland's Medical Dictionary 1957).

\textsuperscript{16} A current response to the neglect of same sex couples' desires for creating children through both donor insemination and IVF is being considered by the gay/lesbian community in British Columbia (personal communication by lesbian feminist January 1994).
embryo transfer (an established pregnancy) will be considered a "success". (interview with IVF specialist March 1994) While these are meaningful in that they establish certain benchmarks that fertilization and pregnancy have been reached, they do not necessarily translate into a healthy, full-term "take home baby". Ultimately this is the only meaningful measure of "success".

By the early 1990s the world leaders in NRTs were recognizing the importance of official registration of clinical "success" rates. The registry devised by the Society for Assisted Reproductive Technology (SART), a section of the American Fertility Association and the Canadian IVF registry both encouraged voluntary registration to standardize the reporting according to certain criteria. Although SART results are published annually, it still leaves clients at the mercy of those unregulated practitioners and clinics who choose not to submit their statistics to a voluntary body. The CRCNRT report has called for immediate formation of a formal national regulatory commission, with greater powers than the existing informal Canadian IVF registry. Its mandate would prevent irregularities in statistical claims to "success" for certain treatments, as it would only license bona fide clinics.

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17 Both the Alberta Foothills Hospital IVF and the UBC IVF programmes became affiliated with SART in 1991.
V THE CAUSES OF INFERTILITY: MERGING STANDARD MEDICAL, PUBLIC HEALTH AND ENVIRONMENTAL DISCOURSES

(i) The Standard Medical Discourse

Paradoxically, while medical practices are expanding into previously uncharted social domains of new family relationships, commerce and genetic research, the solutions to identified medical problems are being sought after in areas of society which are not normally associated with health issues. For example, deviant social practices resulting in sexually communicable diseases and industrial and environmental practices affecting human sexual health also are being implicated as causal links with infertility problems.

Most commonly, infertility problems presented in clinical practice are established within parameters of individualized mechanical or physiological failure, rather than a part of broader social factors. The causes of infertility are equally distributed between male factors and female factors, with a third category labeled "unexplained" or idiopathic (see glossary), with no identifiable causes. Unlike the African Ndembu, who like many traditional societies view infertility as a collective problem, in the West infertility is constructed as individually created, experienced and solved. Infertility treatments therefore focus on individual therapies rather than looking for solutions to the causes in the larger society. Increasingly, it has been left to experts other than health practitioners, with a few notable exceptions. Instead these experts focus on the social indicators in the public health and environmental domain, which need to be factored into the diagnostic stew of fertility problems.

18 Victor Turner's (1969) classic study of the rituals associated with infertility demonstrate the significance of community participation in resolving the problem.
Established medical discourse proposes that male factors may affect from eighteen to thirty percent of infertility problems (Collins et al. 1984). Numerous articles in *Fertility and Sterility*,\(^{20}\) the official journal of the American Fertility Society, point to causes, other than underlying physical factors such as varicoceles and undescended testicles, which may include exposure to lead or dibromochloropropane (a pesticide), the mumps virus after puberty, as well as smoking and marijuana use.

However, most of the preventable factors that have been studied so far affect women's fertility. This emphasis on treatment of the female partner may in part result from a universal misperception that blame for infertility rests with the female partner. Factors such as past contraceptive history,\(^{21}\) the prevalence of sexually transmitted diseases (STDs), specifically *chlamydia trachomatis* and *neisseria gonorrheae*;\(^{22}\) and delayed childbirth for frivolous or career development reasons, all support non-compliance in expediting women's "expected" role of procreation. Other equivocal risk factors include inappropriate lifestyle habits, such as excessive exercise, heavy smoking, substance abuse and caffeine intake (Mueller and Daling 1989).

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\(^{21}\) Bryant (1990:18) cites several studies which have indicated that pelvic inflammatory disease (PID), which commonly affects fertility, has been associated with intrauterine device (IUD) use, excluding copper-containing IUDs. Conversely, use of barrier methods and oral contraceptives have been shown to protect from STDs and PID. An inverse relationship between risk and the number of sexual partners was also indicated. For a comprehensive list of references see Bryant 1980:36-37.

\(^{22}\) STDs cause twenty percent of the infertility in some populations in the United States according to the United States Congress, Office 1988. Rates in Canada have been dropping since they peaked in 1982 following a steady rise since the 1950s. Rates continue to rise for girls aged 1-4 years and 10-14 years, highlighting sexual abuse of young girls. Girls aged 15-19 were the highest risk group since 1986, 5.43 per 1,000 girls were reported to have acquired gonorrhea (see Bureau of Communicable Disease Epidemiology 1988; Parra and Cates 1985; Hockin 1985; Todd and Jessemine 1987, cited in Bryant 1990).
What is not voiced in the discourse is the potential effects of some drugs and devices associated with reproduction, which may prove harmful to women's health. Rarely are harmful toxic agents in the workplace and the environment mentioned. Less evident in the medical discourse of infertility are the iatrogenic causes, whereby medical procedures may also render people infertile. Andrew Kimbrell (1993), in his radical critique of the technological and commercial controls in American society perpetrated through certain NRTs, cites a number of these causes that affect women's reproductive capacities. These have been identified by The Office of Technology Assessment of the United States Congress and include infections from surgical procedures, surgical sterilizations, treatment for endometriosis, unnecessary hysterectomies, cancer treatments and damage done by contraceptive devices (Kimbrell 1993:69).

(ii) The Environmental Discourse

According to Bryant's Report for the Canadian Advisory Council on the Status of Women, in 1990 the Canadian Government spent $3.5 million on research in reproductive technology and yet only $400,000 on public health research into the causes of infertility. In a recent position paper, Louise Vandelac,23 a member of The Canadian Women's Alliance on Reproductive Health,24 drew attention to these facts. She notes that in spite of the evidence, public health issues such as the safety of the workplace, a clean

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23 Vandelac, a feminist sociologist, was one of four commissioners hired for the CRCNRT, who was fired along with lawyers Maureen McTeer and Martin Hebert and physician Bruce Hatfield. On December 6th 1991 they had filed a suit against the Chair, Patricia Baird and the federal government in an unprecedented action. Ten days later when Parliament had adjourned for Christmas they were fired, with no recourse for rebuttal. See Eichler (1993:196-222) for in depth account of events.

24 This alliance is an ad hoc group of feminists across Canada, who are affiliated with NAC and interested in NRTs. Their position papers were prepared for response to the CRCNRT's Report, which was finally released November 1993.
environment and better programmes for control of STDs continue to be ignored. For example, questions are beginning to be raised about the fertility status of farm workers in British Columbia. These are mainly south Asian women, whose fertility is alleged to be compromised by pesticide spraying.

Similarly, evidence is now being assembled, which suggests a link between pollution in the Great Lakes and human infertility. A recent Canadian Broadcasting Corporation documentary, *Sex under Siege* (1994), in the Witness series, provides fascinating coverage of original research being conducted in Canada and elsewhere, which connects infertility with toxic effluents in major waterways and with compounds found in plastics. Paradoxically, while industry is contaminating Canadian waters and rendering people infertile, other industries, are polluting other Canadian water sources in order to produce a drug which treats menopause symptoms. For example, Ayerst Organics Ltd. of Brandon, Manitoba, a division of the multinational pharmaceutical company, Wyeth-Ayerst has recently been implicated in pollution of the Assiniboine River. In order to produce the drug, Premarin, which manages post-menopausal symptoms, the company dumps "a murky and deadly stew, {into} Brandon sewage lagoon four, abutting the Assiniboine River ...the waste from a controversial plant that processes the estrogen rich urine of pregnant mares" (Regush 1994:72).25

Industry has been accused by the International Joint Commission, amongst other groups, of long-term neglect in cleaning up of dangerous industrial chemicals.26 The

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25 This pregnant mares' urine (PMU), referred to locally as 'superjuice', is collected from mares under inhumane conditions, which has environmentalists, animal rights activists and feminists rallying against its production, especially since synthetic forms of estrogen and estrogen substitutes are available on the market (Regush 1994).

26 These chemicals include especially chlorine-based pollutants, such as DDT, PCBs and many pesticides, as well as by-products of the chemical, pharmaceutical and plastic industries, which are routinely dumped in the Lakes. Current research links some of these
CRCNRT report cited conflicting studies of effects of exposure of pregnant women to PCB bioaccumulation in the Great Lakes. One study associated lower birth weight and smaller head size in the children of affected women, while the other study did not confirm it (CRCNRT 1993:290). A growing number of cases have been reported of defects in babies born to women exposed to toxins in North America.\(^{27}\)

With the perceived increased prevalence of infertility has come the promotion of science and technology as the correct solution to cure infertility. With the complicity of the media has come the notion in the public perception that technical advances may assist in the management of infertility problems. While surgical correction can permanently restore damaged tubes, technology such as IVF in conjunction with superovulation therapy offers only artificial solutions. It does not cure infertility. Firstly, it offers a circumventory solution to mechanical (anatomical) disorders, such as obstructed fallopian tubes. Secondly, it creates temporary mimicry of normalcy for physiological (hormonal) disorders of reproduction. As yet little attention is given to socio-environmental factors leading to infertility, whose resolution lies in an entirely different social realm from biomedical therapy. To date, the debate on NRTs has tended to focus on the technologies themselves, rather than the antecedents that are beyond the technical realm.

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chemicals, which act like synthetic sex hormones, to reproductive damage to the offspring of animal and humans exposed to them (Vancouver Sun, April 12th 1994: A7). See also Jarrell 1993.

\(^{27}\) For example, a high incidence of anencephaly, a rare defect in which babies are born with an open skull and only the rudiments of a brain, was noted in 1992 in Brownsville, Texas and its sister city, Matamoros. Suspicion for the cause of this defect rests on the effluents pumped from the industrial plants of these Mexican border towns along the Rio Grande (Vancouver Sun, January 20th 1992). In Vietnam mass abortions have been occurring following ultrasound detection of abnormalities in fetuses of women, two generations after the wholesale spraying of dioxin-containing herbicides, such as Agent Orange (Manthorpe 1994).
VI AN IVF PROGRAMME IN BRITISH COLUMBIA

(i) A Short History

During the 1980s in response to the rapid acceptance and institution of the IVF technology, IVF clinics opened worldwide. The British Columbia IVF programme's inception occurred in 1982, at the University of British Columbia, four years after the first IVF baby, Louise Brown, was born in Oldham, England. It was established within the Division of Reproductive Endocrinology, Department of Obstetrics and Gynaecology. The inception of the programme was the collaborative work of Gomel, the Department Chairman at the time, Ho Yuen, the present medical director and divisional head, and infertility specialists Rowe and McComb, laboratory director Moon and the first IVF medical director, Poland. Dr. Moon, the gamete and embryo laboratory director, reminiscing on the difficulty of getting a successful programme started recalls:

Dr. Gomel initiated it, but everyone chipped in to establish the lab. and it took a long time to get our first success in 1983, because at that time the operating room was situated in the basement, the laboratory was situated on the third floor of the acute care unit at UBC. I had to jump around, you know. I had to go up to the lab and go down again to pick up again. (interview with laboratory director November 1993)

This experience was not dissimilar to that of the English pioneers in the field, Steptoe and Edwards, after their removal from Oldham Hospital, where Louise Brown was born, to Cambridge's Addenbrookes Hospital. Funding from the unlikely source of the Daily Mail newspaper eventually led to their relocation in the present site, Bourne Hall, a Jacobean mansion. In Edward's historical account of those early days, when they could not generate operational funding, because development of IVF had ignited a fiery debate between science and ethics, he reminisced:
But instead of a large, fully-serviced clinic with operating theatres, patient beds, and a supporting staff to cope with a heavy schedule of operations, we were offered two rooms in old Addenbrookes' Hospital; an ancient operating theatre up on the third floor, and a shed on the ground floor for our laboratory. Eggs collected from patients upstairs would have to be taken downstairs for fertilization, and embryos would have to be carried upstairs for replacement in their mothers. Upstairs, downstairs with such precious cargo - seven or eight times a day (Edwards 1989:12).

The neglect of the physical plant resulting in practical inconveniences in both programmes is symptomatic of the early days of operating IVF facilities with lack of funding, due to the common perception that infertility does not constitute an "essential" medical service, since it affects such a small percentage of the population. This perception has persisted in the medico-political arena of funding. Apart from the province of Ontario, Canadian medical plans have never funded the total IVF procedures. However, once IVF became available in British Columbia, there has been no shortage of enrollment in the programme. It has registered routinely about forty patients each month and has a waiting list of about one year.

Up until 1988, some IVF related procedures in the Vancouver programme were covered by the British Columbia Medical Services Plan (Newman 1992). Oocyte retrievals were performed by the relatively invasive and expensive surgical technique of laparoscopy, which required a general anaesthetic. This procedure was paid for by the medical plan, as was the embryo replacement, which was billed at that time as artificial insemination by husband, AIH. During 1988, less invasive and less costly oocyte retrievals using vaginal ultrasound gradually replaced laparoscopy. Gamete Intrafallopian Transfer (GIFT) also was offered to patients as a variant of IVF. In this procedure the oocytes are retrieved either by laparoscopy or under ultrasound guidance and then introduced with sperm immediately into the fallopian tube of the woman. For some clients this procedure has been considered more acceptable for religious reasons than creating
embryos in vitro. The procedure was discontinued by the programme in 1988, except on rare occasions, because its success rates were not any better than IVF and "the procedure was more invasive and required a general anaesthetic. Also it did not answer the question of fertilization potential for the couple. At least with IVF we knew what the fertilization potential was and GIFT never answered that question".28 (one of many telephone interviews with the IVF nursing director to corroborate data. April 1995)

As part of a policy to check escalating health costs, in July 1988, the British Columbia Medical Services Plan (MSP) decided to withdraw funding for the IVF procedures.29 Provincial governments have always been responsible for health care, since 1867. However, in 1988, the federal government decided to progressively withdraw its funding contribution through provincial transfer payments, which put greater pressure on provincial government budgets. This has resulted in provincial governments paying more than the approximately fifty percent that they have paid since the block funding programme was introduced in the early 1970s.

28 A departmental memorandum, covering the month August 16th - September 16th 1987, reflects that the sample of GIFT cycles performed was very small. In that month only five GIFT procedures were performed and no pregnancies resulted. In contrast, twenty-five patients were induced for IVF, twenty-two of which went to embryo transfer, seventeen after laparoscopy and five after ultrasound retrieval. In these cases fertilization potential had been proven. There were, however, only five positive pregnancy tests in this group of twenty-two patients.

29 Ontario is the only province that has ever covered IVF costs for all infertile couples. OHIP paid about $1,500 for each IVF treatment cycle performed at one of the five publicly funded clinics and several private ones. Patients at the public clinics paid for their own drugs, which cost $1,000-$3,000 per cycle. On February 17th 1994, IVF, except for women with tubal obstruction, was one of several treatments or procedures struck from the list of insured services in Ontario, along with routine circumcision of newborns and repair of earlobes deformed by pierced ears. The Ministry of Health and the Ontario Medical Association drew up lists of nonessential services to be considered for delisting, in order to cut the province's health insurance billings by $20 million. (Brooks 1994:970-971).
These budgetary changes affected IVF services in a piecemeal fashion. Whereas the initial medical consultation and investigative procedures remained covered by the provincial medical plan, the surgical procedures were not. The IVF laboratory procedures were already being paid for by the clients, as were the cost of the prescription drugs. However, the pharmaceutical costs were reimbursed to the patients at a rate of eighty to one hundred percent through provincial or private insurers. By 1989, there were additional costs for cryopreserving and storing pre-embryos. In consequence, whereas in 1985 the partial user fee cost to the client was $1,200.00; in 1987 $1,500.00 and in 1988 $1,800.00, as of July 1988, participants became responsible for the total cost. (Newman 1992:5). By the end of the 1980s, the costs had tripled according to a Vancouver Sun newspaper article:

IVF now costs $3,500 per cycle, with success rates of 15-20%. The clinic performs 300 procedures a year and 75 babies have been born by IVF since the program started in 1982. Cryopreservation has been available since spring 1989. 50% of the embryos survive the process and 6-10% result in pregnancy following implantation (Stainsby 1989:A5).

These increased costs were not reflected in noticeably improved outcome statistics of the programme. Prior to 1989, the programme kept an informal, in-house accounting of IVF statistics. The IVF success rates and the percentages of the indications for clinical treatment were made available in the IVF video, at least to those prospective participants, who had already enrolled in the programme and borrowed the video.

Since 1985, the clinic has collected outcome statistics, which reflect incremental increases in success rates for each phase of the treatment cycle (see Table 1). But as noted in earlier, "success rates" of IVF, both nationally and internationally, have frequently

30 See Appendix B for a breakdown of schedule and fees as of August 8th 1988.
been misleading. To create uniformity in reporting practices by clinics submitting their statistics to a voluntary registry, reporters were requested to break down the numbers for each of the stages of IVF cycle outcome. These included statistics for the number of IVF cycles initiated, the number of embryo transfers, the clinical pregnancy rates, as well as the number of live, full term birth, including multiple pregnancies and abnormalities. As of 1991, following the policy of other countries, such as Britain, Australia and the US, the University of British Columbia IVF programme started to submit its statistics to the Canadian IVF Registry, as well as the United States SART Registry.

31 The Canadian Registry was set up by Dr. Arthur Leader of the University of Ottawa.
32 SART, the Society of Assisted Reproductive Technology, is affiliated with the American Fertility Association and is responsible for collecting statistics from all of the 175 registered clinics. This figure includes four clinics in Canada, which joined in 1991, of which the UBC IVF programme is a participant.
Table 1. University of British Columbia IVF Programme

1985 - 1994 IVF Outcome Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Pregnancies</th>
<th>Percentage of Pregnancies per Embryo Transfers</th>
<th>Number of Deliveries</th>
<th>Number of Oocyte Retrievals</th>
<th>Number of Embryo Transfers</th>
<th>Number of Treatment Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>13</td>
<td>20.6</td>
<td>10</td>
<td>69</td>
<td>63</td>
<td>76</td>
</tr>
<tr>
<td>1986</td>
<td>20</td>
<td>15.1</td>
<td>15</td>
<td>151</td>
<td>132</td>
<td>166</td>
</tr>
<tr>
<td>1987</td>
<td>25</td>
<td>12.6</td>
<td>16</td>
<td>217</td>
<td>197</td>
<td>235</td>
</tr>
<tr>
<td>1988</td>
<td>42</td>
<td>15.6</td>
<td>33</td>
<td>283</td>
<td>268</td>
<td>316</td>
</tr>
<tr>
<td>1989</td>
<td>38</td>
<td>16.4</td>
<td>24</td>
<td>246</td>
<td>231</td>
<td>274</td>
</tr>
<tr>
<td>1990</td>
<td>49</td>
<td>18.7</td>
<td>39</td>
<td>279</td>
<td>254</td>
<td>360</td>
</tr>
<tr>
<td>1991</td>
<td>67</td>
<td>24.5</td>
<td>48</td>
<td>295</td>
<td>270</td>
<td>408</td>
</tr>
<tr>
<td>1992</td>
<td>76</td>
<td>25.5</td>
<td>56</td>
<td>325</td>
<td>298</td>
<td>404</td>
</tr>
<tr>
<td>1993</td>
<td>58</td>
<td>19.8</td>
<td>43</td>
<td>314</td>
<td>293</td>
<td>369</td>
</tr>
<tr>
<td>1994</td>
<td>60</td>
<td>28.7</td>
<td>44</td>
<td>235</td>
<td>209</td>
<td>272</td>
</tr>
<tr>
<td>Totals</td>
<td>448</td>
<td></td>
<td>328</td>
<td>2414</td>
<td>2215</td>
<td>2880</td>
</tr>
</tbody>
</table>

Source: IVF Programme Records
The pregnancies rates recorded in 1985 (20.6%) were high because treatment at that time was restricted to women under thirty-five years old and with a diagnosis of "pure tubal factor". Those women with non-tubal factor problems used the GIFT procedure. Statistics collected since the late 1980s reflect a small but gradual improvement in success rates. Whereas in 1989 pregnancy per embryo transfer were 16.4%, in 1992 they had improved by 9% to 25.5% pregnancy per embryo transfer. As the following table indicates, when these outcome statistics are viewed in terms of percentage of live births per transfer cycle the improvement over four years is less than 6%. Whereas in 1989 they were 8.8%, by 1992 they had increased to only 14.1% deliveries per cycle.

The medical indications for IVF are listed in table 3 and apply to women who are less than forty years old when they sign up for treatment. "Couples must be in a stable relationship, HIV-negative, and without evidence of unstable or untreated psychiatric illness or other conditions that would be contraindications for pregnancy. Since the use of donor gametes is not currently feasible in this program, couples must provide their own oocytes and sperm, thus excluding men with azospermia and women with ovarian failure" (Fluker and Ho Yuen 1993:883).
Table 2. **Indications for Treatment from 1989 to 1992**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubal Disease inoperable or ≥ 1 year post reconstructive surgery</td>
<td>1282</td>
<td>57</td>
</tr>
<tr>
<td>Endometriosis unresponsive to medical or surgical treatment</td>
<td>207</td>
<td>9</td>
</tr>
<tr>
<td>Unexplained ≥ 3 years duration</td>
<td>178</td>
<td>8</td>
</tr>
<tr>
<td>Male Factor should have ≥ 1 million total motile sperm recoverable per ejaculate</td>
<td>168</td>
<td>8</td>
</tr>
<tr>
<td>Multiple and Miscellaneous infertility factors</td>
<td>404</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: Fluker and Ho Yuen 1993:883

Between 1985 and 1993, at the Shaughnessy Hospital site, there were 2239 treatment cycles initiated, resulting in 242 deliveries from 330 pregnancies. In 1992, 25% of couples conceived following each completed transfer cycle, and 14% took home one or more babies for each cycle started. By 1993, the total cost including medications (on average $1,400, but ranging from $800 - $4,000), IVF programme/procedure fees of $3315 and hospital short stay admission $280, had risen to approximately $5,000 (Fluker and Ho Yuen 1993:883-884). By this time, IVF treatments were beginning to be offered for some male factor infertility and for women over forty years, who were already enrolled in the programme. No oocyte donor programme or gestational surrogacy arrangements have been made available to clients.

(ii) **The Current Situation of IVF in Vancouver**

During the period of the research project, the IVF staff's offices were located in different parts of Shaughnessy Hospital. For example, the IVF medical director, who was
also the university divisional head of endocrinology and infertility; a reproductive endocrinologist, the laboratory director, scientific researchers and clinical research staff and support staff were all located in offices in the academic wing, close to Children's Hospital. Here the two endocrinologists and the gamete laboratory director also fulfilled their university research and co-ordinated their teaching commitments as geographical full-time professors (GFT). Meanwhile the nurse co-ordinator, nursing staff, social worker/counselor and two support staff were situated in the Jean Matheson Wing, along with two other infertility specialists, who were also GFT professors in the Department of Obstetrics and Gynaecology. Three IVF biologists, with occasional assistance from a doctoral candidate, carrying out research on discarded oocytes, under the direction of the laboratory director, worked in the gamete laboratories. These were located beside the operating rooms.

The IVF ultrasound technologist worked part-time with the IVF programme, and part-time in the adjacent maternity unit, Grace Hospital, as did one of the part-time nurses. One of the reproductive surgeons worked at the Women's Health Centre (WHC), specializing in recurrent pregnancy loss and ultrasound screening where the sophisticated and expensive ultrasound machine was located. It was here that IVF clinic appointments, as well as routine blood tests and ultrasound scans were conducted. In addition to the core staff, four reproductive surgeons, who conducted private Obstetric/Gynaecology practices, specializing in infertility, in Vancouver were also associated with the programme to assist with oocyte pickups and embryo replacements. This enabled the surgical procedures of oocyte pickup and embryo transfer to be conducted seven days a week. Thus one out of a total of seven surgeons was available on a daily roster.

Despite the diffusion of the staff throughout the Shaughnessy site, they maintained strong ties with each other through the network of long Shaughnessy corridors. The
mission control for this amorphous body of people was managed from the nursing co-
ordinator's office, as she was responsible for the smooth daily running of the programme's
interface with a continual rotation of clientele. The overall administration was directed
from the medical director's office, on the other side of the hospital. Apart from their
professional cohesiveness and weekly staff meetings, the staff came together for
occasional social events, such as an annual Christmas dinner.

Operating room staff, which included a Shaughnessy Hospital anaesthetist and two
operating room nurses were made available to the IVF programme for mornings only.
This permitted a maximum of three retrievals to be done on any given morning, as well as
any embryo transfers scheduled. In part, this is the reason why the waiting lists for IVF
have continued to be approximately one year. In part, it has been due to the ability of the
reproductive endocrinologists to schedule time to see patients in clinics two or three times
a week for the necessary medical counseling and treatment arrangements. During the
hospital fieldwork period, throughout the summer and fall of 1993, room 10 was the only
operating room in use and the hospital was in the final stages of its closure and largely
deserted. A few nurses still clustered for their breaks to chat and eat in the nurses lounge
attached to the operating suite.

In February 1993, the Provincial Government declared the closure of Shaughnessy
Hospital, in order to save $45 million a year. The wards, which had previously been full
of veterans, when the hospital was part of the Department of Veteran Affairs, and later as
University Hospital, Shaughnessy site, were now full of hospital beds, equipment, filing
cabinets and boxes, which could be seen through the open doorways. A sense of
abandonment and dejection permeated the long corridors and uninhabited rooms. The
hollow shell of a once vital hospital was reflected in the abnormally loud sound of
footsteps periodically coming and going down far off corridors. Previously, having been
employed as a clinical physiotherapist for five years in the hospital, I experienced strange flashbacks, as I looked into the well-known rooms. I saw instead the images of old veterans, busy staff, an atmosphere of warmth and friendship, which had now receded into this spectral shell of a once important veterans' hospital.

On November 24th, the last ovum retrieval was performed and two days later, the final embryo replacement brought a final closure to the IVF oocyte retrieval/embryo transfer part of the programme at Shaughnessy Hospital. By the end of November 1993, the official closure of Shaughnessy Hospital had occurred, leaving behind the administrative, patient intake and research part of the IVF programme. They continued to function surrounded by construction workers, who had begun to reorganize the physical aspects of the hospital shell that were to be inhabited by the adjacent Children's Hospital.33

Unlike the high profile media coverage of the closure of Shaughnessy Hospital, staff lay-offs and reduction of critical services, the fate of IVF in Vancouver was shrouded in silence. Over the winter, uncertainty among the staff prevailed about the fate of the IVF programme, as decisions about space allocation at the Vancouver Hospital and Health Sciences Centre remained unclear. The IVF staff took their normal one month break from treatment services in December. Some staff reductions were made at this time. A secretary was lent to another department part-time, one of the casual nurses was laid off, while another took maternity leave. The social worker/counselor and an IVF technologist were laid off with severance packages.

33 The spinal unit had already moved to Vancouver General Hospital. This hospital has since been renamed Vancouver Hospital and Health Sciences Centre (VHHSC), in response to the consolidation plans for the major Vancouver hospitals. The Shaughnessy cancer clinic had relocated at Burnaby Hospital and the adult cystic fibrosis clinic at St. Paul's Hospital.
(iii) An Uneasy Separation

In early March 1994, the IVF program started up services again, this time based at two hospital sites. The procedure room and IVF laboratories were relocated at Vancouver Hospital. Only the IVF laboratory staff moved to their new premises in the old maternity building, on the fifth floor of the Willow Pavilion, which after more than half a century of birthing babies was to become the place of artificially creating them. The administration and patient services remained at the defunct Shaughnessy Hospital.

The IVF laboratory was dismantled at Shaughnessy Hospital and equipment was moved to the new site. The microscopes, the incubators and the two big tanks in which the embryos were cryopreserved were transported by the company responsible for their maintenance. During the two months before IVF services commenced again, the laboratory staff reorganized their equipment in the newly renovated space, which seemed larger than the previous laboratories. Extra space also had been made available for the sperm micro manipulation equipment\(^{34}\) on a solid marble bench, which would be run by the Ph.D. candidate in embryology, supervised by laboratory director, once she had defended her thesis.

During this time the chief technologist had run trials with mouse embryos to check that the cryopreservation tanks had not been effected by the move. She was completing further trials on the day before the first retrieval. "Beautiful embryos", she said in delight of the mouse embryos she had frozen two days earlier as a final trial. "I wish all the

\(^{34}\) One of the latest innovative reproductive technologies is intracytoplasmic sperm injection (ICSI), which involves the injection of a single spermatozoon into an oocyte. ICSI was developed in Belgium by Dr. van Steirteghem. More then 130 births have resulted from the procedure, which has been developed to overcome male factor infertility. IVF Canada, a private Toronto clinic, claimed credit for the first pregnancy in Canada using ICSI (Murray 1994).
human embryos froze so well. Over the winter after the IVF programme closed, when
the tanks had remained at Shaughnessy, under lock and key.

VII CONCLUSION

There has been a long history of medical interest in understanding the beginnings of
human life. The scientific medical discourse is well represented in a chain of theories
about conception models which stretches back to classical times. IVF is just a modern
link, and one among a number of recent techno-medical applications on humans which has
arisen from this legacy of embryological research. However, there is a fundamental
difference between research on dead embryos obtained in the past from abortions, embryo
flushings and in teaching hospital based embryo collections, and a living pre-embryo that is
created in the IVF laboratory. It is now possible to nurture, examine and manipulate the
pre-embryo as an animated, growing entity, external and separate from its gestator.
Although there is an accepted fourteen day limit on the preservation of the pre-embryo in vitro, prior to the development of the primitive nervous streak, nevertheless it takes on a
life-of-its-own, despite its dependency on laboratory support systems. There is a
subliminal recognition at this stage of its potentiality for the vested interests of both
research and the marketplace.

The effects of alienation and reification automatically place the pre-embryo in a
dependency relationship other than its biological symbiotic relationship to the woman,
who produces the oocyte, gestates the resultant embryo and will in all likelihood be the
primary nurturer and caregiver of the child. This other dependency association made
possible by envisaging the pre-embryo as a separate entity, albeit with human potentiality,
brings it under the purview of scientists, who reason its value as a highly instructive information-bearing piece of human matter. Its relative moral or social valence beyond the laboratory or to the biological parents is eclipsed. It is a piece of research tissue.

It would appear that IVF is part of a continuum, and provides the necessary gateway into future avenues of embryological research, which perhaps may offer the final solutions to how life begins. However, a different view of the pre-embryo emerges when it is placed in the simple IVF model of human infertility therapy. Here the complex social organization around creating pre-embryos to provide babies for infertile couples masks the potential for other research. As fast as IVF clinics open up around the world, so do the banks of frozen embryos. The future of those embryos is of limited concern to the health providers in the IVF clinics, procedure rooms and laboratories. The salient epidemiological discourse is clearly directed towards an identified need of a defined population of infertile Canadians wishing to produce families. While frozen embryos have limited used in the IVF treatment domain, the by-product of the therapy, large numbers of supernumerary pre-embryo is of greater significance in the research field. In general the clinical momentum is directed towards refining treatment protocols and trying to improve the statistics, "the numbers game", which legitimates and validates the provision of a largely unsuccessful and expensive service.

Political and public interest in infertility is also a fairly recent phenomenon. Problems of adoption, the availability of medically corrective infertility procedures and the need to regulate the variety of services are all part of a growing communal awareness. These are further compounded by a generalized fear that environmental and industrial toxins are damaging human fertility. Thus infertility is no longer constructed as a private grief, it is a highly charged political matter. This is apparent in the public process and subsequent report of the Canadian Royal Commission on New Reproductive
Technologies. Currently, the medical, public health and environmental discourses are all focused on the causality of infertility problems and in finding medical cures. Meanwhile frozen pre-embryos accumulate in cryopreservation banks in clinics that remain unregulated. So in a relatively short period of time, infertility has moved from private grief and social stigma, to entrepreneurship and national politics; from individual needs to moral discourse.
The technical processes of IVF are poorly understood by the general population, other than those who are directly involved with the practicalities of the procedure. Patients and the staff of IVF clinics share a clinical sub-culture with the practices and values which are the subject of this study. The fieldwork experience for this research is that represented by a broad overview of the treatment routines of the University of British Columbia IVF programme, which provides an introduction to the medico-technical activities of creating, transferring and freezing pre-embryos. The narrative presents a particular view of a social organization in a specific IVF programme setting, based on the interplay of science, technology and medical practice. It creates a descriptive context for more abstract discussion of the pre-embryo as an emerging social category. The perspective examined is that presented to me by IVF service providers and my own observations. It does not reflect the view of patients undergoing the procedures, whom I did not interview, but rather a view of the patients in relation to the provision of the technology.

Firstly, the different phases of the IVF procedures from the time of enrollment through an IVF treatment cycle are outlined. Then I describe the cryopreservation process of freezing pre-embryos, including the circumstances which led up to freezing becoming one of a number of options for dealing with supernumerary embryos. A thick description gives an account of the standard oocyte retrieval, fertilization, embryo transfer
and embryo freezing processes, that to the observer are bewildering technical details and yet to the practitioner are a matter of routine fact. It exemplifies how personal and cultural experiences of specific technical knowledge are accepted as common practice. Often this makes the researcher's task more challenging. "Social scientists interested in problems of technical change rarely ponder how people make sense of the technologies they use or what their sense making may imply for patterns of social organization" (Barley 1988:497). The medical discourse of pre-embryos requires an intimate knowledge of a sequence of medical and technological interventions through which pre-embryos are created, stored and replaced in women on a daily basis. As this research attempts to make clear, the different knowledge bases of the health professionals involved in IVF means that they construct distinct understandings about the value of pre-embryos.

I PREPARING FOR THE SUPEROVULATION PROCESS

(i) "Ladies-in-Waiting": Coming "on board"

The decision to resort to the technology of IVF is the end stage of a cumulative build up of investigations, which couples undergo on the long path from initial concerns with inability to conceive, through to the final decision that all other treatments have failed. This technology is often seen as the last chance of having a baby and before resorting to adoption or accepting a childless lifestyle. As Mathieson, a researcher for a British government Member of Parliament comments

Waiting is the most common experience for infertile people. Waiting to see their own doctor, waiting to be referred to a clinic, waiting for the outcome of tests and waiting to see whether the treatment has worked (Mathieson 1986:5 quoted in Doyal 1987:179).
In British Columbia, couples are referred to the University of British Columbia IVF programme from all parts of the Province. Sometimes a local specialist in obstetrics and gynaecology has done the early investigations into possible causes of infertility. When this has not occurred, which is becoming more common, the clinic infertility specialists must initiate or reorder the battery of diagnostic tests. These range from simple patient initiated charting of the female ovulation cycle, to testing factors in the male partner's sperm that affect fertilization, to x-rays of the female genital tract through hysterosalpingograms and diagnostic surgical laparoscopy. Sometimes the therapy is the regulation of ovulation with drugs, while at other times, surgical correction of obstructed fallopian tubes is the solution. At the point when all other appropriate forms of treatment have been ruled out, and IVF appears to be the only hope, then the long wait for IVF treatment begins over again.

Initially, when clients inquire about enrolling in the IVF programme, they are placed on the waiting list. It is approximately one year before they will be eligible for an IVF consultation. This leads to some patients turning elsewhere for more prompt treatment, especially if advancing age is a critical factor. When they reach the top of the waiting list, each couple attends a two and one half hour orientation session at the hospital, where they watch a video in vitro fertilization at University of British Columbia. They meet with the medical, nursing and counseling staff and have a medical examination. Between 1991/1992 an orientation evening was offered, at which the medical director, nursing co-ordinator and social worker would meet with the new intake group in the evenings. For various reasons it was not a successful strategy. Within a few weeks of the orientation session, patients were required to show their intent to proceed with treatment by submitting a $500 non-refundable deposit. When an IVF treatment cycle was started,
the balance of the payment became due in the form of certified cheques or money orders on the first day of treatment. At this time they were truly "on board".

(ii) Counseling the Clients

The "counseling" of clients before, during and after an IVF treatment cycle is undertaken by doctors, nurses and the social worker/counselor from their different professional perspectives. Considerable value is placed on educating and reassuring patients, as they have to absorb a lot of information about the treatment process, as well as to come to terms with the high incidence of failure. In this way the staff attempt to prepare patients to deal with the emotional aspects of a highly technical procedure with poor success rates. However, differences of opinion about what constituted counseling exist among staff members. The social worker/counselor feels that preoccupation with the treatment aspects sometimes replaces the counseling aspects for some patients, in that some may feel rushed into making premature decisions. IVF nurses feel that patients normally have ample time to consider their options, because "the year wait-list allowed couples time to gather information - for the most part, they seemed well informed and had already decided to have treatment". They still have ample time to reconsider, as it is often another four months before they become eligible for treatment. After the counseling session with the nurse, who tells them that they are now at the point where they can book a treatment month if they wish, they are asked to wait a further two to three weeks before calling back to enroll. They are assured that delaying a decision in no way influences losing a place on the programme. These differing perspectives reflect the different

1 The nurse co-ordinator commented that the challenge to informed decision-making is more likely to have be to faced when there is a short or no wait-list, as may soon occur when the private, Genesis clinic opens.
professional epistemologies about the relative values of educating and counseling, as expressed by social workers, nurses and doctors, as well as differing expressions of the patients' best interests.

Coping with the reality of the high failure rate of IVF and making further decisions about whether to continue with another IVF cycle is an integral part of the counseling. One IVF nurse described her duties this way:

I do a lot of counseling. I do hands-on nursing, such as giving the injections, drawing blood, but a good part of it is the counseling aspect. Not deep counseling like N. does, but just the general counseling that is associated with giving positive and negative results, once their cycle is completed and dealing with their questions before and after they come for treatments.

The social worker/counselor, with fifteen years of experience in adoption and infertility, as well as individual, couple and family counseling, sees each couple before starting the IVF treatment. Often this counseling takes place during the busy orientation session. However, she is always available to them for further assistance by telephone or in her office. Her position in the programme is unique in Canada, although much more common in clinics in other countries. She explains:

I think I'm the only counselor who works right in a programme. The rest (of the Canadian IVF counselors) are on a referral basis for those people who are in crisis. Some clinics have a social worker, who is in a hospital, who comes when needed.

When I ask who does the counseling at these clinics, she replies that "most places in Canada don't have them". The Canadian Royal Commission on New Reproductive Technologies (CRCNRT) recommendation #119 has stated that "{C}ounseling be an integral part of assisted conception services and be offered either on-site or by referral to appropriate professionals" (CRCNRT 1993:551). However, the report notes that patients surveyed by the Commission found this aspect of their experience at IVF clinics the least
satisfactory, in that the majority of clinics used the term "counsel" and "educate" interchangeably. In some clinics, the role of 'counselor' is filled by doctors, nurses or administrators and that it is unclear as to whether these staff members had specialized training (ibid:550). While the Commission recommends that clients should have access to a social worker/counselor, it is not explicit about how this should be achieved. In this sense the very complicated area of counseling is glossed over and diminished by the report. 2 The University of British Columbia IVF programme is not alone therefore in its emphasis on ensuring that patient's are thoroughly educated about the complex IVF protocols, sometimes to the detriment of providing the objective counseling that may be necessary for some people, who for a variety of reasons, may require considerable advice on whether it is in their long term interests to proceed. Once the decision to enroll in treatment is made, the decision-making reverts to that of the endocrinologist, who then must individualize the treatment management.

(iii) "Calling the Pergonals": Calling the Shots

The complex realm of the first phase of the IVF treatment, the ovulation induction phase, exemplifies the fine-tuned protocols and critical decision-making patterns, which are legitimated though the filter of the reproductive endocrinologist's scientific knowledge. Endocrinology 3 is a relatively new field within the specialty of obstetrics and gynaecology,

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2 I witnessed the avoidance of answering this question, when it was put to the Chairperson of the Commission, Patricia Baird, when she presented the McCleery Lecture (February 23rd 1994) to an academic audience at the University of British Columbia.

3 Endocrinology involved the clinical management of hormonal problems. Early remedies in the field included treatment of women for amenorrhea (absence or abnormal stoppage of the menses) with bromocriptine, and with galactorrhea to counter excessive or spontaneous flow of milk. More recently, the field of endocrinology has promoted the widespread use of estrogen hormone replacement (EHR) therapy for peri- and post-menopausal women. Swiftly this was followed by the mandatory addition of a
and the drug therapies developed in this field are among many which demonstrate the rapid changes in clinical and laboratory research which are translated into patient management.

In the case of IVF, the first phase of treatment that women undergo is ovulation induction. A critical sequence of drugs replicates the normal hormonal pattern leading up to ovulation, but more powerfully, such that multiple ova develop in the fluid-filled follicles of the ovaries, instead of just one as in natural ovulation. The medications are selected by the endocrinologist according to each individual patient. These include clomiphene citrate (Serophene or Clomid), human menopausal gonadotrophin (Pergonal), GnRH Analog (Lupron, Suprefact or Synarel), human chorionic gonadotrophin/hCG (Profasi) and Progesterone. (see glossary of medical terms for action of these drugs). The increased clinical use of long-acting analogs of gonadotrophin releasing hormone (GnRH) are now becoming routine treatment for infertility, because they suppress normal endogenous pituitary action and replace it with a more controlled one.

In the University of British Columbia IVF programme ovulation induction usually starts between days three and five of each patient's menstrual cycle and lasts for five to ten days. At this time, women are expected to visit the IVF clinic for daily blood tests, ovarian ultrasound scans and injections. For out of town patients, accommodation is provided at the Easter Seal House or Heather House for the ten to sixteen days of the IVF treatment cycle.

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progestational agent to the oestrogen because of fears of increasing risk of breast cancer (Speroff 1984).

4 This protocol has changed slightly since the time of the research, as about eighty percent of the patients give their own injections at home.
Some patients, who live within reasonable commuting distance of Vancouver, may continue to work through this phase. However, the physical and emotional toll on stamina is high and often women take sick leave or use disability insurance. A few may even give up work entirely during an IVF cycle. The morning coffee hour offered by the programme acts as a support group for patients, who are going through the treatment cycle at the same time. As noted in my earlier pilot study of the IVF waiting room, women coming in for their daily blood work and scans often socialized with one another. I witnessed the relaxed attitude of some women, who appeared to be familiar with the protocols and chatted familiarly with other women, in contrast to those women, or couples, who appeared withdrawn and apprehensive. Some women knew the nurses by name and left in a casual manner when their name was called, unlike the jumpy attitude of the perhaps, first-timers or those who had experienced "canceled cycles" previously.

This part of the programme is one of the critical highly charged emotional times for the couple, particularly the woman (Newman and Zouves 1991; Daniluk 1988). In the past, one in five treatment cycles might be canceled prior to oocyte pickup, for a number of reasons. Now there are fewer cancellations with the new gonadotrophin releasing hormone protocol. Sometimes the drugs cause an irreversible premature ovulation to occur, or there is a poor ovarian response or an ovarian cyst may be detected on ultrasound on the first day of treatment and requires delaying the cycle for resolution of the cyst. After months of waiting this can be a devastating disappointment to participants, who must face making a whole series of decisions about further treatment.

In what has been called the phenomenon of perpetuated dependency, frequently couples, who have been unable to conceive a child and eventually have sought medical solution, go through a transformation of self, saying "I am infertile" and become desperate
for treatment at any cost and will not cease, if ever, until they have tried hard and long enough for a solution (Williams 1989b; Modell 1989; Sandelowski 1991).

In research on twenty Canadian women concerning their motivation to participate in IVF therapy, some of the frustrations of the women are recounted by those who have had their treatment cycles "canceled", when they are already advanced in the procedure and have invested more emotionally. Yet they continue trying:

Marilyn - I was really disappointed. I was really upset. Andrew took me out to dinner, and I don't drink, but I had a drink because I was really upset. And he didn't know what to do for me. So it was very frustrating at that point. And again, I felt like I had let him down, I'd let myself down. I think it was more of a rude awakening, because it had gone so well in July and I went through the whole program, how the hell did I get canceled? So you go through a lot of what did I do wrong? I didn't do anything. Every period is different and your body reacts differently each time.

Lois - ...I remember getting in the car and crying all the way home. I'm never going back there! They've had enough! I'm not a guinea pig any more (she laughs nervously) And I just...I'd had it. I thought - this is it. I'm not doing this again. But about two days afterwards it was, okay, let's get back in (she laughs) (Williams 1989b:130).

The preoccupation with what clients call "100% genetic parenthood" and with "the product of a full biological baby" (Modell 1989:133) leads them into treatment compliance with the expectations of their doctors for controlling "the odds of success" for a "last chance baby". This ethnographic study of an American IVF programme demonstrates that while the technology may seem innovative, in reality it is conceptually conservative in upholding traditional ideas of heterosexual sex.

"{T}he 'obsessive' desire of infertile people for a child of their own" (Stanworth 1987:22) and the pervasive tendency to caricature the infertile as desperate people (Pfeffer 1987:84) has not been helped by the stigmatic description of the distress of an
infertile woman as "barren woman's suffering", a disparaging comment registered by British IVF pioneers (Edwards and Steptoe 1980:47).

Those women, who undergo repeated IVF cycles, run the risks of experiencing the side effects from the powerful, superovulatory medications. These may range from those which are usually associated with a normal menstrual cycle, such as breast tenderness, mood swings, backache and some bleeding to occasionally, hot flushes or headaches, and closer to the time of retrieval, lower abdominal twinges or cramps. Very rarely, in less than 1% of cases, ovarian hyperstimulation occurs, where the ovaries become very enlarged and fluid accumulates in the abdominal cavity. Symptoms of vomiting, diarrhea and excessive weight gain may be experienced, or if very severe, shortness of breath and chest pain. In this event, hospitalization for bedrest and close observation are indicated. These drug management problems are clearly explained to patients in the University of British Columbia IVF Programme Patient Manual.

The close daily monitoring of the menstrual cycle of each patient by blood tests determines the hormone levels, such that when estrogen has reached a certain range and when ultrasound scans have detected that the appropriate size and number of follicles has been attained, the human menopausal gonadotrophin (hMG) injections are discontinued. Every morning one infertility specialist is responsible for "calling the pergonals", which requires reviewing each patient's chart and adjusting the individual medications. In this way the attending physician does not have to actually see the patient, just check the chart. When the critical point is reached, then two nights or thirty-six hours before the oocyte pickup, the woman is given an intramuscular injection of Profasi (hCG), which

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5 One of the criticisms of the University of British Columbia IVF programme is that patients do not have their own infertility physician, who can give a sense of continuity and security as each patient goes along the IVF roller coaster. This attention to individualized treatment is one of the advertising hallmarks of the new Bellingham clinic.
recreates the natural luteinizing hormone (LH) surge that normally triggers ovulation. This induces the final maturation of the eggs, which are then ready for collection. The egg retrieval will then be scheduled for about thirty-six hours later.

II THE OO CYTE RETRIEVAL OR THE "EGG PICK UP"

The description of the oocyte pickup procedure is riddled with metaphors of conception, which express women as passive objects, awaiting active male control and penetration within the private domain of coitus. These mysteries of the act of insemination and conception are conveyed by the tensions, dynamics and role playing that accompany the relatively short oocyte retrieval procedure. The surgeon symbolizes the power of the male partner to control the submissive female body, to repeatedly probe, to inflict pain and to intrude into and beyond the secret domain of her reproductive self. Conversely, however, in the IVF procedure, taking (of eggs) rather than giving (of sperm) is the nature of the act.

(i) The Routinization of A High Drama

While each IVF oocyte retrieval procedure is a unique event, there are commonalties to the routine sequences for each IVF retrieval and these give meaning to what Koenig (1988) calls the social creation of a "routine" treatment.6 At Shaughnessy

6 According to Koenig "When a new procedure has evolved over the mysterious boundary into the territory of standard therapy, it cannot be denied....As with TPE {therapeutic plasma exchange} a new treatment may or may not be efficacious; it might be risky. The moral imperative for the treatment overrides these concerns. It becomes unthinkable for the physicians not to perform the treatment. The social inevitability of therapy takes on a moral tone; the experience of the technological imperative becomes a moral imperative for
Hospital, the procedure takes place on a daily basis in the operating room, OR10, starting around 8.00 a.m. and is performed by one of the reproductive surgeons, who is on call for IVF that day. In all probability the couple may never have met this surgeon before and they may well be attended by another one for the embryo replacement two days later.  

Not surprisingly, a feeling of both success and apprehension accompanies each couple, who has reached the point of the oocyte pickup.

The woman is prepared for the retrieval, as if undergoing any other form of daycare surgery. She is gowned, draped and given a small amount of short-acting intravenous medication for relaxation and pain control if necessary. Meanwhile, her partner is producing a semen specimen in a room across the hall from the gamete laboratory. This specimen will be prepared in the laboratory for mixing with the oocytes later in the day. As soon as he is ready, the male partner is gowned in operating room "greens" and is brought into the procedure room to sit at his wife's head, a position which is reminiscent of a hospital birthing procedure. Ironically, if he is not ready, they start without him and he comes in later.

There is a disjuncture between the private realm of the couple, who are finally about to obtain, if fortunate, some pre-embryos and the social realm of the surgical team. It is as though the heads of the couple, so close together reflect their personal experience action. Hence the creation of a moral imperative is a social process, the end result of the routinization and consequent acceptance of a new medical technology" (Koenig 1988:486).

7 The new Bellingham clinic in Washington State, which is soliciting British Columbia clients with their attention to personalized services, has capitalized on this inconsistency in the Vancouver programme (promotional flyer mailed to British Columbia infertility specialists).

8 If there is a problem for the male partner in producing a semen specimen, the couple may obtain it at home and bring it with them.
while the surgical team is attending to that other medical world out of sight behind the ultrasound monitor at the other end of the patient's body. I was drawn by the similarity to a husband-attended caesarian section, where the lower half of the woman's body is screened from the couple's view. An ultrasound monitor is placed over the abdomen facing the surgeon, while another monitor faces the couple, so that they can likewise view the retrieval. The woman has become very familiar with the ultrasound monitor during the ovarian scans, which she has received three or four times during the superovulation phase. However, this time it is combined with the ovum retrieval procedure, which she will feel with varying degrees of discomfort or pain. In the case I describe here, this particular patient has refused anaesthesia and is alert, unlike a procedure I witnessed the following day, where the patient was very sleepy.

An anaesthetist is in attendance, as s/he may or may not need to give further assistance. With a transvaginal ultrasound retrieval, usually only some high vaginal freezing is necessary, unlike in the past, when oocyte pickups were carried out under general anaesthetic, through the laparoscope. There is an atmosphere of hush and the overhead lights are dimmed. This theatrical ritual is reminiscent of that outdated term, operating theatre.

In the cases I observed the couples who had consented to my attendance, seemed oblivious to the people surrounding them.

Ultrasound imaging originated in sonar detection for submarine warfare, but was not incorporated into obstetrical practice until the early 1960s, some years after its acceptance in other medical diagnostic fields (Gold 1984 cited in Petchesky 1987:65). In the early 1960s ultrasound was also used therapeutically as a physical therapy modality for swift resolution of inflamed tissues.

This was the pioneer procedure developed by Patrick Steptoe, which made possible the single ovum retrieval in a natural cycle, leading up to the first IVF birth. In order to diffuse some of this high drama, patients are invited to bring in some tapes that they find relaxing, which can be played on a recently acquired portable cassette player.
As I sit on the surgeon's left side, the ultrasound monitor is directly in front of me. It is connected to the ultrasound transducer, which is about one inch in diameter and symbolically reminiscent of an engorged penis. High frequency sound waves sent from the transducer rebound and are converted into electricity, so that a computer can plot the information and produce an image of the woman's reproductive organs.

(ii) The "Egg Pickup"

The surgeon gently introduces the transducer into the woman's vagina, as she explains to us what we are seeing on the monitors. In monochrome, the screen displays the shapes of the ovaries and the uterus, but at an angle. As one's eyes become accustomed to the created images of the reproductive organs, the clear shapes of the enlarged follicles come in and out of view, as the transducer is moved. They appear somewhat like spherical cysts of varying sizes; one is noticeably large. A large internal iliac artery is outlined and later the intestines.

In OR 10 all eyes are focused on the two monitors, thereby directing attention away from the experiencing woman and towards the anatomy of the female reproductive organs. Petchesky notes in her study of maternal/fetal ultrasound how fetal imagery replicates the paradox of photography to give "the appearance of 'objectivity' of capturing 'literal reality'" (Petchesky 1987:62). As a visual society, we have become adept at voyeurism, at virtual reality, disassociating ourselves from the empathic response to pain and "being there". We do this all the time when we watch on television news footage of some horrific event. Similarly, Barthes (1982:62) has pointed out that photographic images are always based in a context of historical and cultural meanings.

The surgeon demonstrates the frightfully long aspiration needle, about 1-2 mm. in diameter, which is introduced through a small orifice in the base of the ultrasound
transducer. She advises the patient that she will feel an uncomfortable prick as she pierces each ovarian follicle. The first follicle pops and quickly deflates as the follicular fluid containing the egg drains into the test-tube, which is attached to the aspirator, by a long rubber tube taped to the patient's left leg. As the surgeon deftly pricks one follicle after another, they miraculously deflate and disappear in the grey ovarian outline.

Meanwhile the nurse, who is sitting by the patient's left knee detaches each test tube, as it fills; gets up and hands it through the window between the operating room and the gamete laboratory to the biologist. The biologist is sitting out of the couple's view at a small table monitoring and logging the test-tubes as they are passed to her. She calls back into the OR a number, only when one or more ova are found in the contents from each test tube, which another biologist is viewing under a high powered microscope.

Within ten minutes, the surgeon has punctured each of the follicles, which she can see in the left ovary. She then scans the whole organ, as some follicles are less easy to see than others. Sometimes the follicular fluid is clear, at other times bloody or tinged with pink. In this instance, eight eggs have been found in the left ovary, although more than eight test tubes have been passed into the adjacent laboratory. Half-an-hour has passed in a flash for me, if not for the stoical patient.

Some ultrasound pictures, which have been taken before the retrieval started lie on the console and one shows that only one enlarged follicle is visible in the right ovary. As the surgeon moves to the right ovary, I am asked to switch over the monitor to that ovary. The follicle is resistant to puncture and the patient reacts with a loud "ow", to which response the surgeon apologizes, in a mechanical way, as she has done each time the woman winces, as a follicle is pricked. The patient feels everything without anaesthesia, which she has chosen to refuse. She looks awfully pale, as does her husband. They are both withdrawn, but together, somehow unconnected from the efficient, swift activities
going on down our end of the table. Every so often, the surgeon swivels her stool to the side of the monitor, so that she can make eye contact and verbally reassure the couple, thereby bridging the artificial world of subject and object.

Finally, the resistant large follicle ruptures, the test tube fills with fluid and everyone exclaims with pleasure, although in fact it does not contain an oocyte. In this case, bigger is not equated with better. There are no other follicles to be found in this ovary. The surgeon removes the aspirator to check that it is not clogged. She introduces another one and re-scans the ovary unsuccessfully searching for more follicles. She takes some follicular fluid in a search for stray oocytes.

By 8.40 a.m. the procedure is completed and the operating room team is mobilized in a flash to clean up. The husband is sent outside. I stay and try to keep out of the way, as machines are moved swiftly to the side walls, a trolley is brought in and the patient is slipped on to it. The anaesthetist, who has had nothing to do, helps move the patient and wheels her outside into the hall, where the surgeon speaks reassuringly to the couple. The nurse picks up the intercom and says "Room 10 is ready for cleaning", the cue for the cleaner to enter the room and lethargically push a mop around in preparation for the next patient, who is waiting.

III A WINDOW OF OPPORTUNITY: INTO THE LAB.

(i) A Mecca of Machinery

The microscopic exercise of the egg hunt goes on in the adjacent laboratory. It is connected to the operating room by a small corner window, through which follicular fluid and later pre-embryos are passed. This is a world completely off limits to the patients,
where two or three of the three busy biologists rotate daily through a myriad of technical processes. They prepare medium and sperm, monitor ova and later pre-embryos not only for replacement, but also for cryopreservation for use in later replacement cycles.

The two IVF laboratories are considered as an extension of the operating room, so that anyone entering must be correctly gowned. They are kept scrupulously clean, and equipment is handled wearing disposable gloves. When gametes are handled, the biologists wear masks. In the laboratory attached to the operating room, there is a microscope, housed within a laminar flow hood, which is used solely to observe and handle the oocytes and embryos. An incubator for the oocytes sits beside it. On another counter a microscope is used for magnifying sperm samples and beside it an incubator for the sperm samples, which are artificially capacitated\(^{13}\) before mixing with the oocytes. Under the counters are kept all the sterilized and packaged supplies. A counter for paperwork is close to the table and chair beside the window linking the laboratory with the operating room. It is from this site that the biologist can observe the procedure.

Across the hall in the other laboratory, serum is prepared from new patients undergoing the superovulation induction process. The serum is heat inactivated in a water bath at 56°C. and sterilized through 0.22 \(\mu\)m filter unit. This laboratory is crammed full of equipment, consonant with what Reiser and Anbard describe as "(T)he landscape of modern health care is filled with machines" (1984:3). There is the sophisticated ultra pure water

\(^{13}\) Capacitation under natural circumstances is a process whereby motile spermatozoa must undergo alteration during their time in the female reproductive tract in order to develop the ability to fertilize eggs. After sperm have 'escaped' from the inhibitory factors within the liquefied seminal plasma in which it travels, capacitation involves several changes that alter the plasma membrane of the sperm to allow an acrosome reaction. This process is mimicked \textit{in vitro} by separating the sperm from the plasma and capacitating it in a physiological saline solution supplemented by serum albumin and energy sources (Soules 1989:191-192).
system along one wall, which provides pure water for the procedures. On the counter is a freezer, which has been programmed to freeze embryos loaded in slow cooling 0.25 ml straws. It slowly steps down (slow cooling) the pre-embryos. Two large cryopreservation tanks and the liquid nitrogen refill tanks sit on the floor. A small desk provides space for the technologists to do their paperwork and on the wall a fan plays incongruously above all the freezing equipment on a warm summer day, in an old hospital bereft of air-conditioning.

Very few people ever venture into these technological Aladdin's caves. Requests by some patients to view their embryos have been rejected by the laboratory director, because of the critical importance of keeping this area as sterile as possible. In many centres a video monitor, attached to the laboratory microscope is placed in the operating room for patients to view their ova and embryos. The IVF programme has not been able to afford such equipment from its limited budget, despite it proving to be an indispensable piece of equipment in the animal IVF laboratory in the Animal Science Department at the University of British Columbia. 14 In some cases, the programme has given the patient a clean petri dish, as a memento of this elusive stage in the creation of their potential baby. This souvenir has similar symbolic resonance with the tiny casket, which some patients in the United States, who experience recurrent pregnancy loss, use to mark the loss of a potential baby. 15

14 On one of my visits to the IVF facilities in the University of British Columbia Animal Sciences Department, I was struck by the technology that was available to its researchers, in comparison with the human IVF programme. It was much simpler for me to view the embryos magnified under the microscope on the adjacent television monitor.

15 One of these caskets was displayed by Sherokee Ilse, an expert in recurrent pregnancy loss at a lecture in Women's Health Centre, Vancouver, on May 20th 1993. I was told of another symbolic marker of the loss of a fetus in the release of coloured helium balloons up into the sky.
(ii) "Egg" Care

As the test tubes are handed in rapid succession through the connecting window between the laboratory and operating room, the biologist logs twenty-five aspirates from one ovary and seventeen from the other. In all, a total of twenty-five eggs are retrieved. The biologist calls back into the operating room as each oocyte is identified, not only for the surgeon's information, but also to boost the couples' morale. The couple in this case has withdrawn consent to my observing their retrieval procedure at the last minute. I am told that the couple are overwhelmed by the ordeal, and in consequence unnecessarily tense about intruders into what they perceive as a very personal experience. I am invited to remain in the laboratory to see what for me seems the even more personal experience of the fertilization of their gametes.

While one biologist is logging the aspirates, the other is examining the samples under the microscope, which is housed in a fumehood. The procedures are performed swiftly and deftly, with silent concentration. First, the biologist draws up in a pipette about a teaspoon of aspirate into a petri dish and examines it for oocytes. She sucks off the oocytes into another petri dish, mixes it with some medium mixed with the patient's serum and then covers it with a lid. This serum has been prepared from the blood samples of the patient, drawn during the superovulatory work-up the week before. The serum is used as a nutrient in the culture medium for preparing sperm and for the incubation of the oocytes. Incubation occurs prior to insemination, which takes place about three to five hours after the retrieval process. The granulosa cells in the remaining aspirate is put aside for graduate student research projects.

16 "Egg" is the colloquialism most often used by IVF professionals, as well as patients, even though the more correct term, ovum or oocyte is used in operating room and laboratory notes, conference papers, etc.

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Once an oocyte is picked up from the follicular fluid, it is placed in a culture dish and washed with PBS medium about two times. Finally the oocyte is cultured with a special medium (HF10) containing seven point five percent of the patient's heat inactivated serum. Then the dish is placed in the incubator to await the insemination procedure. Each dish is labeled with the female patient's surname and colour coded from among six rotating colours. One shelf of the incubator is reserved for each patient undergoing a retrieval that day. In this way safeguards are implemented to ensure that there is no chance of mixing up the embryos.

The same intensity of silent concentration, as I witnessed in the operating room, occurs in the laboratory as each oocyte pickup procedure occurs. There may be up to three oocyte retrievals, followed by as many embryo replacements, on any given morning, so there is pressure to keep moving along. The operating room and its nurses are only available until lunch time and anyway there is much else to be done by the surgeon and the biologists. In between procedures, the surgeon does paperwork, and talks to the patients, the nurses prepare for the next case, and in the laboratory, the pertinent laboratory equipment is swiftly cleaned in preparation for the next case.

(iii) Insemination and Syngamy: Technology versus Nature

Once the male partner has produced the semen sample\(^\text{17}\) in a room across the hall, one of the available biologists examines a specimen under the microscope. Under magnification, the tiny drop of semen on the slide appears like a pond, full of active tadpoles, surrounded by bits of floating debris and intriguingly irregular shaped cells. This

\(^{17}\) One half to one teaspoon of sperm is produced by a healthy, fertile man. Each ejaculate contains between 200 million and 500 million sperm. But only one sperm is required for fertilization to occur (CRCNRT 1993:147-148). See glossary.
semen will be kept in an incubator in the main laboratory in a test tube, supported at a 30° angle and covered with some of the medium containing the female partner's serum, in order to enhance "swim up". This process facilitates the "good" or motile sperm to swim up to the top of the sample, which then appears clear as the dead sperm remain at the bottom. The clear portion or supernatant is drawn up with a pipette and introduced into a clean tube and centrifuged. The resultant sperm pellet is washed twice with the medium containing maternal serum and the number of motile sperm in the final preparation are counted. Finally, the concentration is adjusted to about 50,000 sperm per drop. The biologists also processes the blood samples of new patients, who are being "worked up" for retrievals later in the week, in order to produce the maternal serum.

With the bustle of the morning over and after lunch, the business of insemination finally occurs, by placing a drop of the prepared semen sample on to the oocyte enveloped in its culture medium in the petri dish. This usually takes place about three to five hours after retrieval. Then the fertilized oocytes will be left overnight in their dishes and examined the next morning when they have reached the pronuclear stage. At this time, the best are reserved for embryo transfer the following day, while the rest, if there are any and if the couple so desires, are frozen for future use in a natural cycle. Within twenty-four hours of the sperm penetrating the oocyte, the process of syngamy (see glossary) has occurred, when the nuclear membranes of the two pronuclei dissolve and the chromosomes unite. "Although the genetic constitution (the genome) of the zygote is established at syngamy, the genes do not begin to function until the zygote has eight cells. Until then, the zygote is operating under genetically programmed instructions from the

18 A natural cycle is one in which a woman has not undergone superovulation, or only minimally, in order to replicate the optimum time for an embryo replacement. It is used commonly by women, who have excess preembryos stored in the freezer. A natural cycle replacement is also substantially cheaper and less invasive than an IVF cycle.
egg only" (CRCNRT 1993:153). A few hours after syngamy occurs, the process of cell division, cleavage, causes the cells to split into two, then four, then eight, sixteen cells and so on. 19 Usually, the pre-embryo created through IVF is replaced at the two to four cell stage.

(iv) Cleaving Embryos: Watching, Waiting and Wastage

The period between the ova retrieval and the embryo transfer, when the cleaving cells are left to their own genetically programmed sequences, is a critical and liminal time for both staff and patients. Human intervention is at a minimum. It is a period during which the patients after leaving the hospital have to wait. The biologists can only watch over their charges and ensure that no outside factors interfere with the optimum conditions for cell division. In part the lack of knowledge about and therefore engagement with this process for patients is a means of self-protection, because they have been primed to the poor fertilization success rates of IVF technology. One IVF nurse explained her view of why patients use this distancing process:

I have talked to couples about that period before implantation. They are trying to keep it very clinical in their minds, because that's their way of protecting themselves, if the treatment fails. They don't want to think of it as the death of this embryo or that they have failed the embryo. They want to put aside the grieving of that particular section of the technology.

Because the laboratory is off-limits to patients, this is also an area of the IVF technology about which patients have very little comprehension.

19 In normal conception in vivo, this division occurs at about eighteen hour intervals to form a clump of blastomeres, each one of which becomes successively smaller. However, the clump remains about the same size, about the size of a period at the end of this sentence, until implantation occurs.
According to the differing epistemologies of IVF health professionals, such as medical, nursing, laboratory, counseling, a variety of perceptions about the conceptus in its early stage are expressed. For example, the IVF nurses, who work most closely with infertile couples through daily monitoring of hormone levels and in counseling them about their concerns about treatment, tend to define the pre-embryos in relation to the potential parents. One nurse swiftly elides her definition of the embryo with the concerns of the potential parents:

The embryo is the joining of two cells. But it is more than that, to these couples, the embryo has such emotional significance, because many of these couples have never achieved a pregnancy before and to them, even if they don't become pregnant from the treatment, I think that the realization they have created an embryo, even if it's in the lab., its meaningful to them. I'm talking generalizations here and obviously there is a difference from one couple to another how they view their embryos.

Another nurse followed the same type of reasoning:

the human embryo is a living thing, something that a man and a woman form and its something pretty special and its just not possible to create a human embryo, due to external problems that the couple have. With the help of research and science they are able to accomplish that.

In distinction, those scientists, IVF technologists and IVF physicians, whose epistemology is based in embryology tend to focus on the pre-embryo as part of a developmental process, in which their skills are critically involved. A biologist describes the arbitrariness with which cell division occurs and the potential failure of pre-embryos to develop.

The embryo is like two cells that come together, but it could potentially become something, but you don't know because there are a lot of factors that will make it a human being.
In natural conception, each of the cells in the blastocyst cluster is totipotential. This means that any of the cells has the ability to become the true embryo and subsequent fetus. Each cell has an independent, genetic constitution, a genome. But most of these cells are not destined to become the embryo. By seven days after fertilization, the outer ring of cells, called the trophoblasts, begin to invade the lining of the uterus, (the endometrium) and eventually become part of the placenta. The plate of cells which becomes the embryonic disk separates two fluid-filled spaces, which become the amniotic cavity.

It is from this disc that the embryo itself develops. By about 14 days after fertilization, implantation is complete, and one or two days later the first indicator of a body axis becomes visible. Called the primitive streak, it appears as a heaping up of cells at one end of the embryonic disk. Thus, the embryo proper develops from just a small fraction of cells that make up the zygote before implantation. Only at this point, (15 or 16 days after fertilization) can individual embryonic development truly be said to have begun, because only with the development of the primitive streak is it possible to tell whether one embryo, multiple embryos, (identical twins or triplets) or no embryo at all is developing (CRCNRT 1993:158).

In reality, more than ninety-nine percent of the zygote develops into the trophoblast and other supporting tissue, such as the placenta, chorionic villi, amnion etc. It is for this reason that some people prefer to use the term pre-embryo for the zygote prior to implantation.

The long journey from two cells to complete human being "makes it open to the risks of errors and dysfunction. In fact, only half of all fertilized eggs survive embryo and fetal development and result in live births. The remainder are lost sometime between fertilization and the end of pregnancy, many of them before implantation and many within the first few weeks of implantation" (ibid160). This knowledge of the common wastage of gametes and embryos associated with natural intercourse and conception, in vivo, allows
many of the IVF staff to keep biological realities in perspective and therefore not to be consumed by moral quandaries concerning discarding unneeded or damaged pre-embryos.

In my mind, an embryo doesn't have the right to be gestated. I guess I don't have problems with discarding embryos - no. I don't lose sleep over discarding embryos because that is the choice the gamete providers have made and have to live with. I don't think anybody has a right to interfere with that kind of decision.

The laboratory director perceives the pre-embryo objectively from a scientific standpoint, unclouded by moral theology:

Conception outside the body gives a lot of confusion. Most of us put too much emotion on the embryo and it's unnecessary. They are just simply 1-2 cells...anything can happen with this type of IVF embryo. For example, even in (the) natural cycle, we don't know how many embryos are fertilized and disappear, aborted or rejected, by the body. Also, the IVF embryo is only at the two to eight cell stage, early embryos - less than 8 cells. Even if we transfer to the mother, what is the success rate? 20%? Can you accuse me that I am murdering 80% of the embryos. Once the embryo is attached to the mother's womb, is growing and healthy, then I would call that the real potential then.

Likewise one of the IVF physicians, with expertise in endocrinology, situates the pre-embryo in terms of its critical dependency on human or artificial nurturers for its future development.

An embryo, a zygote is the structure that is formed following the fertilization of an egg; an egg that is fertilized by a sperm which as it starts to divide becomes a zygote and an embryo, which is human tissue -living tissue; but incapable of living without tremendous support from the IVF lab or the mother and even in the IVF lab. only for a very limited period.

Another IVF physician and fetal ultrasound expert, involved in both the technical aspects and patient care, also refines her definition in embryological terms, according to both her specialized professional knowledge and her socialization to the practical situation of patient care.
I have problems with calling it (the pre-embryo) an embryo when I am talking to the couples, telling them about the embryo replacement procedure, because for me it is an embryo when it has a form to it after implantation. I tend to call it a fertilized egg rather than embryo.

In all the explanations posited by IVF staff, the reification of the pre-embryo is focused clearly on its biological, extendible status as human tissue, which is sometimes subject to rejection. The ability to think both in terms of the social relationships around the embryo and linearly about the pre-embryo as part of a biological developmental process pervades the rhetoric of IVF, whether or not there is formal knowledge of human biology. The experience of biological aging is a universal phenomenon, which Leach points out is associated with our odd concept of time passing as "a discontinuity of repeated contrasts" (Leach 1979:228). Likewise, we tend to take for granted the connected sequencing of the biological progression from embryo, to fetus, to infant, to child and so on.

(v) The Embryo Transfer

Within thirty-six hours of fertilization the pre-embryos, which will be somewhere between the two to eight cells stage, will be ready to be replaced in the woman. This event occurs in the same procedure room as the retrieval but in a far less tense atmosphere. It is a relatively simple, speedy and low-tech procedure. Earlier, one of the other biologists loads each of the pre-embryos from their individual petri dishes into a catheter in such a way as to create the minimum of damage to the pre-embryos. The surgeon, this time assisted by one of the IVF biologists, introduces the pre-embryos in the catheter, attached to a long, narrow tube, high into the woman's uterus, usually without any local freezing. Emotions are often running high at this point for the couple, for whom it may be the first time that they have come so close to a pregnancy. While the woman
relaxes for a while after the procedure, the biologist remains in the procedure room, talking in an informal manner and trying to reassure the couple.

In reality, what follows afterwards is another tense period of waiting. Firstly, there is the fourteen day wait until the pregnancy test is performed, even if the patient starts to bleed in the meantime. Several weeks later ultrasonography will identify and confirm an implanted embryo. For some the long wait is over, to be replaced by the anticipation of an uneventful gestation and birth; for many others the decision-making process starts all over again. For others the failure to conceive brings to a closure the attempt by a couple for their own biological child. Many more couples' hopes rest on their pre-embryos, which are frozen solid in the large cryopreservation tank in a laboratory, which they are never permitted to enter. Some IVF centres allow visitation rights to the cryopreservation unit, in respect of the attempted bonding between pre-embryos and potential parents.

IV FROZEN IN TIME AND SPACE: FREEZING PRE-EMBRYOS

The western cultural infatuation with technology clearly revealed by some anthropological studies (Koenig 1988; Bassett 1993) demonstrates that there are unexplained social processes, which occur when practices become accepted as routine. In the IVF laboratory the equipment associated with the freezing procedures form a

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20 I accept Bijker, Hughes and Pinch's observation that technology is a slippery term and "it seems unfruitful and indeed unnecessary to devote much effort to working out precise definitions, at least at this stage of the research in progress" (1987:3). They distinguish three layers of meaning of the word technology as described by MacKenzie and Wajcman (1985). The first layer is the level of physical objects and artifacts; the second refers to activities or processes and the third refers to what people know as well as what they do - the know-how.
substantial part of this machinery, which is routinely utilized by the technologists. "Ordinariness", "standard therapy", this familiar pattern of routine make their workplace social life possible. "Habituation makes it unnecessary for each situation to be defined anew, step by step" (Berger and Luckman 1966:53-54). For example, common acceptance of routine practices makes it possible for the IVF laboratory director, who is not even located on the same hospital site since the removal of the gamete laboratory to the Vancouver Hospital and Health Sciences Centre (VHHSC), to rest assured of the smooth running of the complex protocols. Even when the IVF programme was based at Shaughnessy Hospital, his office was located in another part of the hospital. On weekends, sometimes one biologist works alone. Thus there is an implicit reliance on and confidence in the integrity and competence of the biologists to follow the accepted protocols and for the machines to do their job.

(i) A Chilly Climate

A standard procedure, according to strict protocols, for selection and freezing of embryos is followed by biologists at the IVF programme. The freezing of pre-embryos takes place on the morning after the oocyte pickup at the two pronuclear stage. If there are five or more embryos, the best three are reserved for replacement the following day and the remainder are frozen. Delaying the freezing until the day after retrieval allows for the chance of delayed fertilization and in some instances for four embryos to be replaced.

As with any highly practiced skill, the procedures look disarmingly simple to the observer. The calm expertise of the doctors and biologists, born out of years of experience when applied to the oocyte pickup, insemination and embryo replacement

procedures is also replicated in the freezing process. In the laboratory, where the storage tanks reside, the biologist prepares the cryoprotection solutions, which protect the pre-embryos for their freezing plunge. First, she clearly labels three centrifuge tubes and then prepares three solutions in which the embryos are rinsed prior to freezing. The solutions are of different concentrations,\(^{22}\) which are then filter-sterilized through double-stacked filters in the correct order, using the same filter system.

The biologist then labels and sets up three petri dishes (Falcon 3001), each of which is filled with one of the filter-sterilized solutions. Each solution is mixed well, as the propanediol (PD) tends to separate quickly. Then each pre-embryo is rinsed in the 20% media for about three minutes, then placed in 1.5 M PD for fifteen minutes and then finally in 0.1 M sucrose plus 1.5 M PD for five minutes. At this stage the pre-embryos are ready for loading into special cryopreservation straws.

Each straw, called a French straw, is carefully labeled with the date, the patient's name, laboratory number and straw number. The loading procedure involves a steady hand to attach the coloured end of the straw to a mouthpiece adapter set. Using the other end of the straw as a pipette, the straw is loaded first with a small volume of sucrose solution, then air, then embryo plus sucrose solution, then air again and a small volume of sucrose solution again, then air, then critoseal to hold all of the above in place. One embryo is loaded into one straw, until a maximum of five straws is used for each patient. Doubling may be required when a patient has more than five embryos for freezing. The biologist then places the straws in the cell freezer (Planer KRYO 10) in preparation for the required slow cooling process, before the icy plunge into liquid nitrogen.

\(^{22}\) Solution 1, labeled as 20% D-PBS (Dulbecco's Phosphate Buffered Saline) contains 4 ml. D-PBS + 1 ml. maternal serum. Solution 2, labeled as 1.5 M PD (propanediol) contains 8 ml. D-PBS + 2 ml. maternal serum + 1.25 ml PD. Solution 3, labeled as 0.1 M sucrose + PD, contains 5 ml. 1-5 M PD (solution 2) + 0.171 g. sucrose.
Prior to loading, the biologist, using a razor blade, makes a diamond shaped window in each of the goblets to be used. This window is for seeding. The goblet is fitted into the cane, which is lowered into the freezer. The cell freezer is manually activated to begin the cool down process. When the cell freezer is ready for loading the straws, it beeps. Then the straws are placed inside the goblets. Each straw is positioned so that the embryos gravitate away from the site of forceps' contact during seeding.

The cell freezer automatically decreases from room temperature to -7°C at -2°C per minute. This temperature is then maintained for five minutes, during which period, seeding is performed. The samples are then further cooled at -0.3°C per minute until -40°C temperature is reached. Freezing is then held at this temperature for one minute, then further cooling continues at -50°C per minute until -140°C is reached. At this point the biologist removes the canes with forceps and plunges them into the large liquid nitrogen tanks on the floor, into which they are placed in the rack, which is then lowered into the tank and the lid replaced. Every so often the biologists fill up the big tank with liquid nitrogen from a smaller tank. This is performed by a method reminiscent of science fiction movies, whereby the liquid nitrogen is transferred through a makeshift paper funnel, enveloped in clouds of nitrogen steam and poured into the tank.

(ii) More than Enough: Freezing Choices

In the early years of IVF, before ovulation induction and the retrieval of multiple ova became commonplace, there were no excess pre-embryos available for freezing.

23 The seeding procedure involves the forming of ice crystals on the straw. A thermal flask is filled with some liquid nitrogen and long forceps are plunged into the flask to cool. Then during the five minute holding period, each cane is lifted one at a time from the freezer. The cold forceps are brought into contact with each straw and held for a few seconds. If ice crystals do not form, the seeding procedure is repeated.
During the 1980s, three developments occurred to pave the way for freezing of human embryos. Firstly, IVF as a therapeutic modality became more enticing to potential participants. This was due to the introduction in 1987 of routine use of the minimally invasive vaginal ultrasound-guided retrieval method. This replaced the surgically invasive, more complicated and less acceptable method of ovum retrieval by laparoscopy. Secondly, physicians routinely prepared their patients for the IVF process with increasingly sophisticated ovulation induction protocols. The rationale was to enhance the chances of greater ova production in the ovaries and better quality ova. More oocytes facilitated a greater number being retrieved and fertilized, over and above what a couple would need for one replacement cycle. Thirdly, advances in the animal sciences and bovine industry showed that not only could embryos be successfully frozen, but quality control of embryos could be enhanced. Although of tangential interest for human IVF at that time, immunity from diseases in some parts of the world, transportation and international marketing of embryos had improved dramatically the cattle industry in Canada, which has become the world leader in the industry.  

Overtime the IVF programme has instituted several changes to the drug protocols it had been using to stimulate oocyte production. In 1982, only pure hMG (Pergonal) was used, while by 1987, both clomiphene citrate and Pergonal were being administered. In 1988, GnRH analogs (see glossary) were introduced for a select group of patients, who either tended to ovulate early or had a poor response to ovarian stimulation. Use of analogs had became standard practice to induce ovulation in the United States IVF clinics,

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24 I am indebted to Dr. Rajamahendran, professor in the Faculty of Animal Sciences at the University of British Columbia, for his assistance in explaining both the research and industrial applications of bovine ovum retrieval, in vivo embryo flushing and embryo freezing and transportation. I appreciated his staff allowing me to observe the procedures. His own studies on cloning embryos were also of assistance.
with improved "success" rates. Therefore as of April 1994, despite some internal
dissension among the endocrinologists, GnRH analogs are now routinely used in the
programme. 25

In late 1989, the University of British Columbia IVF programme started to freeze
pre-embryos, in order to deal with the supernumerary pre-embryos. Cryopreservation
when linked with superovulation, solved the problem of what to do with the excess
embryos created from retrieval and fertilization of multiples ova. Since 1989 the number
of embryos in the freezer has increased to the point where on July 7th 1994, there were
807 embryos in the freezer. As in other centres, little attention has been paid to the
consequences of stockpiles of unneeded pre-embryos or if a clinic decided to close its
operation.

Table 3. Number of Embryos Remaining in the Freezer Tanks
per Year between 1989-1994

<table>
<thead>
<tr>
<th>Year</th>
<th>Embryos</th>
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<tbody>
<tr>
<td>1989</td>
<td>69</td>
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<tr>
<td>1990</td>
<td>86</td>
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<td>1991</td>
<td>161</td>
</tr>
<tr>
<td>1992</td>
<td>293</td>
</tr>
<tr>
<td>1993</td>
<td>185</td>
</tr>
<tr>
<td>1994</td>
<td>106</td>
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Although success rates with frozen embryos are poor, about eight percent clinical
pregnancy rate per embryo transfer, the procedure is now offered routinely as one of three
options of IVF treatments. Despite the poor odds of success, the majority of IVF
participants choose freezing. For example, in the last six months of 1993, seventy-five

25 Although it is too early to predict, early results suggest that this may improve not only
the likelihood of successful retrievals, but also better fertilization rates.

133
percent of couples elected to have their embryos frozen, although in reality only twenty-five percent had embryos available for freezing.

The number of supernumerary pre-embryos possess important long-term personal effort and legal issues for both the couples and the laboratory. Both partners must choose and consent to one of the three options concerning disposition of surplus embryos, which is explained in the general IVF Consent Form. The first option, (freezing) permits the retrieval and insemination of as many oocytes as possible and the replacement of three or four pre-embryos\(^\text{26}\) in that retrieval cycle, while freezing the remainder for future replacement in a later cycle. With the second option (selection), couples reject freezing of pre-embryos, but agree to retrieval of oocytes from all accessible ovarian follicles, followed by insemination. Then the best three and at most four pre-embryos are replaced in that retrieval cycle and the remainder are either technically fixed on slides for research purposes or discarded. The third option allows couples concerned by moral aspects to reject both freezing and selection of pre-embryos, because they may involve possible destruction of extra pre-embryos. In this instance, a maximum of six mature oocytes are retrieved and inseminated and in the unlikely case that all six fertilize, they will all be replaced. With this procedure there is a risk as high as 30% of multiple pregnancy. If that risk is unacceptable to the participants, then the number of oocytes inseminated may be reduced to four. For some patients the dilemma of wasting oocytes, which they have consented to not be fertilized, may also be a problem. All the participants are also made

\(^{26}\) Transferring more than four embryos carries a significant risk of multiple pregnancy. The Voluntary Licensing Authority in the United Kingdom and the IVF Special Interest Group in North America recommends that a maximum of three, and under special circumstances four embryos be replaced in one cycle. As of January 1995, the University of British Columbia programme changed its policy to transfer no more than three preembryos in order to minimize risks of multiple pregnancies.
aware of the further option of selected termination or reduction, a technique whereby certain post-implantation embryos are eliminated by one of a number of surgical techniques (IVF Consent Form revised October 1992).

(iii) It's Just a Matter of Time

Unintentionally, the cryopreservation procedure had created an unforeseen problem as to what should be done with all the unneeded pre-embryos, which could not be frozen indefinitely. It has became standard procedure in the programme to store pre-embryos for only five years. After this time, with the permission of the contracting couple, they will either be defrosted and discarded or used for research purposes. The time is shortly approaching when the five year limit will be reached and when a decision will have to be made about those pre-embryos that have been in the freezer for five years.

Evidence from Australia and New Zealand, where almost 10,000 pre-embryos were stored by the end of 1990, have demonstrated some of the problems occurring with large banks of frozen pre-embryos. In both countries legal inhibitions had deterred both infertile couples from "adopting" a pre-embryo for implanting and donors from donating their surplus pre-embryos. The latter would remain legally responsible for their pre-embryos, even if they donate them to another couple. Likewise the recipient couple would not be the legal parents of children produced from the donated embryos" (Medical Post 1992:21).

Only one case of selective reduction has been documented by the UBC IVF clinic, which occurred in the late 1980s. Currently, a participant has elected to use this techniques to remove one of the three embryos/fetuses that have implanted, because she does not want to have triplets.

In most Australian states, the father, usually the genetic one, is the legal parent. Yet the woman, who carries the embryo of another couple, has no legal right to the resultant child.
Recently, Dr. Armstrong, scientific founder of the IVF programme at University Hospital, London, Ontario and professor of obstetrics and gynecology at University of Western Ontario and University of Adelaide, warned that Canadians should take steps to avoid possible legal problems. He stated in an editorial article that

Couples should sign a legal document when they begin an IVF programme to choose between destroying, saving or donating the embryos to another couple or for research of early fetal development. That's when the gene expressions are formed, which can be helpful in researching the cause of cancer, for one (quoted in Medical Post 1992:21).

The IVF nursing co-ordinator, who helped revise the University of British Columbia IVF cryopreservation consent form, while acknowledging that "the consent form is subject to judicial interpretation and any couple could take it to court", felt relatively secure that patients' interests were being observed. However, in certain circumstances patients' frozen pre-embryos could revert to the programme's control, with the potential for litigation over ownership of pre-embryos, which has occurred with cases in the United States. (discussed in the next chapter).

I am used to our scenario here, where the couple have the control, up to a point, I guess, because there is a time limit imposed, the five year limit. So if the embryos are not replaced within that five year time, the control reverts to the clinic, who would then dispose of them. If the couple cannot be reached, there are certain conditions imposed in the consent form and one is that if couples have embryos in the freezer, that couples must maintain contact with the programme, at least once a year, so that we know of their intent. That is to avoid those situations where we loose track of them.

She goes on to explain the expanded control of the IVF programme, in the situation of a marital breakdown:

A few times people have written to say that they want their embryos disposed of because the marriage has dissolved. That is a stipulation in the consent form also, that if the relationship dissolves the programme gains
control of the embryos. It would then dispose of them. There is another that couples are given a choice that in such an event that the program gains control, that they have another choice of offering the embryos either for donation or to dispose of them.

She noted later, however, that the programme does not as yet have either a pre-embryo or ova donation programme. However, they do have stored the pre-embryos of a couple, who did not want their pre-embryos frozen for themselves, but neither did they wish them to be destroyed. They chose to have their surplus pre-embryos frozen for donation at a later time. In the meantime, they had a baby and the couple have not contacted the clinic again. The programme has received ethical clearance from the University Ethical Review Committee, therefore it is probable that donation of pre-embryos may become an option in the future.

The consent form also stipulates that if there is a death of one of the partners, who have pre-embryos frozen, that the clinic gains control over those pre-embryos. The moral right of a clinic to make these kinds of stipulations has apparently caused concern for some patients, because they feel the remaining partner may wish to use those embryos in another relationship later or if the husband dies, perhaps the woman would want to gestate her posthumous husbands embryos at some future time. Shore (1992) discusses some of the gendered inequities surrounding posthumous use of pre-embryos in relation to The Warnock Commission in Britain.

The IVF programme had decided that the consent form would remain in effect for five years after the validation, but as the co-ordinator noted "it is too early to say how the five year time frame will work, because we haven't reached five years yet, since we started at the end of 1989, and they've probably all been replaced. We probably have a
few left from ninety".\textsuperscript{29} Although some effort is made to keep track of patients with embryos in the freezer, one IVF staff member chaffed "some people totally forget they have frozen embryos".

V IDENTIFYING RISKS AND ACKNOWLEDGING THE COMPLICATIONS

In the absence of national and international legislation on assisted procreation, each IVF programme is responsible for developing its own individual treatment policies within ethical guidelines. While university operated IVF research programmes are more stringently monitored by ethics committees, private programmes, driven by both consumer and entrepreneurial interests are less scrutinized. However, in the wider domain of international concerns about the quality of practice involving an increasingly complex array of infertility treatments, recent events are shaking the medical and pharmaceutical communities out of their complacency about ethical practices, causing them to close ranks.

The catalyst for this strategy has been the publication of a longterm, thirty year epidemiological study in the United States into the relationship between the effects of fertility drugs and ovarian cancer. The Whittemore \textit{et al} (1992) study\textsuperscript{30} proposed that nulligravid (never having borne children) women, who used fertility drugs were at increased risk of 2:1 to develop ovarian cancer, in comparison with fertile women. The

\textsuperscript{29} A check on these number showed that a few frozen embryos still remain from 1989.

\textsuperscript{30} The Whittemore study was based on an analysis of twelve case-control studies of ovarian cancer between 1956-1986. It was conducted by the Collaborative Ovarian Cancer Group in the United States, which confirmed findings from many other studies, which concluded that oral contraceptives, pregnancy and lactation were substantial protectants against ovarian cancer.
authors supported their contention that treatment with fertility drugs were implicated, rather than some underlying ovarian disorder, based on their evidence that there was a higher risk associated with a diagnosis of infertility after 1970, the time at which fertility drugs were introduced to the United States, compared to those diagnosed between 1961-1970 (Whittemore et al 1992; 136:1184-1203).

These findings provoked an immediate and concerted response from pharmaceutical manufacturers of gonadotrophins, followed by the American Fertility Society (AFS), National Cancer Institute and the United States Federal Drug Advisory, all of which found the study flawed. Experts immediately tried to reassure patients, pointing to various defects in the study. Arguments were made to refute evidence of a claim of causal effect in 1993, at a special session on 'fertility drugs' and ovarian cancer, to a standing room only crowd of delegates, at the annual meeting in Greece of The European Society of Human Reproductive Endocrinologists and the International Fertility Society, The American Fertility Society criticized the small sub-division of the study, when balanced against the estimated 28-30% of all infertile women given ovulation inducing drugs. The European Society of Human Reproductive Endocrinologists suggested that the increased risk of ovarian cancer might be related to the underlying defect rather than the therapy used to treat the disorder. It maintained that the risk was less than one in five thousand, and that "this limited risk should be balanced against the benefit of achieving birth" (Reported in IVF News 1993:2, a newsletter published by Organon Canada Ltd.).

The delegates argued that a few anecdotal reports in journals concerning borderline ovarian cancers associated with ovarian hyperstimulation syndrome would require investigation as to whether there is a true causal relationship or is mere coincidence. The Federal Drug Advisory estimates that since fertility drugs were licensed in the United States, chlomiphene citrate and hMG in the late 1960s, there have been more
than twelve million cycles prescribed and yet no increase in cases of ovarian cancer commensurate with the rise in prescription. Likewise, the British National Institutes of Health's surveillance of 3100 women, who had undergone IVF, recorded no cases of ovarian cancer (ibid). The general consensus was that doctors should advice their patients of the risks. A collaborative study, reported by Lunenfeld, who is credited with the development of human menopausal gonadotrophin, found no increase in cancer risk from hMG/hCG. He has been quoted as suggesting that the risks may be multifactorial:

I think we have to tell patients about the Whittemore study, but also explain its weaknesses. We must also tell them that nulliparity, infertility and polycystic ovarian disease have been consistently reported risk factors for carcinoma of the breast and endometrium. Hereditary factors, environmental factors - such as high galactose consumption - have all been linked to an increase in ovarian cancer risk (Lunenfeld quoted in Infertility News 1993:2).

The strategy of presenting a unified front has not been one followed by all infertility specialists in the international community. Schenker and Ezra (1994) in an extensive review of the potential complications of assisted procreative techniques have acknowledged the iatrogenic effects of IVF therapy and the importance of control of complications before and during assisted pregnancies. While the authors agree that assisted reproductive treatments should be allowed as a first choice, it should only be so in well controlled circumstances and preceded by thorough investigation of infertility

32 These Israeli authors cover complications associated with ovulation induction, notably associated with ovarian hyperstimulation syndrome (OHSS) and the potential to develop genital cancers; problems associated with extra corporeal methods that are used for IVF-ET, GIFT and ZIFT, in which problems associated with laparoscopy, anesthesia, oocyte retrieval and laboratory procedures are identified; and complications of assisted reproductive pregnancies, such as spontaneous abortions, ectopic and heterotopic pregnancies, congenital malformations and multifetal pregnancies and the course and delivery of such assisted reproductive pregnancies (Schenker and Ezra 1994:411).
problems. They conclude with the caveat that while "{M}any of us consider cost as an important factor of assisted reproductive practice. We believe the main problem is not cost but the complications of this mode of treatment, which may result in permanent damage or even death to patients who otherwise are healthy" (Schenker and Ezra 1994:411-422).

VI CONCLUSION

In less than twenty years the "science of the impossible" has become the "ART of the possible". What appears to the untutored outsider as a world of science fiction made reality, for the IVF staff creating extra-uterine life is a routine daily experience. The regimented protocols embody specific interpretations about what constitutes clinical expertise and rational practice. The latter are envisaged as neither arbitrary nor experimental. Yet Gordon's (1988) analysis of the arbitrariness of medicine points out that there is a commonly held belief that the scientific endeavour is to develop increasing and better clinical science for medical practice, which assists the art of making medical judgment "more rational, explicit, quantitative and formal" (1988:258). So applying scientific principles to patient therapy with the goal of maximizing success rates is the unitary focus of IVF staff. In this way they see themselves as providing a clinical services, rather than doing biomedical science. The focus on the IVF results is that number count - more fertilizations mean more pre-embryos, which imply more chances at implantations, which ultimately translate into more "take home babies". The attention is deflected away from concern with investigation of the biological processes of infertility and conception, which distinguishes the epidemiological and clinical research.
The ethos of the University of British Columbia IVF programme embodies a generally cautious, conventional and conservative approach to IVF patient treatment, which it views as morally correct. The staff are well aware of the experimental nature of some of the more controversial and risky applications in common use in other centres and the new categories of clientele they serve, who were previously barred from treatment. However, while many staff do not resist morally some of these treatment options, neither do they envisage a ready acceptance of them in their programme. The nursing coordinator voiced the general satisfactory consensus with the ethical, conventional nature of the IVF programme in this way:

I feel really dedicated to it and I know that this programme is very conservative. When I go to these (international fertility) meetings, I really feel like the country cousin, as far as what we offer here to couples. But in many ways, it makes it a lot easier.

In contrast to the recently emerging international medical discourse about the potential iatrogenic effects of superovulatory drugs and other IVF applications, there was at the time of my ethnographic research a remarkable confidence in the drugs, which it was reasoned had surely been tested properly in animals trials before being marketed on humans. There was also a general lack of interest with the long-term consequences of unneeded pre-embryos. The ramifications of IVF were considered as beyond the purview of daily practice and as belonging in the remote political and regulatory realms of law and government to rule on in light of CRCNRT's recommendations.

The University of British Columbia IVF programme is not market-driven, although it has legitimate concerns about cost recovery. The production of supernumerary pre-embryos and their cryopreservation are justified as a provision of additional services to consenting patients and as methods for maximizing the chances of not only creating many pre-embryos, from which the best can be selected for transfer, but also as a cost-effective
mechanism for facilitating natural cycle transfers of frozen pre-embryos, despite the minimal success rates. It appeared to me that little thought has been given to the social consequences of donating and/or selling pre-embryos to third parties, nor to research projects involving pre-embryos as information bearing entities or for preimplantation diagnosis and genetic manipulation. These applications have little relevance in the practice of the simple model of IVF, which facilitates individual customer service.

Both the patient oriented staff in the clinics and the laboratory staff work towards the common goal of providing a much desired baby for the contracting couple. However, beyond the social organization of the IVF programme is a less obvious facet of the IVF process, which has little to do with human interaction. Despite the highly technical nature of the IVF processes, the creation of pre-embryos is a combination of technology trying to replicate nature as well as nature-in-action. The issue at hand is yet another variation of the old nature/culture controversy. No matter how culture - in this case the medico-technical culture of IVF - manipulates social environments, the facts of biology, the genetic blueprints and genetically programmed responses of the human organism dictate the final outcome of the technology. Scientists as yet do not know why ovaries of female fetuses store more oocytes than could ever be needed in a reproductive lifetime. But they do know how to technologically override nature to suppress, mimic and create an ovarian environment to produce many, not just one mature oocyte per month, ready for insemination. At present, scientists know little about exactly how nature triggers the action of syngamy and cleavage of the developing pre-embryo. This is a miracle, which occurs unaided by human intervention in the quiet of the laboratory, free of human observation. If fertilization does not occur, no triumphs of technology can intercede in the action. Likewise the technology of embryo transfer facilitates deposition in the uterus of the gestational woman, but it cannot control the subsequent implantation into the
receptive uterine wall. This remains at the discretion of natural factors, which are still poorly understood, as attempts at rectifying recurrent pregnancy loss in normally fertile women confirm.

In reality, IVF is still an experimental technology which attempts to replicate piecemeal every aspect of natural conception and so far has only solved some parts of the puzzle. Similarly, genetic engineering programmes are experimenting on pre-embryos as ready-made sources of genetic information. It is to the advantage of genetic engineers that IVF provides a limitless supply of otherwise surplus discarded embryonic material, which has been artificially created in a controlled and hermetically sterile laboratory environment.
CHAPTER 5

THE LEGAL DISCOURSE; THE CASE FOR THE PRE-EMBRYO

In Canada, assisted procreative technologies are developing swiftly in a largely unregulated legal vacuum. However, a number of committees and commissions have been mandated in the last two decades to provide a legal framework based on guiding principles rather than laws. Last in this long line is the Canadian Royal Commission on New Reproductive Technologies (hereinafter referred to as CRCNRT), whose recommendations were bypassed by the federal government in July 1995. Instead it presented an interim measure, calling for a moratorium against nine technologies, and indicated that legislative and regulatory restriction would eventually follow (Bryden 1995:A5). This fell far short of the anticipated outlawing of specific technologies and the immediate formation of a National Regulatory Commission on NRTs, which would strictly regulate all the technologies.

There have not been any legal cases brought before the Canadian courts as yet about the status of pre-embryos, however, a number of interesting cases have occurred in other jurisdictions, which have relevance for Canadian cultural values. These court battles demonstrate some of the potential problems that may arise when pre-embryos are orphaned, require custody, or their ownership is challenged. They represent the challenge to a construction of the pre-embryo as a new social and legal category which is neither property, nor person; and how to consider its alienations and transfers as gift or commodity. In terms of the matrix of social relations surrounding the pre-embryo, it
poses complex issues of who has vested interests in and rights to its versatile disposition.
The present state of legal understanding demonstrates the confusion surrounding fertility
clinic responsibilities and enforceable state controls.

I  CANADIAN VALUES AND GUIDING LEGAL PRINCIPLES

One of the major controversies surrounding new reproductive technologies, in
general, is whether or not and how much they should be subject to legal regulation.
Usually, legal aspects relating to regulation of the use of NRTs in Canada are analyzed
within a discourse of ethics, which examines those values and objectives that would be
furthered through such regulation. The law usually lags behind the social dimensions of
biomedical issues. Political scientist, Blank notes this in relation to NRTs:

The cultural and institutional frameworks of society largely define the
boundaries within which technological development proceeds. Prevailing
values although open to pressure for change by technology, are resistant to
major and rapid alterations. Established institutions, too, resist change and
attempt to minimize alterations. Although not always capable of
maintaining stability, they moderate changes. Societal priorities therefore
always reflect existing social values and structures. (Blank 1984:4)

The present Canadian constitutional and legal regime provides a useful framework
within which regulation of NRTs might be carried out. In the opinion of the Canadian Bar
Association (hereafter referred to as CBA), legal principles and accepted social policy,

1 CRCNRT also used an eight point ethic of care framework for its medical evidence
based report. These ethical principles included individual autonomy, equality, respect for
human life and dignity, protection of the vulnerable, non-commercialization of
reproduction, appropriate use of resources, accountability, and balancing of individual and
collective interests (CRCNRT 1993:52-58).
which have been developed from existing legislation and jurisprudence, have served to
guide the processual attempts in Canada to promote, protect and preserve entrenched
socio-legal values. However, it cautions that the proliferation of "the use of reproductive
technologies should be subject to review when fundamental social and legal, as opposed to
medical issues, arise" (CBA 1990:14). In its submission in November 1990 to the
CRCNRT hearings in Vancouver, the general legal issues that it broadly identified as the
subject matter for regulation at that time were

the status of the child, parentage and birth registration, artificial
reproductive technologies, medical records, agreements for the gestation
and delivery of a child and the surrender of custody ("surrogacy"), research
and experimentation on human genetic material, and judicial intervention in
gestation and childbirth (CBA 1990:4).

CBA argued in favour of a sociological view of the individual as opposed to
biological reductionism because "{T}he fact of biological reproduction, particularly the
use of non-natural means of conception, should not be separated from the social aspects of
childbirth, child rearing, and family relationships" (ibid:15). Thus legal concerns about
NRTs continue to focus on socially accepted ideas about the salience of "the family",
while still allowing for new forms of family to be incorporated under its ample penumbra. 2

Therefore the impetus has been to develop NRTs within a framework of
contemporary societal values so as to diminish conflicts between those people most
directly affected by them, such as parents, children and reproductive caregivers, as well as
the broader implications for society in general. Furthermore, since it is women who bear

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2 This strategy is currently being implemented with legal recognition of the desire to be
considered family and share spousal benefits in the case of long-term same sex
relationships. As yet these principles have not been applied to NRTs. An impending
challenge in British Columbia reported in the Vancouver Sun exists over the controversial
issues of access by lesbians to artificial insemination by donor (AID) (Wigod 1993a:A1).
Another case has been reported in England (Lightfoot 1994:1).
the greater risk of such technologies, it is their interests and opinions, in particular, which should be recognized.

Historically, legal principles have evolved through instruments such as the Canadian Charter of Rights and Freedoms, the Canada Health Act and provincial and territorial legislation. Together they have embraced a consensus which asserts legal principles, which preserve values of individual autonomy and human dignity. The Canadian Bar Association (1990) was of the opinion that these principles should prevail, unless good reason for change was found. These principles have been applied to such aspects of NRTs as informed consent, access to technologies, rights to knowledge about affiliation, presumption of paternity provisions, regulation over areas such as adoption, child custody, maintenance and human tissue gifts.

II PERSON OR PROPERTY: PRECEDENT SETTING CASES IN THE UNITED STATES

In contrast to the non-litigious Canadian climate of new reproductive technologies, several cases have occurred in the United States, which are helpful in developing an understanding about how the pre-embryo may be socially constructed as potential person or as potential property of some party with vested interest. While decisions were made in

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3 The Canadian Charter of Rights and Freedoms is contained in Part 1 of The Constitution Act, 1982, which is Schedule B of The Canada Act 1982 (United Kingdom) 1982 c. 11. Rebecca Cook's research paper published in advance of the CRCNRT report notes that Canada as a founding member of the United Nations and a participant in the development of international human rights covenants has used the language of these international instruments to shape the Charter. In effect the Charter acts as a bridge between its international obligations and its domestic laws (Cook 1991:1).
each case eventually, the convoluted court processes demonstrated the uncertainties that arose about how to categorize the pre-embryo.

(i) Reos

In the early days of IVF, a wealthy American couple were killed in a plane crash in Brazil, in June 1984. The Reos had been attending an IVF clinic in Melbourne and had left two frozen pre-embryos there. Problems about the limits of decision-making about reproductive issues and the rights of the unborn arose from this event. While the Australian Walder Commission, which had been appointed to consider such issues, suggested that the "orphaned" Reos pre-embryos be thawed but not implanted, the Provincial government of Victoria later voted that they should be implanted into one of the many volunteers (Gallagher 1987:197). This did not happen.

Inheritance and succession are issues that all societies attempt to regulate to ensure social stability. The Reos case is a good example of the complications that can ensue when inheritance patterns become muddied by creating pre-embryos, particularly in a transnational context. Legal confusion occurred because the Reos couple did not leave a will. Questions arose as to whether the frozen pre-embryos should be considered as persons and therefore have rights to the large Reos inheritance. If a gestational surrogate was implanted with the pre-embryos, could she make a subsequent claim to the estate on behalf of the child and herself? Other heirs also existed, who also had a claim to the estate. The legislation proved to be so complicated and difficult to interpret that no action was taken until 1987, when under relevant California law, the court decided that the

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4 The Report of the Law Reform Commission of Canada (1992) warned about the complexities of "procreative tourism", which can occur when NRTs service provision are utilized and/or gametes/preembryos are produced, stored and /or transferred across national boundaries.
"orphanned" pre-embryos had no rights to the estate and Mrs. Reos' mother was found to be the sole inheritor of the estate (Kimbrell 1993:92).

(ii) **Davis v. Davis, Kass v Kass and Jones v. York**

A number of cases have occurred in the U.S., which demonstrate further difficulties of decision-making surrounding the pre-embryo. Each case challenged the fundamental question about the nature of the pre-embryo as property. Two cases involved a quarrel between the biological parents of frozen embryos as to who had the ultimate control over their destiny. The other case involved a dispute between a couple and an IVF clinic, where their frozen embryos were stored.

"In no case, however, has the status of the embryo been presented more clearly and confused more completely than in the trial court's opinion in *Davis v Davis* (1989)" (Clayton 1991:102) In 1988, Mary Sue and Junior Lewis Davis, after six unsuccessful attempts with IVF, decided to try the new freezing programme offered by the Fertility Centre of East Tennessee. In this attempt, nine pre-embryos were retrieved and two were unsuccessfully implanted. The remaining seven pre-embryos were frozen; but before the Davises could use the pre-embryos, Mr. Davis filed for divorce. A bitter and protracted custody battle for the frozen pre-embryos ensued over the next four years.

It was the first United States case to decide on custody, ownership and the legal status of frozen pre-embryos. The trial court in the first instance ruled that life begins at conception and incorrectly held that pre-embryos were morally equivalent to children and that it was in their best interests that they should be transferred back into Mary Sue Davis. In awarding custody of the pre-embryos to Mary Sue, Judge Dale Young concluded that the pre-embryos were "human beings existing as embryos" (quoted in Raymond 1993:61). However, Raymond points out that the judge reached the right conclusion for the wrong
reason, because using this logic, every pre-embryo created through IVF would have to be implanted in the egg donor, who would serve in Margaret Atwood's (1985) term like a "uterine hostess". In Mary Sue's case then, she could be liable, although highly unlikely, to bear seven children from the seven available pre-embryos. Accepting the challenge that women's efforts to control their procreation and pregnancy behaviour would be jeopardized by this ruling, the Tennessee Appeals Court in 1990 overturned the ruling. The appellate court looked at the procreative liberties of both parents, and stated that the husband had a "constitutional right not to beget a child where no pregnancy had taken place" (Davis v Davis, No. 180 Tenn. Ct. App., Sept. 13 1990:4). It was reasoned that Mr. Davis thereby had the right not to procreate, even though he had consented to create the pre-embryos in the first place with the intention of becoming a parent. Champion of "procreative liberties" lawyer and expert witness, John Robertson, argued in this case, that it would be a greater burden for Junior Davis to be encumbered with unwanted fatherhood, than for his ex-wife to undergo yet more invasive IVF cycles. Raymond makes a strong case that these allegedly equal rights to parenthood decisions are false equivalents.

The Supreme Court of Tennessee in June 1992, in criticizing the appeals court for viewing the pre-embryos as property, took the middle ground. "We conclude that pre-

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5 An interesting reversal concerning a potential father's procreative liberty occurred when a former boyfriend, Jean Guy Tremblay, of a Quebec woman Chantal Daigle, argued that his self-interest in becoming a father should take precedence over Daigle's right to have a therapeutic abortion. In the emergency session in August 1989, the Canadian Supreme Court's unanimous decision quashed the injunction a Quebec court had granted Tremblay to prevent Daigle having an abortion. To ensure that no woman ever had to endure a similar ordeal to Daigle's, the court said "We have been unable to find a single decision in Quebec or elsewhere which would support the allegations of "father's rights" necessary to support this injunction...There is nothing in the Civil Code or in any legislation in Quebec, which could be used to support the argument. This lack of legal basis is fatal to the argument about "father's rights" (Makin 1989:A5).
embryos are not, strictly speaking either persons or property, but occupy an interim category that entitles them to special respect because of their potential for human life" (Davis v. Davis 1992:21 cited in Kimbrell 1993:97). The resolution in which the husband was awarded control of the frozen embryos resulted in the final destruction of the pre-embryos at Junior's request. Mary Sue and Junior would have to start over again with new partners using IVF if they wanted to have children. There was disappointment that the case failed to answer the question of whether to consider the pre-embryo as person or property (Crockin 1993:10). If they are property, then who owns them - clinics, donating parents or recipient parents?

In a current case in Nassau County, Kass v. Kass (1995), the New York Supreme Court reached a different conclusion from Davis v. Davis. In Kass, the judge held that a woman had the right to control the future outcome of the pre-embryos she created with her husband. When she petitioned for divorce, the only contested issue in the divorce was the possession of the five frozen embryos, which she wished to gestate and her husband wished to be donated for research (Jaeger 1995:16). So in this case, the wife was entrusted with the right to control their destiny, thereby rejecting the rights of the divorcing husband on the grounds that a man, whether married or not, cannot control the conception nor continuance of a pregnancy. The judgment, in noting that a woman has the sole right to use contraceptives and to terminate a pregnancy, stated "The fact is that in vivo husband's rights and control over the procreative process ends with ejaculation...It matters little whether the ovum/sperm union takes place in the private darkness of a fallopian tube or the public glare of a petri dish" (ibid). The court's argument in this case is consistent with feminist beliefs that women should have ultimate control over their reproductive decisions.
Unlike the middle position decided in *Davis*, that embryos are neither persons nor property, but nevertheless deserving of special respect, another United States' case, filed in Virginia, *York v Jones*, decided in 1989, that pre-embryos should be treated as commodities. This case was cited as an important precedent by the appeals court that decided *Davis*. The dispute concerned a conflict between a couple and a clinic over the ownership and control of the couple's frozen pre-embryos stored at the prestigious Jones Institute in Norfolk, Virginia. The Institute had refused to allow Risa and Stephen York, who had contracted the clinic to freeze and store their pre-embryos, to transfer them to a California depository in Good Samaritan Hospital, Los Angeles. There Risa York would be implanted with those pre-embryos under the supervision of Dr. Richard Marrs, who challenged his competitors in Norfolk with the taunt, "When a physician starts owning embryos and making decisions for his patients, there'll be no stopping anyone who has anything to do with pregnancy from getting involved" (quoted in Raymond 1993:61). The federal court of Virginia ruled that the frozen pre-embryos, which they referred to as "pre-zygotes" were the "property" of the couple and the Jones clinic only held those pre-embryos in bailment (trust) for the couple pending their later use. Neither the welfare of the pre-embryos during their transportation across the continent, nor the interests of the clinic in ensuring their secure preservation were considered to have any legal relevance (Kimbrell 1993:97). Essentially they were considered the property of the gamete producers to do with as they chose.

These cases represent early attempts in the United States to define the legal status of pre-embryos, and suggest that they may well join sperm and ova as full-fledged commodities. Lawyer and policy director of the Foundation on Economic Trends in Washington, D.C., Andrew Kimbrell, has argued the analogy between commodifying fetal parts and pre-embryos. "(W)hile Congress has forbidden the sale of fetal parts, it is
unlikely that they will do the same for embryos, due in part to the view that so-called pre-embryos or pre-zygotes are merely "masses of cells" (Kimbrell 1988:98). However, he envisages a time in the not distant future when "as reprotoch advances, we will soon see our first headlines announcing the first sale of an embryo and perhaps even the first patenting of a human embryo for research use" (ibid).

(iii) Oocyte and Embryo Donation

As the case law and legislation develops, the destiny of gametes and embryos will probably become subject to tighter legal controls as circulating commodities. United States legislation has recently been drafted concerning ova and embryo donation, which point to a growing acceptance of and market in both gametes and fertilized ova. This suggests an elision of the two entities as similar in nature for legal definition. To date the focus has been placed on using family law to protect the resultant progeny of such rudimentary tissues, rather than a concern for research uses or the practice of marketing human tissue. For as long as the social and legal purview is on the consequences for family of assisted conceptions, there will be little concern about the pre-embryo as a reified entity, which can be used to assist important medical research.

Recently, two American states, Florida and Texas, have drafted and lobbied for egg and embryo donation. Oklahoma passed an egg donation law in 1990. Both states have given legal recognition to children born of egg and pre-embryo donation. In both test cases the recipient gestational woman and her husband are considered the legitimate parents of the child, in the same way as donor insemination (Crockin 1993:10). In these cases the best interest of the child is the pre-eminent consideration. Even in cases where parental reality is more complicated than the one mother, one father biological model, courts have favored functional parent-child bonds, such as the Thomas S. v Robin Y., a
New York Family Court case, where a lesbian relationship overrode the request for unsupervised visitation with the child's biological father (ibid:11).

(iv) Fetal Tissue Commerce and Research

Although the sale of fetal parts in the United States has been prohibited, this situation may be changing as a result of federal permission being granted to carry out a clinical trial to transplant fetal tissue for treatment of Parkinson's disease. A $4.5 million research project in the field of neural fetal tissue transplantation for treatment of forty Parkinson's disease patients has recently been authorized. The American research group had already performed the first transplant in 1988, despite a national moratorium on this type of research (Weber 1994:46). Likewise, in 1988, Canadian medical researchers at Dalhousie University applied for ethical review to perform the first Canadian transplant of neural fetal tissue for treatment of Parkinson's disease. However, a similar ban as in the United States delayed this research trial until 1992 (ibid). Fetal transplants had already been tried in Mexico, the United Kingdom and Sweden.

In Canada, considerable ethical debate has been raised by this innovation. One concern is that perhaps pre-embryos in the future could be gestated in vitro beyond the present seventeen day restriction to a point where differentiated tissues would be sufficiently advanced for use in research. If a culture medium can be perfected, it may even become possible to grow pre-embryos for the explicit purpose of providing tissue and organs for human transplantation purposes. The benefit here would be that anonymity of donor could be respected if pre-embryos came from a reserve pre-embryo bank. Abby Ann Lynch, director of the Canadian Westminster Institute for Ethics, in calling for strict criteria, has stated: "I think I would be concerned about the source (of the fetuses). You must absolutely guarantee that you are not growing embryos in vitro for the purpose of
being able to take its brain for transplant" (Povenko 1988:A5 and A8). In a recent study surveying Canadian doctors' attitudes towards transplantation of electively aborted human fetal tissue, although they were not asked about use of pre-embryonic tissue, they did consider fetal tissue donation often to be analogous with organ donation (Mullen, Williams and Lowy 1994).

III CREATING A CANADIAN LEGAL FRAMEWORK FOR REGULATING PRE-EMBRYOS

Unlike the free enterprise, private health care system in the United States, as yet there have not been any controversial law suits in Canada relating to pre-embryos. In this sense, the Canadian legal system has had more time to consider how pre-embryos, created through IVF, should be socially and legally classified, although the outcome still remains unclear. The Canadian process has evolved through a series of committees and commissions, which attend to the problems that have arisen in other jurisdictions.

Different types of law can be brought to bear in discussing regulation of the human pre-embryo. These include property law, laws pertaining to persons, family law, patent law and contract law. There are also many forms of regulation and levels of decision-making about health related issues, which have relevance for NRTs in Canada. Varying degrees of control may be exerted by the different levels of government, by professional medical associations, hospital boards and health care professionals.

(i) The Context of Canadian Health Regulation

Constitutionally, health issues cannot be controlled by a single level of government. The federal government retains the ability to regulate, which is based both
on its interest in national health and welfare and within its national jurisdiction to enforce the criminal law and control budgetary allocation of scarce health funds.

The Canada Health Act behaves as the cornerstone of the health care system and its framework is intended to provide a broad social and health security net for all Canadians. The system is based on five criteria, comprehensiveness, accessibility, universality, portability and public administration. Unfortunately, despite the ideals of the Act, medical services are not implemented in a uniform manner across Canada, but according to provincial discretion. Provincial governments are responsible for regulating those matters related to health, such as control over hospitals and over health care workers, hospital administrators and professional medical associations within their jurisdictions. Provincial government funding of health is based on social and political rather than medical criteria. How this fits within the framework of the Canada Health Act or the Canadian Charter of Rights and Freedoms is as yet undefined.

The power of provincial governments to regulate health services has been idiosyncratic in defining what constitutes the practice of medicine. This has been demonstrated in two instances in the area of reproductive issues where certain reproductive technologies have been considered not "medically required". The Canadian Bar Association (CBA 1990) argued in their brief to the CRCNRT that "(T)he new

6 Comprehensiveness ensures a minimal level of insured health services, which are mandated at the national level and cannot be interfered with at the provincial level. Accessibility ensures reasonable access and uniform availability unimpeded by financial, geographic or regulatory barriers. Universality ensures that all Canadians have access to reasonable levels of health services, regardless of who they are and where they live or their financial status. For a comprehensive examination of the Canada Health Act, see Sheila Martin (1989).

7 In Canada, there is no uniform definition of the practice of medicine. Therefore provinces interpret differentially the Medical Practitioners Act of 1979, which broadly defines the composition of medical practices and the Medical Act of 1989, which specifies the actual service and the profession of the person performing the service (CBA 1990:32).
artificial technologies constitute remedies and treatment for infertility, a human condition which may result from disease and which may be regarded as a defect. Application of these technologies therefore probably constitutes the practice of medicine in law" (CBA 1990:32).

In both the cases cited by CBA, women's reproductive autonomy has been compromised. In 1985, the Alberta government unilaterally de-insured surgical sterilizations, contraceptive counseling and the insertion of intra-uterine devices (IUDs), except in specific circumstances. Funding was based on social and political agendas, rather than medical necessity (CBA 1990:33). In British Columbia, although IVF services were not yet available in the province, they were automatically deemed as not "medically required" and therefore ineligible for insurance under the term of the Medical Services Act, R.S.B.C. 1979, c.255, s.1.

CBA further points out that "such legislative action cannot, however, be considered conclusive since it ignores the link between infertility and disease or defect and the invasiveness of the procedure" (CBA 1990:32). Technically IVF can only be performed by an appropriately licensed surgeon in an appropriately licensed facility. The socio-economic effect has been to make those services available only to those who can afford it, in flagrant contravention of the principles of the Canada Health Act.

(ii) Canadian Commissions and Committees for Regulating New Reproductive Technologies (NRTs)

The mainstream legal discourse about NRTs in Canada has developed during the 1980s from a plethora of influential commissions, reports and surveys. These preceded the piece de resistance, the recent report Proceed with Care, published in two volumes by the Canadian Royal Commission on New Reproductive Technologies (1993). In general,
these documents have reiterated the importance of national standardization and monitoring, national approval of research and accreditation and licensing of research and treatment facilities. This legal discourse has attempted to co-ordinate and compartmentalize thinking about an otherwise amorphous, uncoordinated series of reproductive practices, which are developing largely unchallenged and uncontested.

Beginning in the early 1980s, Canadian legal investigations have included the report of the Advisory Committee on the Storage and Utilization of Human Sperm to the Minister of National Health and Welfare, *Storage and Utilization of Human Sperm* (1981), the Ontario Law Reform Commission (hereinafter referred to as OLRC) *Report on Human Artificial Reproduction and Related Matters* in 1985; The Working Committee of the Quebec Department of Health and Social Services, *Rapport du comité du travail sur les nouvelles technologies de reproduction* in 1988. In the same year the Bar of Quebec published *Rapport du comité sur les nouvelles technologies de reproduction*. A year later, following the Quebec Department of Health and Social Service Report, a supervisory framework in Quebec for embryo research was proposed "that would require official approval for current projects and prohibit trade in embryos or the creation of human embryos solely for research" (CRCNRT 1993:657). However, to date no legislation in Quebec has been presented to date.

In 1987, the Medical Research Council of Canada in Ottawa published *Guidelines on Research Involving Human Subjects*, which upheld the fourteen to seventeen day limit on maintaining pre-embryos for "non-therapeutic" research in the *in vitro* state and recommended that embryo research only be conducted to improve knowledge and the treatment of infertility. It also reinforced the need for donor consent and for local ethics board approval for research on pre-embryos, and the unacceptability of transferring pre-embryos that had been subject to experiment, as well as limitations on certain kinds of
research, such as cloning. Two years later on the other side of the country, in British Columbia, in 1989, the Reproductive Task Force of the British Columbia Branch of the Canadian Bar Association released *Reproductive Technologies* in 1989.

Also in that year, the Law Reform Commission of Canada (hereafter referred to as LRCC), before it was disbanded, had published two working papers, *Crimes against the Fetus* 8 and *Biomedical Experimentation Involving Human Subjects*. It had been called in an attempt to advance the public debate and to complete its trilogy studies in the area of medical law and procreation. The conceptual nature of gametes and embryos is an issue with which Canadian legal scholars have also wrestled for nearly a decade. LRCC had been established to examine issues of particular concern such as "definition of the family; the filiation of children born as a result of medically assisted procreation, the commercialization of procreation, the human body and its products and substances; and the legal status of gametes and embryos" (LRCC 1992:1). It had been called in order to develop a consistent national social policy on NRTs, because the reports of the Ontario Law Reform Commission in 1985 and the Barreau du Quebec in 1988 had expressed diametrically opposed views on a number of fundamental aspects of the issue. The LRCC recognized that the ambiguity surrounding the status of the pre-embryo

gives rise to moral and social objections that have appeared with the creation and freezing of surplus embryos. What is at issue here is one's image of the embryo. Is it a thing, a person, a potential person, or something else?...We might ask ourselves in more general terms whether we wish to treat gametes and/or embryos differently from other parts of the body or alienable cells, or

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8 In Working Paper 58, *Crimes against the Fetus*, the Commission's major recommendation is that the fetus merits criminal law protection, which the *Criminal Code* presently does not achieve adequately. A new chapter would be included in the *Code* and a new offence of "foetal destruction or harm would be incorporated to make it a crime to purposely, recklessly or negligently cause death or serious harm to a foetus" (*The Lawyers Weekly*. March 17 1989).
in other words, create a special regime suited to the specific nature of gametes and embryos" (LRCC 1992:51).

In general, all the preceding reports reflected the substance of the Medical Research Council guidelines concerning embryo research. Each recommended that systematic regulation and monitoring of research be carried out in order to ensure the guidelines were being applied consistently (CRCNRT 1993:658). Similar recommendations have been made by the two Canadian Professional Associations involved in embryo research, the Canadian Fertility and Andrology Society and the Society of Obstetricians and Gynaecologists of Canada, in their Combined Ethics Committee report *Ethical Considerations of the New Reproductive Technologies* (1990). In addition, three infertility surveys have also been conducted in Canada; the Canadian Fertility Survey (1984), The General Social Survey (1990) and the Ontario Health Survey (1990).

Controversy had surrounded the delay in publication of the completed two volume OLRC Project report, *Human Artificial Reproduction and Related Matters* in 1985. Legal scholar, Bernard Dickens (1992), who had worked on the report, discusses the OLRC Project in terms of the three general orientations proposed to develop legal responses to artificial reproduction and surrogate motherhood. One position accommodated individual's private ordering of their reproductive behaviours. This included donation, selling and receipt of reproductive services. Another approach accommodated several levels of regulation to enhance individual reproductive preference, while a third approach prohibited or frustrated these individual options. Finally, the Commission "rejected both extremes of the private ordering and the prohibitory approach in favour of a hybrid approach. Different techniques of assisted reproduction were found to warrant different legal approaches" (Dickens 1992:62). Because it was released after
the British Warnock report, it led several critics to conclude that OLRC Commissioners had simply adopted the Warnock approach. According to Dickens (1992:47) this was untrue. However, there was congruence between Warnock and OLRC recommendations in the areas of gamete and embryo donation, IVF and related techniques. The OLRC did depart from Warnock and most other reports on NRTs in its recommendation on surrogacy.

Guided by the confusing developments that obfuscated the legal decision-making concerning the Scarborough, Ontario surrogate motherhood case in 1982, and the report of a healthy baby being born by pre-embryo transplantation in California in January 1983, the OLRC Project set the following terms of reference:

to inquire into and to consider the legal issues', including the 'legal status' and 'legal rights' of children produced by artificial reproduction, the 'legal rights' and 'legal duties' of biological parents and their spouses and of medical practitioners and other personnel involved, the 'legal procedures' for establishing and recognizing parentage of children, the applicability of custody and adoption laws and the bearing of medical and related evidence on legal issues" (Dickens 1992:52-53).

Not surprisingly in a Canadian political climate where children's rights were beginning to emerge, the focus of the Project was not on infertility per se or the concerns of those with fertility impairment, but on protecting "the best interests of children" born through artificial means of reproduction. At this time the discourse of infertility promoted both by the medical establishment and the newly emerging special interest groups

9 The Warnock Commission, chaired by philosopher Dame Mary Warnock had been called by the British Government in 1984. Its recommendations were not translated into law until 1991 when the British Fertilization and Embryology Act was passed after much controversial public and political debate. In February 1990, the House of Lords decided 234 to 80 to allow research to continue on human embryos for 14 days after fertilization under the control of a new statutory licensing authority (Wintour 1990:3).
concerning infertility awareness about the plight of infertile people was still largely unheard. The terms of reference thus restricted the Commissioners' approaches. Otherwise, emphasis might equally well have been put on the best interest of couples, or protection of women's interests, or the concerns of disabled people. What was noticeably absent at that time was the concerns that would be raised later, as occurred in Britain over the political debacle about embryo research, about reconciling the emerging status of the pre-embryo. The novel ways in which pre-embryos could be used were only just beginning to reach the media and public purview, and the problems associated with them were still largely unenvisaged.

The OLRC had recognized in 1984 the challenge of introducing a women's or feminist perspective in relation to reproductive technologies. However, while feminist research at that time was just entering this area, a wealth of feminist writings was undertaken later in response to the Report (Dickens 1992:57). This was the beginning of a decade of feminist response to all aspects of NRTs and its related commissions and reports.

IV THE CANADIAN ROYAL COMMISSION ON NEW REPRODUCTIVE TECHNOLOGIES (CRCNRT)

Since the early 1990s there has been limited attention given to legal regulation of pre-embryos and since the release of the Commission report in November 1993, there has
been a noticeable absence of interest. What is going on is happening behind closed
government doors and inaccessible to public comment. 10

In November 1990, the Canadian Bar Association submitted a report to the
Canadian Royal Commission on New Reproductive Technologies (CRCNRT) at the
public hearings in Vancouver. The impetus for this submission came from the findings of
the Special Task Force Committee on Reproductive Technology, which had been
appointed by the British Columbia Branch of the Canadian Bar Association in May 1988.
This task force was made up of Vancouver physicians and lawyers. The members were
lawyers Janice Dillon (chair), Georges Goyer, Karen Nordlinger Q.C. and Professor Lynn
Smith, as well as paediatrician Dr. Sydney Segal and the medical director of the University
of British Columbia IVF programme Dr. Christo Zouves. The Committee's objective at
that time was to ascertain the scope of the practice of artificial reproduction and to review
the legal and ethical issues and problems arising from such techniques.

More recently, Bernard Dickens has produced the research volume *Legal Issues in
Embryo and Fetal Tissue Research and Therapy* for the CRCNRT. It was published in
1991 in advance of the final report of the CRCNRT, in order to assist people working in
the field of reproductive health and NRTs, as well as to inform the public. It was an
attempt to review some of the problems that might arise from the ability to produce
supernumerary embryo. Dickens analysis is likely the most concise, comprehensive review
in Canada of the probable difficulties and legal resolutions, which may result from use of
pre-embryos beyond its simple application for the gamete producers, who want to
biologically create their own children.

10 A press release in July 1994 stated that the federal government was about to announce
an interim management scheme on how to deal with NRTs, such as commercial and non-
He examines four legal issues in his report. Firstly, he considers issues of liability, including "wrongful life" suits, in relation to research designed to render individual pre-embryos more easily implanted. Secondly, he examines the right of gamete donors to approve research on pre-embryos. Thirdly and fourthly, he discusses the broader circulatory issues related to the use of human tissue from both pre-embryos and fetuses for donation within families and as marketplace commodities, with monetary value.

(i) **Damaged Pre-embryos and Wrongful Life Suits**

What would be the legal implications if wrongful life suits were brought over damaged pre-embryos, which could result in a child being born with a serious impairment? Dickens infers that "it is improbable, however, that criminal liability would arise for gross negligence resulting in the birth of an impaired child, unless that same child could have been born unimpaired" (1991:vii). Since genetic surgery on pre-embryos would only occur in order to correct an already "at risk" pre-embryo of some identified genetic disorder, it is unlikely that genetic surgeons would be held accountable. But what would be the situation if a couple, who had frozen embryos in good condition subsequently had a child with a disability that could be traced to the freezing process? Given this situation, what would the chances of IVF clinics absolving themselves of responsibility for freezing pre-embryos, when so little is known about the long-term consequences? As yet no such legal cases have been reported in any jurisdiction.

The closest analogy might be a recent 'wrongful life' suit that has been brought before the Supreme Court of British Columbia against a physician, who did not fully inform her pregnant patient of all the possible dangers, when she contracted chicken pox in the twelfth week of her pregnancy. Subsequently a child, now seven years old, was
born with severe abnormalities, requiring twenty-four hour attention (Still 1994: B8). The parents have sued for damages to offset the expenses of caring for this child.

(ii) A Regulatory Agency

Secondly, Dickens asks how regulation of research on pre-embryos could best be enacted. He maintains that the pre-embryo, embryo and fetal research and therapy would probably be better accommodated legally not by legislative permissions and prohibitions, but by a regulatory agency. This is essentially the conclusion reached in the British Fertilization and Embryology Act (1991). As English anthropologist Cris Shore points out in his analysis of the British debates, this Act resulted from "a bitter and protracted battle over the legality of embryo research in Britain" (Shore 1992: 295). Opponents of the bill had been quoted as saying "Parliament's decision signaled the "collapse of moral consensus" in Britain and a step towards "society's self-destruction" (ibid). In particular, Dr. Robert Winston's Hammersmith Hospital team in London had been severely criticized for undertaking new research on screening pre-embryos for male genetic disease by identifying the sex of the embryo less than three days after fertilization (Hall 1990: 11). In this case only female embryos would be transferred to the gestational woman, thus eliminating male carriers of the defective gene.

Dickens advocates following the British precedent in Warnock, in calling for the licensing of particular projects and research centres to be undertaken by a National Regulatory Commission. In this way the thorny issue of approval of research on pre-embryos could be uniformly addressed, with respect to their deliberate sacrifice for the sake of knowledge that would benefit future pre-embryos, which could develop into embryos in utero and fetuses and be born unimpaired.
The report of the CRCNRT concurs with Dickens' findings. Based on its ethical and evidence-based medical review, it concludes that "decisively, timely, and comprehensive national action is required with respect to the regulation of new reproductive technologies" (CRCNRT 1993:107). This would be achieved through an independent national body, responsible for overseeing and controlling the development and application of technologies, both from research and practice perspectives. Six subcommittees would be established to assume each of the following functions in specific areas:

setting and enforcing national standards and guidelines, standardizing data collection and analysis, licensing clinics and practitioners, monitoring research and services, and providing information and advice to governments regarding policy, legislation and regulation" (ibid:110).

In essence, these controls are similar to those recommended by the British Warnock Commission report, published in 1984 and administered through a system of licensing which replaced the Voluntary Licensing Authority. In Canada, the Baird Commission's report, at a cost to the taxpayers of $28 million, also suggested that a National Regulatory Commission could be established and put into operation within a relatively short time frame. ...given the urgency of action deal with these issues while there is still time to contain and control current practices and future developments" (ibid:112-113).

Although the report noted a trend in recent federal policy away from the commission model as a choice of the regulatory instrument, Commissioners felt the costs would be warranted (ibid:114). By early 1995, there was still no evidence of a National

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11 Following the Warnock Report (1984), the Voluntary Licensing Authority changed its name to the Interim Licensing Authority under the auspices of the medical profession (CRCNRT 1993:651-652).

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Regulatory Commission being instituted and a generalized cynicism about the likelihood of there being any funding to undertake such an initiative has been expressed by people interested in the Report, including Dr. Baird. Given the spirited debate in England, prior to the enactment of the *British Fertilization and Embryology Bill*, it will not be surprising if a better informed Canadian public does not lodge a similar debacle in the future.

(iii) **Donating and Selling**

The third and fourth legal issues examined by Dickens concerned the use of human tissue from pre-embryos and fetuses for subsequent use as a donation within a family or as a market commodity. How could the law come to terms with pre-embryo, as well as oocyte donation and their potential to become circulating commodities in an expanding reproductive tissue market?

These issues could possibly apply to pre-embryos if, or more probably when, the technology becomes available to culture pre-embryos *in vitro* beyond fourteen days. Dickens raises concerns that women's interests could be severely compromised by coercion to either undergo superovulation and IVF or to accept the timing and techniques of induced abortion, or to agree to terminate a wanted pregnancy, in order to best salvage embryonic or fetal tissue. As noted elsewhere there are more scenarios developing, where women are specifically creating pre-embryos for the express purpose of checking the embryos for genetic problems. Preimplantation diagnosis (see glossary) of pre-embryos is an earlier and for some participants morally less odious version of prenatal tests, such as amniocentesis or chorionic villus sampling. These tests all in various ways determine if a fetus has some identifiable genetic disorder. In each screening method, if the test is
"positive", either the embryo can be discarded or the fetus can be aborted, putting enormous pressure on women to make the "right" (or perhaps "wrong") decision.

Dickens notes that legislation might be warranted in some ethically objectionable cases where there would be a need to separate decisions to abort from decisions to designate the human tissue for known recipients. For example, a woman agreeing to conceive, gestate, then abort an embryo or fetus for an elderly parent with Parkinson's disease or a dependent child in need of an organ transplant. Recently, a Canadian woman undertook a pregnancy, followed by a therapeutic abortion, in order to use the bone marrow from her aborted fetus for a daughter who was in desperate need of a bone marrow transplant to treat her leukemia. The report of the CRCNRT has absolved itself of further comment on this complex subject by recommending Medical Research Council funding of fetal tissue research in order to relieve two concerns, supporting "potentially life-saving research, while also providing, thorough accountability for the use of public funds, a mechanism to monitor and regulate the ethical use of fetal tissue" (CRCNRT 1993:1005).

V LEARNING FROM THE PAST: GUARDING AGAINST THE FUTURE

Canada has an unenviable record of laws whereby the state has exerted controls over who and how Canadians should procreate. The genocidal underpinnings of these laws was to ensure that future generations of certain categories of people should be eliminated. These regulations exist as a cautionary message of the most recent eugenic

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12 Rapp notes the paradox of the term used by genetic counselors to refer to a "positive family history", which it is anything but that, because "it refers to presence of a serious, genetically transmissible condition" (Rapp 1994:7).
thrust which promises to eradicate certain categories of people from the gene pool forever. This initiative is associated with prenatal and genetic screening technologies. At the end of the twentieth century, which was heralded in with "germ theory" and "racial hygiene" cleansing programmes, the harbinger of the next century is "genetic theory" and a new form of quality control, "good/bad genes". The pre-embryo serves as the "already made" but unimplanted messenger of some of the sex-linked genetically transmissible diseases that have been identified on the human genome. In cases where affected couples do not wish to abort an "affected" fetus, that is the fetus of the wrong sex, most usually male, the screening can be completed on the extra uterine embryo. It can then more easily be discarded if necessary. In the future it may be possible to perform genetic surgery on pre-embryos to correct genes. More likely pre-embryos will serve as knowledge bearing sources about major diseases, like cancer, which have so far alluded scientific rectification.

(i) The Eugenics Heritage

There was an active Canadian participation in the Eugenics Movement of the early twentieth century,\textsuperscript{13} which led to the legalized sterilization of many institutionalized, Metis and First Nations women. Eugenic policies had been initiated in New York by the Eugenics Record Office, which resulted in two legislative outcomes; a compulsory sterilization law and the \textit{Immigration Restriction Act} of 1924. By 1935, about 20,000 people had been forcibly sterilized, more than half of whom were Californians. Most often these people were classified as "feeble minded, degenerates, sexual perverts, druggies and drunkards" (Hubbard 1988:228).

\textsuperscript{13} The Eugenics Movement of the early 1900s grew out of the assumptions of an Englishman, Francis Galton concerning improving human stock through positive and negative eugenics.
By 1937, twenty eight states had adopted Eugenic Sterilization laws aimed at people with epilepsy, mental retardation, mental illness and other kinds of disabilities (Saxton 1988:219). In Germany, the euphemistically labeled racial hygiene programme became seen as a public health initiative, so that by the beginning of the Second World War between 300,000 and 400,000 people had been sterilized (Hubbard 1988:229). This movement was to reach its heinous culmination in the Nazi extermination of gypsies, the mentally retarded and European Jews.

A recent summary of early Canadian eugenic policies in Report 42: Genetics in Canadian Health Care (1991) notes that only two provinces in Canada passed The Sexual Sterilization Act. These provinces were Alberta in 1928 and British Columbia in 1933. Although Ontario did not pass legislation in spite of a bill (1912) and the recommendations of two royal commissions (1929 and 1938), sterilization on the mentally retarded continued to be performed.

Although both men and women were sterilized, the majority were likely women, who could be sterilized by a number of gynaecological procedures, which could also eliminate menses, which was an inconvenient hygienic problem for the institutional management of some retarded women. Mitchinson (1992) and McLaren and McLaren (1986) record how gynaecological surgery was routinely performed on women admitted to mental asylums in Ontario and British Columbia, respectively, at the turn of century. Incredibly, this legislation was to remain in force for almost half a century, until 1972. During that time 2,822 cases of institutionalized mentally ill persons were approved for sterilization in Alberta. Twenty-five percent of these cases were Indians and Metis. The original act had required patient consent, but this restriction was removed in 1937. The numbers of persons sterilized in British Columbia who were "likely to beget or bear
children who would have a tendency to serious mental disease of mental deficiency" were not recorded, but were believed to be in the hundreds (quoted in Privacy Act 1992:35-36).

(ii) Judicial Interventions: Maternal/Fetal Disjunctures

To date judicial interventions have been restricted to either individual controls on access to workplaces or regulation of pregnancies. The increased incidence of judicial intervention into pregnancy and childbirth may be attributed partially to the recent development of technologies that enable visualization and monitoring of the fetus. But more seriously these interventions provide a window through which legal controls can be exerted over women's reproductive behaviour during pregnancy and birth. In this way a woman may be forced to conform to socially accepted behaviours for the sake of her fetus, which sets up an uneasy disjuncture between a woman and her fetus.

Since the 1980s, there have been a wave of legal cases focused specifically on regulating certain identified groups of women during their pregnancies and births. In the name of promoting better reproductive health care, maternal health policies have focused on ensuring healthy pregnancies and robust children. Some women, who have been labeled "deviant" because of their non-compliant health behaviours have been subject to a variety of legal sanctions.

In May 1988, a special Task Force on Reproductive Technology, made up of doctors and lawyers, appointed by the British Columbia Branch of the Canadian Bar Association, appended a study paper on Juridical Intervention in Gestation and Childbirth to their report on ethical and legal issues of the practice and problems of artificial reproductive technologies and the problems arising therefrom. It made clear recommendations regarding the oppositional nature of the fetus and the mother, which have arisen largely out of a growing societal concern with fetal rights. It sought a position
that mediates between a woman's right to be secure from judicial intervention in her pregnancy and the right of the fetus to be protected from undue harm. This position was based on cases that had come before the courts in Canada and the United States. It dealt with court-ordered interventions at the time of birth by Caesarian section, other cases that regulated maternal behaviour and still others that dealt with incarceration or criminal charges against pregnant women. 14

Most of the judicial interventions in Canada have involved child welfare law. The case known as Baby R 15 is the first and only case of an apprehension of a fetus, which has come before the Canadian courts. An apprehension was permitted by the Superintendent of Child Welfare prior to the mother's agreement under coercion to a Caesarian Section. When the proactive legal feminist group, Legal Education and Action Fund's (LEAF) sought intervenor status in the mother's appeal of the resulting wardship, LEAF successfully argued that the relevant legislation concerned only born children. Such a basic interference in the woman's right to liberty and security could not be made where there was no legal authority to do so. In the United States legislative protection has been less effective. 16

Canadian feminist lawyer, Patricia King (1989:395-399) has discussed what moral obligation, if any, a pregnant woman owes her fetus in relation to pregnancy behaviour. 17


16 A distressing case in the United States occurred in 1987, when the District of Columbia Court of Appeal, Washington, D.C. ordered a C-section for a pregnant woman, dying of terminal cancer, in which both mother and baby died after the surgery (Rodgers 1989:181). Other United States cases are discussed in Rhoden (1986).

17 In a recent United States case, a woman who shot herself in the stomach resulting in the death of her fetus, was charged with homicide and imprisoned.
A Canadian case, Re: Superintendent of Family and Child Services and McDonald was subject to judicial review, when it found a neo-natal withdrawal syndrome infant D.J. "in need of protection" from its mother. She had been considered "unfit", because she was on methadone treatment for heroin addiction. The decision was based on an earlier case, which dealt with a baby suffering from fetal alcohol syndrome. In another case, Re A (in utero), the Ontario court held that it parens patriae jurisdiction did not provide for judicial intervention on behalf of a fetus, only a child, in need of protection.

In 1987, C.A.S. Belleville v. L.T. and G.K. in Ontario Provincial Court, an unborn child was found in need of protection and temporary wardship because the mother's peculiar behaviour demonstrated she was suffering from a mental disorder that might result in bodily harm to herself or her fetus/child. The criminal law has also been used as a basis for judicial intervention in the case of R. v McKenzie. Here a prostitute was jailed for the remainder of her confinement on a charge of failure to appear in court in order to protect the fetus. Constitutional arguments have also been used in one Canadian case, Joe v. Director of Family and Child Services, which involved the appeal of an order under the Yukon Children's Act. The court concluded that under section 7 of the Charter, which protects an individual's right to liberty, "fetal alcohol syndrome" was a sufficiently vague term to merit substantive value.

The aforementioned cases show how the Canadian state continues through a variety of institutional mechanisms to exert a powerful control over women's choices to procreate, over how and when they conduct their pregnancies and give birth. However,

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18 Re: Children's Aid Society for the District of Kenora and J.L. 134 D.L.R. (3d) 249. In this case, the Ontario Provincial Court ordered Crown wardship of a child suffering from fetal alcohol syndrome. Although the apprehension was conducted after birth, the significance of using child welfare legislation could be construed to apply to the fetus because of the characterization of prenatal abusive behaviour (CRCNRT 1993:952).
developments in Canadian case law have also not as yet privileged the status of the fetus. In three recent decisions\(^\text{19}\) the fetus has been held not to be a legal person and therefore not protected under section 7 of the Charter to "life, liberty and security of the person". Although there have not been any Canadian cases concerning judicial interventions into assisted conceptions or gestations, there are obviously powerful precedents for such litigation. Well-organized and funded groups such as LEAF will be well placed to take on further precedent setting cases which effect women's equality and reproductive lives.

The salient lesson to be learned from this overview of medical and legal interventions into reproductive issues in Canada is that the Canadian state continues through a variety of institutional mechanisms to exert a powerful control over women's choices to procreate, over how and when they conduct their pregnancies and give birth. The regulation of NRTs doubtless will reinforce these patterns, in spite of promoting women's right to choose. How women's reproductive behaviours and choices will be circumscribed in relation to their pre-embryos produced through IVF has yet to be tested. But if there are precedents to be learned from the coercion of women to undergo prenatal screening and subsequent abortion in the case of genetically transmitted deformities, it is likely that preimplantation diagnosis will pose similar threats. Other obvious problems are raised by pre-embryos created in relation to gestational surrogacy arrangements, where the gestational surrogate under contract may have little say in her pregnancy management or

\(^{19}\) In *Tremblay v. Daigle* (1989) the Supreme Court of Canada held that the fetus is not a person under Quebec civil law, the Anglo-Canadian common law or the Quebec Charter of Human Rights and Freedoms. In *Borowski v. Attorney General of Canada*, the Saskatchewan Court of Appeal held that the fetus is not protected under section 7 of the Charter. Similar decisions have been made in America, England, Australia and the *European Convention*. In *R. v. Sullivan and LeMay* (the Midwives Case), the Supreme Court of Canada held that the fetus is not a person for the purposes of the *Criminal Code* (CRCNRT 1993:956-957).
preferences to keep the subsequent child. Unlike the Baby M case, a recent law has been enacted in California to prevent gestational surrogates from making child custody claims.

(iii) Corporate Protectionism: A New Eugenics

The cases that occur in the United States are often precursors to similar cases arising in Canada and as such provided insights into potential politico-legal problems. The best known case of corporate protectionism leading to reproductive control occurred in the United States. It is an example of an insidious form of eugenics in American industry, resulting in costly court battles.\(^{20}\) Under the guise of protecting unborn fetuses, potentially pregnant women (that is any woman in her fertile years) may be regulated out of certain workforces, unless they are surgically sterilized. Given the increasing need for women to be permanently employed, this type of policy circumscribes the type of women, who are eligible to procreate.

This is a new twist to the old Malthusian plot, because the chances are that the disadvantaged, often from racial minorities, will be the ones for whom the opportunity to reproduce will be limited. As Williams (1990:86-89) noted in Johnson case, not only was a woman's autonomy to choose what was best for her compromised, but the company took no precautions to safeguard both male and female employees from the long-term and complex effects on their gonads from lead poisoning from the manufacture of batteries.

\(^{20}\) Johnson Controls 886 F 2d 871 (7th Cir. 1989) cert. granted 110 S. Ct. 1522 (1990). The case was based on an earlier case concerning a chemical plant that terminated the employment of all female employees aged 15-50, who were without medical verification of sterility (Office of Technology Assessment 1985, 251-258 Christman et al. v. American Cyanamid Co. 1980). See also a collection of six articles in Part 3 of Katherine Ratcliffe's Healing Technologies (1989), which researches the problems of women concerning occupational and environmental hazards.
The company were less concerned with the health of their employees than the potential repercussions for the company of being sued by their employees.

The Canadian legal system is at a watershed in terms of regulating NRTs. It can either decide to follow the British example and form a National Regulatory Commission or it can follow the market driven American system and allow the case law to build up precedents on a piecemeal basis. It will be likely that the first option will be followed as a safer mechanism. However, at present the Canadian government seems in no hurry to set the ball in motion. It has too many other more pressing issues in its purview to settle first. Meanwhile Canadian IVF clinics continue their practices unregulated and the storage banks in each clinic fill up with pre-embryos. What will be their future destiny is an as yet unanswered question.

VI CONCLUSION

The legal discourse about pre-embryos is caught up presently in the cultural distinctions between personhood and property. Ideas about ownership, rights to and interests in things and people are based in a history of western individualism, as anthropologists have long understood. The potentiality for personhood status may affect the way in which we come to value pre-embryos. It may be that as a society, Canada is at a watershed in redefining these ideas in response to a number of social developments surrounding reproductive practices. In each instance decisions have hinged on

assumptions about how the fetus may be defined, which will likewise influence definitions about the pre-embryo's status.

Another set of cultural distinctions between gift and commodity also influence legal reasoning. As fetal, organ and tissue transplantation become a modern growth industry, commodification and personhood are at issue, in terms of what attributes of the human body should be considered as property for personhood. What bits can be given, sold or are otherwise inalienable? In Canada, The Human Tissue Gift Act prevents payment for organs and tissue transplantation. Human body parts and products are deemed the possession of the bearer to designate and the recipient to appropriate. However, the present trend towards using fetal tissue for transplantation moves the debate to whether or not fetuses, as potential persons, may be commodified. Gametes - sperm and ova - are generally considered as forms of human bodily substance or tissue, albeit endowed with a personal genome. But in the case of pre-embryos, the unification of those tissues with new genetic constitutions, means that their research use at advancing stages of development likely will have more complex legal ramifications. The distinction commonly made between fetal and pre-embryonic tissue is that the former is differentiated, with a realizable potential for personhood, while the latter is undifferentiated and each embryonic cell is totipotential. As noted in Chapter 1, only a small percentage of cells in a pre-embryo will go on to become the "true" embryo at implantation, while the remainder will become supporting tissue. Therefore a hierarchical distinction may well be attributed along a continuum in valuing at one end of the spectrum tissue, organs and gametes and then along progressive teleological stages of development from pre-embryo to embryo to fetus and up to the neonate.

Recently, the economic value for human life and limb has entered the debate through insurance claims and civil suits about compensation. So decisions about
commodification of pre-embryos will become more significant in the future as iatrogenic consequences arise from the shift from research to therapy in cloning of pre-embryos, preimplantation diagnosis and genetic surgery. Wrongful life suits may well become more common, especially in litigious societies, if children resulting from preimplantation diagnosis or surgery are found to be born with iatrogenically caused disabilities. The consequences of transplantation of surgically engineered pre-embryos with specified genetic traits has not yet been considered. But charting a course through the ethical fog of medical genetics is certain to become more complicated. Genetic testing rings ethical alarm bells about who has the right to be born and to reproduce. It will be important for the Canadian government to heed the advice of the report of CRCNRT and create a national agency to regulate reproductive technologies, thereby providing national standardization, monitoring, national approval of research and accreditation and licensing of research and treatment facilities. Ex-chairperson of CRCNRT, Baird has raised concern about this tardiness, in a recent commentary on the links between genetic testing and revival of eugenics. "It's of concern the longer time goes on...Genetics seems to be getting better at diagnosing traits and we as a society have to decide what we would do with that knowledge" (Tibbetts 1995b:A5).
CHAPTER 6

A NEW PROCREATION STORY:
FEMINIST DISCOURSES FROM THE MARGINS

The authorized technical, medical and legal discourses which I have discussed present a generalized picture that research and development into reproductive technologies and its therapeutic applications are beneficial to Canadians so long as they are implemented within an ethical and socio-legally responsible framework. Feminism's approach to assisted procreation presents a different set of views, which stand in contrast to the persuasive and generally accepted privileged positions. A multitude of feminist voices are represented in what follows, which incorporate the views from radical, socialist and liberal feminisms explicated by legal feminists, disability rights feminists, scholars and social activitists. Some feminists have a specific interest in assisted procreative techniques, while the interests of others have been more tangential, but nevertheless allows them to discuss the social, ethical and economic dimensions of what pre-embryos mean in Canadian society. The issues I explore are framed around common themes in feminism - women's bodily autonomy, choice, risks, neoeugenics, sense of ownership and environment. The feminist anthropological discourse which I weave throughout this chapter reflects a critical interpretive medical anthropological approach to the cultural meanings about some of the newest reproductive and genetic technologies, which are only just appearing outside of the medical discourse and which are being subjected to early feminist critiques.

The four perspectives which I have specifically identified are all feminist in their orientation, but they are not consistent in their principles or issues. They range from radical activist stances, historical approaches, critical legal and disability right persuasions.
The viewpoints form a post modernist collage in their attention to disparate special interests drawn together though a common feminist epistemology. They embrace the discourse of the academy and of the professions as well as grassroots activism but in a manner which gets beyond and outside of the "relations of ruling" or "ruling apparatus". These are Smith's (1987) terms through which she explores from the standpoint of "a sociology for women" the links between institutions, which organize and regulate society with their gendered subtexts. "Relations of ruling is a concept that grasps power, organization, direction, and regulation as more pervasively structured than can be expressed in traditional concepts provided by the discourse of power" (ibid:3). In this mode of ruling or the complex of organized practices, she identifies government, law, professional organizations and educational institutions as discourses which interpenetrate the multiple sites of power. The feminist enterprise undertaken in this thesis conforms to Smith's strategy of a "a sociology for women", which

    takes as central that women should speak for themselves and their experience and that the communities of their oppression are to be discovered in a discourse that can expand their grasp of their experience and the power of their speech by disclosing the relations organizing their oppression. Such as sociology presupposes a constant process of discovery from within, from different bases and matrices of consciousness. It aims at the making of a discourse that is always being rediscovered and remade from a standpoint that is always beyond, outside, discourse, always pressing on discourse for a means to speak, explore, find, know, map, organize and struggle (Smith 1987:215-216).

The feminist standpoints addressed here take account of the gendered dimensions of how NRTs affect women in different ways and how authorized discourses, such as medicine and law, discount, disqualify and suppress other marginalized discourses. Knowledge and power united are a particularly persuasive form of social control, and have been used effectively in ways which exert authority over women's reproductive autonomy.
While obviously not mutually exclusive, radical feminism challenges the merits of IVF as an acceptable therapy. Historical feminism's retrospective approach provides warnings about past risks for women in relation to among other things their reproductive capacity. Critical legal feminism frames the challenges in the polarized language of rights over pre-embryos, and indeed whether rights discourse is a valid approach for advancing women's particular needs under the law. A feminist disability rights discourse returns to the perennial dilemma for feminism, that of reproductive choice. Recalling past eugenic policies targeted at allegedly disabled women, the significance of context about the rights and risks for the disabled of NRTs are discussed.

There is no simple message here other than a recognition of the complexities and cautions for all women of the medico-technical ability to create pre-embryos. If there is a mindful message, it is that in reifying pre-embryos through IVF technology and genetic screening technologies, women and their pre-embryos are placed in the same odd, polarized position as women and their fetuses. These actions inadvertently can have the effect of making women vulnerable to further devaluation and coercion in a society in which unequal power structures exist. Over the course of the last one hundred and fifty year of Canadian history, the professionalization and institutionalization of medicine and law has created an orthodox blend of colonizing discourse, which continues to suppress and exclude women's claims to reproductive autonomy.

The feminist discourse, while multi-faceted, is united on a number of issues that endorse a different set of cultural values, which are based on interpretations about the potential effects on women and their resultant children of IVF's ability to create pre-embryos outside of a women's bodies. I argue these issues within a feminist ethic of justice and care, which Gilligan reasons as a connection between the dialectic tension of responsibilities and rights. "While an ethic of justice proceeds from the premise of equality
- that everyone should be treated the same - an ethics of care rests on the premise of non-violence - that no one should be hurt" (1982:174). The mission is to move beyond the rival claims of pre-embryo/fetus and pregnant woman, built on an ill-conceived contested terrain of rights claims, to the point where "The virtue of nonmaleficence should govern our relationships with the embryo/fetus, but reproduction ordinarily should not require sacrifices from women" (Overall 1987:198). Since women's ethical visions are focused so often on a network of responsibilities to various commitments, a feminist analysis seems to confirm that women work within clusters of values with a tendency to exclude neither individual and social considerations (Hoskins and Henefin 1984:245). This chapter is peppered with a diversity of feminist responses to my questions about their perceptions of pre-embryos in relation to women. In their singular and communal referents, I include their direct quotes to depict an experiential world of scepticism about NRTs in Canada and beyond.

There has been a long history in Canada of controversial debates about reproduction, in which women have played an important role. They are part of the ideological tug o'war between state interests in procreation and women's interests in control of choices relating to their reproductive functions. In particular, the abortion issue has raged on in various ways throughout the century, even splitting women along pro-choice or pro-life party lines. These polarities have formed the basis of a colourful history of reproductive issues in Canada throughout the twentieth century. The evolution of the Women's Movement, beginning with the right to vote in 1929, parallels in many ways the development of reproductive rights. The New Social Movements of the first half of the twentieth century were made up of women activists who fought over women's needs to control conception and to give birth and rear their large families in safe and sanitary
surroundings (McLaren and McLaren 1986; Mitchinson 1992, Ursel 1988, 1992). Since the second wave of the feminist movement, in the early 1970s, as I will discuss, feminist critics have shown some of the ways in which women's health in both the developed and developing worlds has been compromised by a number of drugs and devices developed allegedly to assist them in control of their pregnancies. A persistent cautionary recitative has been the tenacious nature of eugenic policies in Canada. They have been implemented in various guises, starting with the surgical sterilization of certain populations in Alberta and British Columbia.

There has been a focus by feminists and non-feminists alike around the theme of procreative liberties. While some authors have discussed procreation liberties in terms of legal regulation (Charo 1988, Robertson 1988), other authors have taken the perspective of medically-related right to access to safe abortion (Morgentaler 1982), and others have looked to both sides of the debate for women (Luker 1985). Feminist studies have taken as their departure point the contentious issues about the right to choose the locus of birth and type of assistance, be it midwife or physician (Ehrenreich and English 1979; Oakley 1976, 1980; Kitzinger and Davis 1978, Wertz and Wertz 1978, Burtch 1988, Baker 1990).

Currently, in both Canada and the United States, public health initiatives backed up by legal sanctions are increasingly attempting to regulate how women will behave during their pregnancies and parturitions. (see Chapter 5, section V(ii)) At the same time genetically focused screening technologies are now standard medical routines encouraging women to both screen their fetuses through the alleged "dangerous journey in utero" as well as to detect familially transmitted genetic defects, such as Down's syndrome, Tay Sachs disease and mental retardation, with the express purpose of eliminating 'defective' fetuses. In some centres, this same strategy is now beginning to be addressed to screening
pre-implantation embryos. All screening technologies present a coercive element for women to decide whether to use the technologies and if they do, to act appropriately when an unfavourable diagnosis is made.

Feminist critics (Maroney and Luxton 1987; Adamson, Briskin and McPhail 1988; Ursel 1988 and 1992) have been observing this pattern of control over women's reproductive issues and the choices that they may or may not be able to make. Political and paternalistic decisions frequently have been made allegedly with women's best interests in mind, in order to make their wearisome family lives more livable. The feminist activists and scholars, whom I interviewed for this study, frequently returned to this historical framework as a referent for thinking about the implications for women of the pre-embryo. The pivotal issue of maternal/fetal relations, particularly in respect to abortion and more recently pre-natal screening technologies was a repetitive caution about the ways in which the unhealthy marriage of medicine and law infringe on a woman's symbiotic relationship with her pre-embryo/fetus.

1 NEW REPRODUCTIVE TECHNOLOGIES: A WOMEN'S ISSUE

(i) In Whose Best Interests: Resisting Technology

Feminist lawyer Maureen McTeer (1992), one of the four fired Commissioners on CRCNRT, has pointed out the inconsistency between science's right to discover and society's right to protect itself. But first and foremost NRTs is a women's issue. "While men are affected by it, for women, technology which affect reproduction affects their equality in a direct and basic way" (Day 1993:2). Therefore, it is one which requires radical measures if future generations of women are to be protected from its consequences.
as Gena Corea points out in the film *On the Eighth Day: Making Babies, Making Perfect Babies* (NFB: 1992). In the same video feminist scientist Ruth Hubbard makes a plea for a feminist approach to doing science, because she sees the inherent dangers of NRTs for women. Feminists interested in women, science and technology (Haraway 1979), have struggled with the ways in which science's unchecked advances affect women in a multitude of ways. Since it is realistically improbable that these technologies can be stopped, Birke, Himmelweit and Vines (1990) see the only solution to an engagement with science and technology is to make the needs of women central:

...what chance might we have, even if this was what we wanted, to stop the development of such technologies? Just because science and technology are so clearly not in women's hands, trying to stop it altogether from the outside is a hopeless quest. We have, therefore, whether we like it or not, to engage in a struggle with science and technology, to develop them more in tune with women's needs (1990:58 their emphasis).

The Canadian Advisory Council on the Status of Women also have considered a non-oppositional approach that has been endorsed in a recent unpublished position paper. It considers how to most effectively intervene in the research trajectory of bioscience within the field framed by reproductive technologies.¹

A growing disability rights discourse about NRTs has been constructed mainly with women in mind, since the technologies tend to affect women more than men, disabled or not. Recognition of the connection between feminist and disability discourses has been made in relation to their approach to science and technology.

¹ At the time of completion of this thesis, the Office of the Status of Women Canada, which has absorbed the research of the now defunct Canadian Advisory Council on the Status of Women, is planning to publish a report on *Proceed with Care*, which contains commentary on the non-oppositional stance (Weir 1994).
There is some thinking that needs to be done here, because there is something about the feminist discourse and disability discourse that differs in a lot of ways. But I think there is a way in which they are similar and it's an anti-scientific, anti-technological strain to this. I'm not sure what that's about, but the first presumption is that this is going to be worked out. I think that it is because it is a realm of male control, and it is an area in which we have been largely uncomfortable in. Even women scientists who write on technologies, they realize they perceive the technologies and work with them in different ways from the way men do, who see it in a more positive fashion - following the 4 Rs of scientific research and the potential for making big money, the economic aspects of it. I think that's what a lot of these new technologies are - they are massively creative ways of making money. (interview with feminist legal scholar and disability rights advocate, August 1993)

Disability rights lawyer, Judith Mosoff has challenged the opportunism of some women who characterize themselves as "reproductively disabled" using a techno-medical fix framework, because it means that they have bought into and thus reaffirm a medical model by:

first, accepting a medical model of disability; second, formulating the problem as an allocation of medical resources; and thirdly, appealing to the social values of universal health care. By placing their arguments on entitlements to IVF within a medical framework, women who claim a reproductive disability accept a medical model of disability; impairment is viewed as "fixable" or at least alleviated by medical intervention. This argument is premised on a right to infertility treatment as a right to health care, an argument with a special appeal in Canada because of this country's history and its pride in universal health care (Mosoff 1993:121)

Mosoff explains that the term "infertility" now denotes both the right to medical treatment and the possibility of a technical "fix". She has pointed out the contradictions in labeling infertile people as disabled, because in reality they have been and remain essentially able-bodied in terms of their adaptation to daily living. Therefore their disability is limited only in the social sense of being unable to become parents.
The protection of women's interests in all their complexities, as well as protecting society in general has been a strong message which led many feminist activists and women's groups to take part in the lobby to call for a Canadian Royal Commission on New Reproductive Technology (CRCNRT). One of those feminist lobbyists has reflected on the feasibility of calling a halt to some of the NRTs, which are proceeding currently in a legal vacuum. "I am not suggesting that you bring everything to a screeching halt. Some things perhaps where we can look around and say this is really new and is going to have major implications, we can stop and think about this before we go any further. And to say that isn't to be anti-science or technophobic, I don't think. Its exercising common sense". Her comments are based on her memory of the past warning that those feminist lobbyists raised:

In the mid 80s when feminists were first concerned with IVF for a number of reasons, one of the things that was put forward at that time was the suggestion that before you know it IVF is going to be about the preferred mode of reproduction for everyone, not just for couples experiencing problems with infertility. I can remember people saying, that's ridiculous. Its science fiction, its alarmist. This technology is about helping infertile couples, not anything else. What you are suggesting is light years away. Here we are less than a decade later and already we have children born through pre implantation diagnosis, for cystic fibrosis, for fragile X. It's clearly coming in a big way. And so in less than ten years, something that people widely believed was light years down the road as raising all sorts of ethical concerns, which all of a sudden have almost evaporated. (interview with feminist activist/scholar involved with lobby, October 1993)

While most feminists would probably agree that it is too late to halt IVF and the production of pre-embryos, they do express concerns about who should control these controversial products of IVF. Should it be the people who produce the gametes, the clinics who create and store them, the brokers, who act as commercial intermediaries, or should the state have the overall control? They argue that unless guidelines can be
established then IVF has no place in clinical health care. A further caution is that state
control has some alarming precedents, which has been well articulated in the following
transcript:

We shouldn't be doing it. But if it is happening, it has to do with the
biological parents, and no one else, not the clinic, who have no position
here. If they are doing anything, they are only providing a service to the
parents and they have no status other than that. But if the state had any
role to play in terms of owning or controlling the production of embryos
has for me a side that I am extremely worried about, because of what I see
around the world as a rising fascism, an increase in religious
fundamentalism and because we know the history of the eugenics
movement and how it was used by fascists in the First and Second
World Wars.

So I see all of the political possibilities of the state using this
technology in a way that takes away the control of citizens and could in
fact create perfect babies, by someone's definition, or people that can be
more controlled by the state. If this kind of thing {IVF} is going to
happen, what we want to be sure of is that people are not being ripped off
by shysters of some sort and that clinics are being operated within some
prescribed limits and so perhaps the state has some role to play in that
regard. But as soon as we say yes, that the state should enter the field in
order to make sure that somehow this is regulated fairly adequately, that
it's safe, or accessible, it immediately opens the possibility of the state
becoming more and more involved and therefore being able to control
things that we would not want the state ever to control. For example, what
kinds of genes those babies should have, what kinds of embryos its proper
to perpetuate or what kinds of embryos it's not proper to perpetuate. I
don't trust government to draw the lines properly and that's one of the
reasons why I say flatly no, we shouldn't be doing this at all. (interview
with feminist human rights activist, August 1993)

Yet nearly two years after the CRCNRT brought down its report urging government
swiftly to put in place a Canadian regulatory body has not been instituted. In July 1995,
Diane Marleau, the federal Minister of Health urged doctors and researchers to voluntarily
refrain from using nine controversial technologies, which include sex selection techniques,
commercial contracts for surrogate motherhood and the buying and selling of oocytes.
spennand embryos. To encourage compliance she removed funding by the federal government and granting agents. The moratorium fell far short of what was expected. Baird the Commission chair stated in a written response that "decisions on such technologies cannot ultimately be left to self-regulation by doctors and researchers...Accountability and regulation in how new reproductive technologies are used in Canada are needed and the moratorium won't provide that" (Baird quoted in Bryden 1995:A5). As Williams, director of ethics and legal affairs for the Canadian Medical Association, pointed out it will be difficult to stop such practices other than licensing clinics, because withholding of government money is irrelevant to private clinics who do not receive Medicare funding anyway (ibid). There is no reason to think the new private clinic, Genesis, which opened in Vancouver in July 1995, will be in any way deterred by the moratorium in July 1995. Its treatment options include IVF and other reproductive services, such as artificial insemination by donor and intracytoplasmic sperm injection, but not simple or gestational surrogacy arrangements. British Columbia clients will have to go south of the border to the American clinics to access these services.

Lack of regulation can lead to unforeseen problems, as occurred in an unlicensed clinic in California, which led to a law suit in June 1995. Informed consent had not been given for transfer of pre-embryos to another woman client at the clinic by the biological couple, who produced them through the clinic's IVF services. Problems of consent are

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2 An Associate Press report "Fertility clinic sued over embryo swap" in The Globe and Mail, Saturday June 10th 1995 reported that a fertility clinic in Orange County, California was being sued for giving a couples' embryos to a woman, without their permission. The women had twins as a result of the donation. The clinic was managed by the University of California, Irvine, Clinic director, Dr. Richard Asch, who had built an international reputation as a pioneer in GIFT. The prosperous clinic was shut down following alleged irregularities. Another case in the Netherlands has been reported about the birth to a white woman of one white and one part black twin, when her white partner's sperm was
just one of a number of potential issues that are raised in both Canadian and American societies and demonstrate that decisions about what social, legal and ethical value should be attributed to pre-embryos are far from clear. It begs the question as to who has the ultimate control in disposal of donated pre-embryos. Indeed whose best interests are being served by creating, giving and selling, even accidentally swapping human reproductive materials? The answer in part lies in who has a vested interest. Clinics and reproductive brokers make money and infertile couple get babies by one means or another. The long-term consequences of such re-arrangements of family relationships appear to be thought through poorly. Will it make a difference to those California babies that they are siblings? How may the parents and the donated pre-embryo children feel about their two mothers, if indeed they are told? How will the mixed race twins and their respective four parents view their relationships? These issues will doubtless be the subject matter of future anthropological studies in kinship and family organization.

(ii) The Enterprise Culture: Fragmenting Women's Bodies

IVF is a technology which both fragments the normal processes of conception and fragments human bodies, and in particular women's bodies. Nowadays, oocytes can be retrieved not only from consenting women undergoing IVF, but from ovaries of aborted fetuses, newly dead women or perhaps almost dead women, who are institutionalized in vegetative states. Sperm can be retrieved from men's vas, and pre-embryos can be

mixed up with another client during an IVF procedure (Associated Press. The Vancouver Sun June 19th 1995)

Imagine the scenario in corrupt circumstances where relatives of such women might be coerced to consent to ovum retrievals being performed on them in exchange for costly institutional care or burial costs.
created, donated with or without consent, gestated in gestational surrogates, even sold on the commodity markets. Strange space/time warps are made possible by the IVF/embryo transfer procedure and the ability to freeze pre-embryos that are not needed in a replacement cycle. These options are becoming readily available in many IVF clinics around the world. In general these procedures have involved women's bodies and feminists challenge that the technical re-arranging of normal biological sequencing of women's life courses are a means of devaluing further the status of women's reproductive bodies.

The cultural construction of an expanding market in body parts, including reproductive tissues and organs is captured under the term "Enterprising Culture". Strathern, in her study of late twentieth century English kinship, asserts that through the Enterprise Culture "a natural and traditional individualism is being restored to the English" (Strathern 1992b:10) in their demands for both individuality and diversity. This consumerism dictates the philosophy that you can have more of everything you desire, when you want it. New reproductive technologies are a good example of this smorgasbord of options.

In Canada, as opposed to the United States, access to reproductive consumerism, what the Law Reform Commission of Canada (1992) called in its report, "procreative tourism" is impeded partly by The Human Tissue Act, which restricts the sale of bodily substances and tissue. Legal regulation in Canada remains closer to the philanthropic notion of the gift, which Titmuss (1971) discusses in relation to blood donation. At present reproductive substances and organs are embraced under the same law, which provides a degree of protection unrecognized in the United States, where the marketplace and venture capital dictate the landscape of a consumerism, which most often
disadvantages women both as vendors and recipients of ova, pre-embryos and surrogacy contracts.

(iii)  **The Art** of the Possible: A Modern Space/Time Warp

The normal biological time frames of male and female reproductive functions, which structure the logically expected life crises of families, have been turned upside down by IVF technology and cryopreservation of pre-embryos. The normal sequencing of births, puberty, marriage, procreation, childrearing, menopause, aging and death are taking on new meanings with increasing use of artificial conception. Now not only have contraceptive and conceptive technologies facilitated women in choosing whether and if they will conceive children, but also when and how they will conceive, even beyond the biological time limits of menopause.

There is a developing trend in the western world for normally fertile women to delay childbearing. The Canadian Advisory Council on the Status of Women has recorded that in Canada, the rate of first births (first-time births per thousand same-age women) for women aged thirty to thirty-four years increased from 11.5% in 1971 to 22.3% in 1988, 94% increase. In comparison, the rate for women aged twenty to twenty-four years markedly decreased. Whereas in 1971 about 47% of births occurred in women younger than twenty-five years of age, by 1991, it was 26%. Conversely, the proportion of all

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4 ART or assisted reproductive technology is an alternative acronym for NRT. The technologies are rife with acronyms as if to give metaphorical substance to hard technology. See footnote 2 in chapter 1.

5 See Kovacs et al 1991 for an interesting discussion of how cryopreservation of pre-embryos can make what might be triplets in one replacement cycle into sequential siblings if each pre-embryo is replaced in a different year. Given the importance of birth order in Western society, what might this mean for the social relations of children technologically created at the same time, but born years apart.
births to women aged thirty years and older increased from 22% in 1971 to 36% in 1991 (Lero and Johnson 1994:11). Recent statistics from FIVNAT, the national registry for IVF in France, has demonstrated that whereas in 1978, 7.8% of IVF treatment cycles were performed on women forty years or older, by 1992 that figure had risen to 13.2% of all cycles (IVF News, Autumn 1993:2). So a reverse trend in childbearing has been occurring in the last twenty years, with women over forty also using advanced technologies to produce children. Donation of pre-embryos is just another step further along the reproductive road for aging women, who perhaps have put their career security above their family aspirations, or who have decided to become single parents late in life, possibly with a same sex partner.

So not only are normally fertile women delaying their childbearing experience, sometimes at the risk of compromising their fertility, but the female partners of infertile couples may also be opting belatedly for IVF treatment, when they are peri- or post-menopausal. Whether the latter case has anything to do with the targeting of a new market of clients for IVF technologies, or the fact that women are discovering late in their reproductive years, when they decide to have children, that they are infertile, or whether it is the choices available with these new technologies is difficult to pinpoint.

It is now not only possible for men and women, who have been surgically sterilized, to produce children again, through operations such as reversal of vasectomy or tubal ligation reversal, but also for post-menopausal women, who have never been pregnant, to be able to gestate and give birth to a child of another woman's ova, which has been fertilized by her partner's sperm. Ova donation also opens up the possibility for aging lesbian couples to have children. Consider the hypothetical case of a lesbian couple, who choose to have the ova of the younger fertile woman artificially inseminated with donor sperm through IVF, then the resultant pre-embryos replaced in the other lesbian partner's
hormonally synchronized uterus for gestation and birth. In this scenario each woman would have an equal investment in the child they would jointly rear. Or both women could choose to carrying pregnancies of donated pre-embryos from the same biological parents. Alternatively, a gay male couples could choose to acquire donated or sold ova, each inseminate them and contract gestational surrogates to bear the pre-embryos. While these options have not been reported to date, there is reason to believe that these arrangements do exist and will become more common as same sex families are created.

The increasing liberalization of homosexuality in Canada and the challenges to both church and law to promote homosexual unions and protect their spousal benefits, pension plans and disability plans are becoming more prevalent. That homosexual couples should also want to add children into the constellation of forming "the families we choose" (Weston 1992) is a realistic option in a futuristic ideal society that does not discriminate against homosexuality.

6 A somewhat similar version of this scenario was recounted to me in June 1994. Two women attended together for ultrasound monitoring of their early pregnancies at Women's Hospital, in Vancouver. It was discovered that both women had attended Pacific Fertility Services in San Francisco. One woman had produced the oocytes, which had been inseminated, by her husband and she was pregnant with a singleton. The other woman had been donated some of the remaining pre-embryos and had become pregnant with twins. In effect both women were carrying siblings. See also Kovacs et al 1991.

7 A recent United States case resulted in catastrophe, when a single man contracted an Indianapolis clinic to arrange a surrogate to bear a child created with his sperm. In December 1994 the surrogate gave birth to a child which was turned over to the father who within a month murdered the baby boy. Issues of clinic responsibility about psychological screening of potential parents and the need for greater regulation of surrogate parenting arrangements are raised in this case (Jaeger 1995:16).

8 In British Columbia homophobic practices have been alleged against a physician in a recent challenge. A lesbian couple, Tracey Potter and Sandra Benson, a physician and a lawyer, respectively, attempted without success to arrange for artificial insemination by donor (AID) services with a Vancouver doctor, Gerald Korn, who has been the main proponent of AID in Vancouver. It is alleged that he refused because he disapproved of lesbian mothering. Several years earlier Korn had performed AID on another lesbian
Currently, research is demonstrating that it is possible for ova to be removed from recently aborted female fetuses, and maybe even newly dead female cadavers. It has been rumored that ova have been removed even from women in permanently vegetative states, confined in institutions. The retrieved ova then can be used to create pre-embryos for donation, or else frozen, like sperm, for future use for research purposes. The ability to freeze human ova has not to date been successful. However, the problem of transmission of AIDS or other infectious diseases exists with using fresh ova. But in the research situation it may not even be relevant if the pre-embryo is tainted with disease; in fact, it may even enhance the scientific understanding of how these life-threatening diseases affect human cell development.

The cultural meanings that we give to these technologies, even if they are at present in the research stage, poses interesting questions for anthropologists, in terms of the alterations to the patterns of descent and filiation in kinship structure produced through space/time warps in human conception. In the not too distant future, it is not inconceivable that a child born through IVF technology may say "I am the child of a mother who was never born" or "I am the child of a woman who never knew she brought me into existence" or "I am the child of a woman who was an old woman when I was born". Keesing explains this complex situation in relation to the everyday semantics of the term "real mother". He draws on Lakoff's concept of base models, which converge in the prototypical case to form a cluster model. Clustered around his example "mother" are the birth, the genetic, the nurturance, the marital and the genealogical models. Keesing views woman, who subsequently tested HIV positive. This led to a protracted law suit. Potter and Benson have appealed to the British Columbia College of Physicians and Surgeons on the basis that health services cannot be withheld on the basis of sexual discrimination.
these models as increasingly divergent through the developments in reproductive technologies, as well as institutionalized adoption and fostering. For example "my mother wasn't a real mother to me"; "I was adopted and I don't know who my real mother is" and "My real mother died when I was an embryo and I was frozen and implanted in the woman who gave birth to me" (Keesing 1993:7).

On the one hand the technological ability to retrieve and fertilize ova from female fetuses and cadavers are telescoping, bypassing, the biological time frame of fetal development, birth, childhood and puberty, when human fertility becomes possible. What this may mean for the value we place on young women to become fertile and future mothers of their own biological children is yet to be explicated. On the other hand, other technologies are extending the time frame of the normal development of the human conceptus through the technical ability to freeze the pre-embryo, to keep on ice, so to speak, for its re-emergence at another time, maybe even long after the biological parents are dead, or in another place, perhaps far from where it was created. Still further is the time warp that other technologies are extending the reproductive life span of a woman to a previously unimaginable limit through the use of donated pre-embryos. These technologically created distortions of both biological and social time and space is analogous to a modern social black hole with no beginning or end, and with an invisible force, irreversibly sucking into its inversion towards an unknown, uncontrollable future. In this manner, the "art of the possible" has emerged out of the "science of the impossible" and created a myriad of social and ethical conundra.

These new twists to creating families by precedent setting technologies have caused a renewed flurry of ethical concerns in Europe about the value of scientific research. The main anxiety here has been that not only are these experimental technologies being used on women, but that the oocytes, the female products of conception, are being procured.
from other females' reproductive organs, both born and unborn. These practices raise a specter of a new eugenics, and a new form of female infanticide, a femicide, which is labeled feticide.

In January 1994, a controversial debate erupted over the report of a request, by researchers at Edinburgh Medical School, to perform IVF trials using ova from aborted fetuses. In the wake of successful work with mice, they wished to carry out human trials, so that eventually this cheap and expendable source of gametes can provide the raw materials to produce pre-embryos for women otherwise unable to conceive because of early menopause or disease. The researchers stated that ovaries of a human female fetus can have up to five million eggs. The number of eggs gradually diminishes over the life span, so that by the time a woman reaches the age of fifty, she may have less than a thousand eggs, which may not be capable of fertilizing.

(iv) "Granny Pregnancies": A New Resource Management

Metaphors about women and their reproductive capacities as natural resources and raw materials are presently emerging. Delaney's (1991) imagery of women as fertile fields demonstrates how intractable has been the notion of women's reproductive bodies as objectified, plunderable and eternally docile and giving. The idea of creating infants from the immature ova of females who have never been born has evoked the specter of "fetus farming" and responses, such as that of British Member of Parliament, David Alton, that fetal oocyte retrieval is "reminiscent of grave robbing...this consumerist approach to the creation of life puts it on a par with an American fast-food outlet" (Tuohy 1994). Feminist Rowland, in a panel discussion on the Canadian Broadcasting Corporation radio programme Ideas, has described this fetal farming by another powerful metaphor of "women being mined as natural resources" (Sinclair 1991:25).
Not only are immature ova becoming commodified, but so are aging uteruses, which give a very different cultural identity to the accepted reproductive life span from menarche to menopause. Recently, it has been discovered that contrary to previous opinion, the aging egg rather than the aging uterus was responsible for inability to sustain a normal pregnancy. This revelation advanced the idea that if women could in fact maintain pregnancies at advanced maternal age, even if their ova were unfertilizable, then women's gestational bodies could remain functional regardless of the source of the gametes, fertilizable sperm and ova. A University of Southern California trial showed that there was no significant difference in IVF results between the older and younger women, who received donated ova either in implantation or ongoing pregnancy. A number of cases have been reported of women who gestate and give birth to their grandchildren with no adverse effects. A situation recently in Vancouver was reported, when a mother acted as a gestational surrogate for her daughter, who was unable to gestate her pre-embryo because she was born without a uterus (Yeager 1995:A4).

These findings have proved a temptation to some resourceful doctors, who realize they can capitalize on a new market of women who might still want a biological child. They can boost the receptivity for pregnancy of an aging uterus by "tilling its soil" with drugs, which recreate normal pregnancy conditions. So although post-menopausal women, many of whom have never born a child, may not be able to produce their own fertilizable ova, they can with the help of donated ova, fertilized by their partner's or some

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9. In fact, the results were better than those for the older women who underwent standard IVF/ET. There were thirty-four pregnancies in the thirty-one older women who underwent IVF with donor oocytes. There were five twin pregnancies, two sets of triplets. Endocrinologist Mark Sauer attributed the "exaggerated multiple birth rate undoubtedly secondary to the placement of four to five embryos at the time of transfer" (Murray 1994:27).
anonymous man's sperm, gestate, give birth and nurture a child. This technique has presented a new way to have a child, which like artificial insemination, represents fifty percent the social parents' biological child. Some couples consider this as a preferable solution to adoption, about which many problems have recently been raised.

An Italian doctor, Severino Antinori, has found a modern NRT goldmine by targeting his infertility practice on post-menopausal women, despite castigation from the Vatican about creating extra-uterine pre-embryos. Antinori has treated a succession of women over fifty, including one sixty-three-year-old Italian woman, as well as a mixed race woman in Italy, who was implanted with a white embryo allegedly because she wanted the child to avoid racial discrimination. He has facilitated the births of twins to an unidentified 59-year-old British woman, using eggs donated from an anonymous Italian woman in her twenties, at a cost of around $8,000. The woman had been refused treatment in England because of her age (The Globe and Mail December 28 1993).

Antinori, who equates himself with Jesus Christ in his ability to perform modern miracles, has also been criticized by the British Medical Association Ethics Committee and the Human Fertilization and Embryology Authority (HFEA) in Britain. Their reasoning is not because they wished to deny access to women wanting to conceive children later in life, after all men do it all the time, but because of the possible long term social consequences for the family in thwarting the accepted sequencing of childbirth and child rearing practice, once the technique becomes commonplace. There is an underlying assumption here that women should have children when they are young, because they will not be capable of being good mothers when they are older. This flies in the face of the reality that many older women work as daycare workers, baby-sitters and look after grandchildren on a regular basis, without detriment to their charges. The twenty-one member body of scientists and lay members of the HFEA has called for a public discussion
on IVF for women over fifty, as well as the use of aborted, donor and cadaver tissue before the summer of 1994. This has posed press-driven debates about "whether older women should be allowed to be mothers, when they might die before their children grow up, whether women should be allowed to have eggs of a different race implanted in them, and the acceptability of overcoming the shortage of donor ova by using ova from aborted fetuses" (Richmond 1994:551).

While this reasoning focuses on racist and gendered assumptions about who will be suitable to rear tomorrow's children, little attention is given to the social consequences for women of mothering young children at advanced ages. The sociological literature on families has discussed the stresses for "sandwich generation" women, who are responsible not only for their own children, but for their long-living aged parents (Tepperman and Wilson 1993:361). "Retirement pregnancies" could narrow further the leisure time for women between rearing children and caring for elders; a situation which is complicated by the fact that most women are engaged in full time employment. Almost no attention is given to the sharing of the nurturing of children by both father and mother. This is a perennial essentialist assumption that it is the mother's culturally dictated biological role, a dilemma against which feminist have long laboured.

The new techniques like "retirement pregnancies" ring ethical alarm bells, causing a Globe and Mail (December 30 1993:A14) editorial to pose the question, "can bio-ethics keep up with bio-technology?", only one month after the release of the CRCNRT's report. Under recommendation 173, the Commission had recommended that "Women who have experienced menopause at the usual age should not be candidates to receive donated eggs or zygotes" (CRCNRT, 1993:600). The editorial questions whether the state, in fact, does have a place in determining the suitability of prospective parents, who are willing to finance the risk themselves. The risks of complications increase with age according to
British data cited by the Baird report. The mortality rate is 5.3% per 100,000 pregnancies in women aged twenty to twenty-four years, compared to 53.9% per 100,000 pregnancies in women over forty (ibid).

As yet nothing is known about the risks of children born from pre-embryos produced from donated ova. But if it is found that there are consistent iatrogenic effects which result in children being born with congenital disorders, then, there is a body of case law building in Canada that addresses wrongful life suits, in which parents rearing severely disabled children have demanded financial reparation for medical malpractice. Similarly, along with regulating active adult euthanasia, Canadian courts are trying to sort out how and if to use the Criminal Law to deal with a parent who commits merciful murder of an extremely disabled child.

Regardless of the Commission's warning IVF Canada, a private clinic in Toronto has been providing ovum donation to post-menopausal women. In June 1995, a fifty-two year old woman gave birth to twins. Batarseh, the co-director of IVF Canada was reported as justifying his disregard of CRCNRT recommendations by raising the point that Nature has allowed some women to get pregnant at the age of 56, and that's the bottom line...As long as I don't go after that, I'm sort of covered. The age limit would be the record of a woman getting pregnant without interference, and that would be 56, and I don't go beyond that" (Murray 1995:1).

II REPRODUCTIVE RISKS

Concerns about "granny pregnancies" for women is a somewhat futuristic problem, but the effects of superovulatory drugs on women undergoing infertility therapy is a more
pressing issue. Currently, little is known about the effects of the superovulatory drugs that are given to women during the IVF process, in order to produce multiple oocytes which can be inseminated and become multiple embryos. How many times women may safely undergo the procedure is also unclear, as one IVF nurse explained:

I don't think I would do it more than three times, because they don't know what kind of side-effects they may have in the future. I have some patients who have gone through over five times, One lady actually had eleven cycles, but only went to retrieval seven times. She got twins out of that. But I have to wonder...a good part of me thinks that maybe in the future she will end up with ovarian cancer and who knows, but I think that anything in moderation seems to be OK and when you go over four that's when you are going to get yourself into problems.

So I think the drugs themselves, they are constantly testing them and trying to learn to do things better. But I think you are taking your chances whenever you take any drug. With my asthma medication, I know the risks. I think that people going through IVF also know the risks. They certainly have enough information to open their eyes to know of the risks and the doctors do their best counseling people on each and every treatment cycle and if they don't feel they can benefit from coming again, they don't encourage them. We used to limit it to three cycles, but now its not limited. But the majority of couples don't do it more than three times. Particularly for financial reasons they will only try it twice. And if they happen to get pregnant and then maybe lose it, they will try again. But we do have those who are going five times. (interview with IVF nurse September 1993)

The feminist critique has cautioned that there may be a chemical relationship between the drugs used in superovulation and diethylstilbestrol (DES) and if past history has any bearing on the matter, often these drugs have been used on women, before they were adequately tested. Surprisingly the first round of cautions has emerged in the epidemiological literature, with an unclear response from fertility experts around the world. In distinction the feminist response has been unifyingly clear about the potential risks to women and their children.
Paradoxically, on the one hand, women are at risk if they do not reproduce, in that they may be at risk for various types of killing cancers; and on the other hand, women who are infertile may be at risk if they take drugs which may cause ovarian cancer. Still further, if they do produce children, these children may be at risk because they were artificially conceived. Balanced against these risks are the screening technologies and therapies that offer to protect women against the risks of giving birth to children with genetically transmitted diseases. Therefore these women must submit themselves to the additional risk of invasive screening techniques such as amniocentesis and chorionic villus sampling (see glossary) while they are pregnant, and furthermore have to make what might be a morally distasteful decision to have a therapeutic abortion in the event the test is "positive" (or rather "negative" in its detection of a genetic abnormality). Alternatively, as is beginning to become possible, women may even submit to the IVF procedure in order that their pre-implantation embryos may be screened. This permits a "defective" pre-embryo to be discarded before it has developed into a fetus. (Newell 1995:22-23). This too may be a situation which raises moral distaste for some women. Research is now at the point where it may not be long before genetic surgery will be performed on pre-embryos in order to remove and replace abnormal genes. What will be the effect on those children born from manipulated pre-embryos is a distant story; or perhaps it is not so far in the future! As feminists have pointed out, this is a neoeugenic thrust to distinguish what constitute "good" and "bad" genes or pre-embryos.

(i) A History of Miracle Drugs and Devices and Reproductive Errors

Since the Second World War, a wave of reproductive disasters has been created with the rapid expansion of the pharmaceutical/chemical/biotechnology industry. Transnational pharmaceutical companies have developed a highly profitable industry and
Some of their products, along with the manufacture of contraceptive barrier devices, used to control conception or regulate pregnancy problems, have been marketed before adequate testing was conducted or under false claims of safety and efficacy. Examples of these drugs and devices, which have been featured in major court cases are diethylstilbestrol (DES), Depo-Provera (DMPA), the Dalkon Shield (aka Copper Seven), an intra-uterine device (IUD) and thalidomide. Adding to this string of reproductive errors, current questions are being raised about the safety of the superovulatory drugs used in hormonal treatments for infertility and in IVF, as well a new contraceptive, Norplant, which has begun to be marketed in Canada (Tudiver 1994).

Feminist writers (Bunkle 1984, Simand 1989, Clarke 1989, Tudiver 1993a, 1994) have been largely responsible for bringing attention to the dangers of many of these drugs for women. Contributors to Arditti et al. (1984), many of whom were members of The Feminist International Network of Resistance to Reproductive Technologies and Genetic Engineering (FINRRAGE), were among the first to document the human trials and applications of synthetic hormones used to control female reproductive issue. Most often these drugs were used on poor women, women of colour, lesbians, disabled women, most often in the third and fourth worlds.

Simand (1989) has traced the course of the synthetic hormone diethylstilbestrol (DES), first synthesized in Britain in 1938 and because it was never patented, it was produced by over 300 pharmaceutical companies for over thirty years. Most commonly used for prevention of miscarriages, its legacy has been the cause of various problems, such as cancer, infertility and pregnancy problems (Simand 1989:95). It was not until

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10 For a comprehensive coverage of international developments in the pharmaceutical industry and more recently the developments in biotechnology and their linkage with pharmaceutical companies, see current research by Canadian feminist anthropologist Sari Tudiver (1993a; 1994).
1971 that the United States Food and Drug Administration (FDA) contraindicated the drug during pregnancy because of evidence that it was linked with a rare form of cancer in daughters of women who were prescribed DES. The effects of DES appeared twenty years after the exposure in utero to the drug, which heralds an ill omen for organizations such as DES Action Canada, who also have concerns about the long-term effects of superovulatory drugs, used in IVF, which some maintain have a similar composition to DES. Ironically, it is many of the daughters of DES users, who now are experiencing infertility or pregnancy problems, and who themselves are using superovulatory drugs and IVF.

One of the potential side effects of the long-acting, injectable, reversible contraceptives, Depo-Provera (DMPA), is also infertility problems (Bunkle 1984, Clarke 1989). Its use has been controversial in Canada for the last two decades because of powerful lobbying of drug regulatory bodies in industrialized countries. In January 1994, the Society of Obstetricians and Gynaecologists of Canada (hereafter referred to as SOGC) released a policy paper recommending that Depo-Provera (DMPA) should be approved for use again in Canada as a long-acting injectable, reversible contraceptive, with the most effective protection against pregnancy (SOGC 1994). Canadian anthropologist Tudiver (1994) has documented similar concerns, which have been raised.

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11 In a single injection which lasts for three months, DMPA releases a huge burst of progestin into the bloodstream. DMPA has been widely used in more than sixty countries and recently it has been approved for use by the Food and Drug Administration (FDA) in the U.S., where it has been banned since the mid-1970s, because of a research protocol which proved increased incidence of breast tumours in female beagles. Subsequently, this study on beagles was found to be irrelevant to humans. For 10% of users their fertility is permanently impaired. Although most of the minor side effects of the drug are manageable with good counseling and medical care, problems have arisen in the dispensing of this drug for long-term contraception with little or no follow up. Whether this situation would occur in Canada, as it has in so many parts of the developing world, is a mute point.
recently by critics of a new long-acting contraceptive, Norplant, developed by the Population Council, a private organization based in New York, and tested on women in the developing world (Tudiver 1994).\footnote{An article from the Economist, "Contraception, Clipping the Stork's Wings" (reprinted in The Globe and Mail February 27th 1993) promotes Norplant, along with Levo-Ova (registered for use only in Sweden) as an improvement on DMPA, because it releases low, steady levels of progestin.}

The Dalkon Shield, another contraceptive device, not only proved ineffective on occasion, but also caused physical trauma to many women when it was inserted, due to infection and in particular, when pregnancy occurred with the IUD in place (Arditti and Minden 1984). This IUD was taken off the market in the United States. in the mid 1970s after several women died of toxemia resulting from its use (ibid:128). Other feminists (Shiva and Marcelis 1986) have drawn attention to the uncontrollable power of drug companies in developing countries, who market a potentially dangerous group of high dose estrogen-progesterone (EP) combination hormonal preparations.\footnote{EP drugs are dispensed in injections or pills "containing the same female sex hormones as the contraceptive pill but in much higher dosage. They were thought to induce menstruation in women whose periods were delayed and who were not pregnant" (Shiva and Marcelis 1986:18). Women started to use these drugs in the misbelief they could bring on a miscarriage by inducing menstruation, an action which the drug does not have in pregnancy. The result was the birth of many babies with congenital deformities.} EP drugs were withdrawn from the Western markets in the mid 1970s, but continue to be sold in Philippines, Africa, India and other developing countries (ibid). The last of these ill-fated drugs, the results of which are still seen today, is thalidomide. This drug was prescribed for early morning sickness in pregnancy, was also widely used in Canada, with the disastrous consequence for children of the users being born with limb deficiencies.

These examples show some of the devastating effects of the widespread use of pharmaceutical agents on women's reproductive tracts, as a consequence of inadequate
testing and regulation. Obviously, there are many other preparations and contraceptive
devices that have been of enormous value to women's control over their fertility. But
unfortunately, the medical fraternity and drug companies have had a chequered history of
mishaps, whose victims have been trusting women. These same inconsistencies have also
arisen in the legal controls over women's reproductive functions. There exists a legacy of
often coercive regulation not only over women's ability to conceive, but also over their
lifestyle during pregnancies or their birthing preferences (see Chapter 5, section V(ii)).
Sociologist of law, Smart draws the parallel between the iatrogenic potential of medicine
and what she call the juridogenic nature of law:

However, we are also aware of the iatrogenic potential of medicine, namely
its ability to create illness and disease in the process of striving for cures. It
is time we extended this insight to the field of law. We need to consider
that in exercising law we may produce effects that make conditions worse,
and that in worsening conditions we make the mistake of assuming that we
need more doses of legislation (Smart 1989:161).

(ii) Risky Business: Superovulation and Fears of Ovarian Cancer

Feminists, who were interviewed for this research, were unified in drawing attention
to the past litany of reproductive disasters, which have often resulted from tampering with
women's normal endocrine functions. They fear there is a correlation between past
practices and the superovulation therapies associated with IVF. It has become the
treatment of preference in most IVF clinics in the last couples of years to target the
ovaries with long-acting analogs of gonadotrophin releasing hormone (GnRH), because
they suppress normal endogenous pituitary action and replace it with a more controlled
one. While many women patients experience unpleasant side effects from these drugs, in
rare cases hyperstimulation (see glossary) occurs. Incidents have been reported where this
syndrome on occasion results in death.
Heightened awareness about the lack of incontrovertible medical and epidemiological evidence as to risks of fertility drugs are just surfacing and raise an unpleasant specter for women. Firstly, it is believed that women may be more at risk for ovarian cancer if they do not conform to normal societal expectations to bear children, and/or secondly, that if they do resort to hormonal infertility treatment, they may also incur similar risks to which fertile women are not exposed. In the meantime drug companies, fertility societies and other federal regulatory bodies are banding together to ensure that therapy continues as usual, so long as, they say, patients are fully informed of the risks.

Although discussions about complications of assisted procreative techniques such as IVF have been raised by contributors to the feminist literature on new reproductive technologies (Arditti et al 1984, Corea 1985, Corea et al 1987, Stanworth 1987, Spallone 1987, Baruch et al 1988, Overall 1989, Ratcliffe 1989) since the middle of the 1980s, it has taken almost another decade before medical experts have begun seriously to address these concerns in their professional fora. Given that press coverage of professional meetings are common, this concern is beginning to reach public purview. It is not uncommon now for feminist critics to attend international medical conferences (see two part film On the Eighth Day: Perfecting Mother Nature (CFB 1992)). Conferences provide a unique source of ethnographic research, as I have found out for myself, especially in the informal question periods and discussion groups, when concerns are raised that do not appear in professional papers. Reading the editorials in the medical journals are also enlightening once one gets beyond the medical transcription problems.

Feminists have often noticed the strategy whereby professionals, corporations and politicians tend to close ranks to recreate the "old boys' network" and present the party line when the going gets tough. Due to the difficulties of getting access to controversial
"in house" information and the lack of funding for feminist projects into institutions, very often the feminist responses are less from first hand evidence and more from past precedents and second hand sources of evidence. This seems to have been the case following the recent controversy over concerns about ovarian cancer related to "fertility drugs", raised by a recent epidemiological study by Whittemore et al (1992). I am unaware of any social science critique on this subject to date. My own interpretations are rendered from journal articles in international professional medical journals, such as the Fertility and Sterility and Human Reproduction, as well as IVF news sheets, bulletins and media coverage about international meetings.

III POSSESSION OR PERSONS? THE POLARIZED LANGUAGE OF RIGHTS DISCOURSE

In this research I sought definitions of the pre-embryo from my participants. Differing epistemologies obviously guided the perspective taken. As noted in Chapter 4, health professionals frame their responses in terms of their relationship to the pre-embryo in the laboratory or in relation to the clients they serve. Feminist lawyers often present definitions that are consistent with legal ideas about personhood and ownership. Often they use the legal reasoning that has developed in the past few years about definitions of personhood in relation to the fetus, which has arisen out of abortion debates. A definition of "potentiality for personhood" seemed to be a common thread, with respect to a changing social and legal view of the fetus in relation to a woman's body and as an emerging entity in its own right due to screening technologies and fetal surgery.

The emerging political message of fetal personhood sends a clear message to feminists that a woman's relationship with her fetus must have similar implications for her
relationship with her pre-embryo. In the past decade, the rhetoric and imagery surrounding the abortion debate is that prenatal screening and monitoring technologies have increasingly allowed the fetus to be reified as a physical entity separate from the woman, who hides and protects the fetus within her body. Strangely, this objectification of the fetus has resulted in an identification of the fetus with personhood status, at the expense of the effacement of the pregnant woman. Images and metaphors of the fetus as person are increasingly entering the rhetoric of the abortion debate, promoted by the pro-life movement, as well as being reinforced by maternal/fetal health management. This strategy has the effect of women's bodies being fragmented. Pregnant women are seen as wombs, which house autonomous little people.

Commonly used screening and monitoring technologies for "hearing" and "seeing" the invisible aspects of human reproduction at various developmental stages prove incontrovertibly to the experts and patients alike that fetuses exist as autonomous entities both in time and space. However, this reification process is endorsed also by other groups interested in the world of fetuses and embryos. Most notable perhaps has been the pro-life utilization of powerful fetal imagery of a fetus being aborted in _The Silent Scream_ to reinforce fetal subjectivity. Petcheschy has shown the illusory nature of this use of technology to create an alternative reality, by decoding the imagery by which the video purports to show a medical event, a real time ultrasound imaging of twelve-week old foetus being aborted. What we see in fact is an image of an image of an image; or rather, three concentric frames: our television or video cassette recorder screen, which in turn frames the video screen of the filming studio, which in turn frames a shadowy, black and white, pulsating blob; the (alleged) foetus" (Petchesky 1987:59).

The receptive human eye and mind fill in unidentified spaces to create the wished for image. The early implanted embryo prior to its fetal stage can also be visualized by
ultrasonography in much the same way. It demonstrates to physicians and patients alike that an IVF pre-embryo actually is there in utero, a reality that IVF patients have longed for. An infertility specialist, specializing in recurrent pregnancy loss, demonstrates the ease with which ultrasound technology conflates seeing and hearing in the experience of the technology practitioner. She describes the arbitrariness of interpreting embryonic development. The point at which she envisages and thereby interprets an embryo as an embryo is:

when I see a heartbeat (my emphasis). I'll pick up a heartbeat between 5-6 weeks gestation and usually I can pick up a heart rate before I can actually measure the fetal pole and that's when I seem to think an embryo is there, or that it is to me a cluster of cells dividing. But once you start seeing from five and a half weeks on, on a bi-weekly basis, this little fetal pole developing, that is a real person to me. (interview with IVF and recurrent pregnancy loss specialist August 1993)

What the ultrasonographer sees on the screen at the early stage of ultrasound monitoring is the pulsating of a rudimentary heart, which by extrapolation becomes an embryo. It is only later that the imagery of the developing fetal pole begins to clarify its physical existence in space and time.

(i) Property for Personhood: Searching for the Middle Ground

Questions most often pondered about the pre-embryo in relation to the people who surround it are posed in a number of ways. Who owns them? Who has an interest in them? Are they possessions like animals, handbags? Are there linear gradations between the status of property and the evolving status of personhood, what Radin (1982) has called "property for personhood"? The language of feminist activists and lawyers on both sides of the pro-choice/pro-life equation are often couched in the language rights discourse, therefore the definition of the pre-embryo is often also framed in the
dichotomous language of personhood/property. In the last decade, the escalation of non-coital procreation, abortion issues and the "best interests of the child" have complicated the status which are accorded to fetuses and has opened up further the rift between maternal and fetal rights (Keyserlingk 1982; Rodgers 1986; Minow 1987; King 1989; Schneider 1991).

Discussions about pre-embryos often centre around the legal distinction between law governing persons, law governing property, contract law and patents law. This model of law was developed without any consideration of the products of human reproduction in mind. Unlike many cultures and earlier western peasant culture, the centrality of reproduction is entirely absent from the Western legal tradition, because there is no central notion of becoming a person or entities that are neither persons nor property.

It may be that in the future Canadian law is going to have to find some middle ground to accommodate fetuses and pre-embryos, because at present legislation with respect to abortion clouds the reasoning, particularly for pro-choice feminists, who see the pitfalls of favouring one definition over the other. Recent discussions have acknowledged the limitations of the property/personhood dichotomy in relation to embryos, Even the report of The Law Reform Commission of Canada (1992), before it was disbanded, pointed out that a legal category does not exist into which the pre-embryo might be neatly fitted. This void leads to uncertainty among some feminist legal scholars as they search for definitions, some of which are abstract and draw on recent interpretations of Canadian jurisprudence relating to abortion. Other views are grounded more concretely in the natural symbiotic relationship between women and their fetuses/embryos.

A legal understanding draws a sharp line between persons and non-person and according to the Morgentaler decision a fetus is a non-person and the current status of our law and in law a termination of a fetus is not the same as euthanasia, but fetuses occupy an interesting status because they are not persons. But they are also not property, I think...I'm not sure...it will be
interesting to think about it some more in relationship to your concern about embryos because when you were suggesting that perhaps post-implantation embryos would fit into the law of person, well fetuses don't, but neither does it fit in the law of property.

At least feminists that don't embrace capitalism would want to resist that idea - they want to preserve abortion rights for women on the one hand and they can't assign fetuses and embryos into the person category, because that jeopardizes abortion rights. Nor do they want to assign fetuses and embryos into the property category, because that gets you right into commodification - property is commodities, so they are caught in this dichotomy and I haven't read it expressed this way, but what I think is going on is an effort to carve out some sort of understanding of non-property and non-person, which embryos and fetuses could occupy. I think that has for me anyway a lot of resonance, I find it hard to consider an early pregnancy baby, whereas towards the end of pregnancy I find it easier to see. But for me birth has to remain a legally significant event. But earlier on it is difficult to see an embryo or an early fetus as person and as appropriately governed by these concepts that we apply to relations between persons. On the other hand I strongly resist the notion of embryo or fetus as property. For me it is just not like the rules that we have about property, but maybe in part it's because I don't like a lot of the rules that we have about property. (interview with feminist legal scholar November 1993)

Another feminist phrased her ambivalence this way:

I can more easily define it in the negative than the positive. What it is not is not a person, not a rights bearing entity. I think it is a form of human life that has the potential to go on to be a person, but only because of some radical changes that it will go through. I don't see it and this might change through our conversation ..I don't see it as a form of property. I see it as something that has inherent social value, that is something worthy of protection, but without necessarily being ascribed with personhood. I see it as a fetus in a sense, but only earlier. But there is a value in its potential to become a human being. (interview with disability rights and legal feminist scholar October 1993)

Yet another feminist lawyer, searches in vain for a synthesis between personhood and property:
I don't think the law is settled in this area, in terms of opinion, I feel that based on where the definition of human life are legally thus far, fetuses are not given the status of a person until emanated from the body of the woman at birth. That is shifting as we are seeing operations being performed on fetuses while they are still in a woman's body. But I think that the legal definition still holds and it has to be a separate life before it can be accorded legal personhood. In terms of human embryos, I get confused about the fact that there is a physical separateness to the embryo and clearly in terms of scientific inquiry there could be 'uses' for the embryo, which might not necessarily impact on the person who would eventually have to carry that embryo to make it come to life, that is the woman. I feel quite anxious about giving the status of human personhood to an entity that can be separate for legal persons, i.e. science. I am more inclined to think of it as a property issue, except I am uncomfortable with the dichotomizing of that language. It is not a piece of property neither is it a person I think probably what will happen is there will be some intermediate status for different purposes, a functional definition that will evolve. (interview with feminist legal scholar November 1993)

Another disability rights activist familiar with legal reasoning clearly defined the embryo as analogous to a fetus, and therefore not as a rights-bearing entity. She refuses to contextualize the pre-embryo as in any way separate from a woman's body:

I don't think of embryos as persons and I don't think of them as property. I think of them as a part of a woman's body, and I believe in the decision that the Supreme Court of Canada made in the Sullivan case, the Midwives case, 14 which said that until the fetus is out of the woman's body as a human being, it isn't a person. I think that is the right way to think of it. I will continue to insist that that's the case, because I think that we are entering on something that is extraordinary dangerous and in fact we don't have any of these questions figured out, I think too that it dangerous to think of embryos as property and we can now see in the court cases that we have different people arguing over whether or not its this person's

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14 Sullivan and LeMay v R. is an important case in Canadian jurisprudence because it makes the clear distinction that a fetus is not a "person" until fully extruded from the birth canal. Feminists, such as the Legal Education and Action Fund (LEAF), one of the intervenors in the case, provided a feminist analysis which did not place mother and her fetus in an adversarial relationship. (Boyle 1991)
property or that person's property. (interview with disability rights activist November 1993)

A similar position is taken in this account:

Rights do not attach until we have a birth...I don't intuitively see embryos as property in the same way as body parts, with inherent value. I have great difficulty with the whole concept of them being separate from their natural environment in the first place. I think that the best way to protect fetuses and the whole chain is through the women in whom they develop. Once you take them out of that context, I have difficulty in conceiving what they really are, because I believe that they should stay where they belong, to be specific. And the best way to protect them is through the women who carry them. (interview with feminist legal scholar September 1993)

The polarizing language of property and personhood, which has been used in the American cases to date has masked the varying degrees of interest that people involved with pre-embryos may have. The property interests are of a quite opposite nature, ranging between those held by the stakeholders in the technology, the clinics and brokers, who create, store and market embryos, and those who are the recipients of the technology, biological parents and surrogates, who also have a sense of ownership over their reproductive products and capacities.

It is not property, not person status but something else. Whether it needs to be in a legal context, I am not clear about why we should need such a definition. The Davis and Jones cases (see chapter 5) are working on the assumption that the embryo is property and that the cases take off from there. The clinic should not have any vested interest in the embryo neither should the state. If anyone has a vested interest, it should be the biological parents. (interview with feminist activist with Vancouver Coalition on NRTs February 1994)

Radin (1982) has proposed a middle ground between property and personhood, the "property for personhood" which can include bodily parts and organs, to which people feel a very personal attachment. Some bodily substances and organs are less inalienable than
others. A recent example was the California case, Moore v the Regents of the University of California et al in 1990, concerning the property rights to cell lines derived from human tissue (Greenberg and Kamin 1993). It is a not unreasonable claim that some people may feel this sense of propriety over their pre-embryos, perhaps in a different way than they might feel about natural wastage of gametes, sperm and ova, which happens all the time in nature.

(ii) "Wrongful Life" and "Rights to Life"

Another way in which the pre-embryo has been imbued with a quasi-status of personhood is that it may be becoming the "subject" rather than the "object" of litigation in the same way as fetuses have recently. Although as yet no precedent setting cases have come before the Canadian courts, there is a genuine potential that the pre-embryo may be defined in terms of its potential to sue or be sued, in the same way as fetuses have become the focus of wrongful life and rights to life suits. Will it be possible to plead criminal negligence against IVF clinics for pre-implantation mismanagement on the basis of certain pre-defined characteristics?

You would have to know whether this thing in its form was able to sue or be sued. You'd have to decide on the circumstances of its alienations, (transfers). Torts are important, because it is issues of injury, liability, and so on and who or what - what characteristics of an entity needs there to be to say that an injury that an entity has a right to bring a legal action. (interview with disability rights lawyer November 1993)

Dickens (1991) has already constructed a regulatory framework for CRCNRT in which these issues might be considered. (see Chapter 5, section III). The risks to pre-embryos from pre-implantation manipulation is one potential problem. However, another set of problems which is already a reality is the effects on women and their subsequent
children from multiple pregnancies, with the attendant increased incidence of prematurity, low birth weight and malformations. The scientific rationale for transferring multiple pre-embryos is that a better chance exists of just one implanting and developing into a normal fetus and child.

Once the mother is induced for superovulation, we do end up having many, many embryos. So at this time we are transporting on average a maximum of four healthy embryos in any treatment cycle. For example, if we have ten, we still end up with having six extra embryos. so we can't throw them away. We cannot transfer all of them, so I think that there is a lot of evidence to freeze them. How did they decide four, because two is better than one, three than two, four better than three, based on our experience of IVF procedures in the whole world. So if we transfer more than one, there appears to be some beneficial effect between embryos if we transfer more than two (in order) to establish the pregnancies. That is one thing. Also we know that if we transfer more than four, it is easy to have multiple pregnancies. So that's why we try to transfer three or four embryos. (interview with IVF laboratory director November 1993)

The reality is that there is a high incidence of multiple births with IVF. The University of British Columbia IVF programme has had its share of twins and triplets born from IVF, and higher denominations have been recorded in Canada. Two recent cases of quintuplets have been born as the result of using fertility drugs. The mother of the Forgies quintuplets, born in Orleans, Ontario on September 22nd 1987, had been taking the fertility drug, Clomid. The first IVF quintuplets born in Canada and only the third in the world were born to the Colliers of Holland Landing, Ontario on February 6, 1988. In this case they resulted from five fertilized and implanted embryos (Hill 1994).

Feminists, along with health economists, have been critical of these multiple births for a number of reasons. First, they point to the drain on the health care system for the management of high risk pregnancies, peri-natal problems and low birth weight babies. Second, they raise concerns about the challenges to families of raising large families and
the costs to the social welfare system for financial, medical and educational assistance. Ideas about individualized family responsibilities for rearing children are well entrenched in Canadian liberal ideology. There is an expectation that families will cope with whatever problems beset them, even when it means coping with severe disabilities that affect the whole family, as the recent Canadian Lamont merciful killing case reflected.

Unlike customary adoption, where the onus is on a more community based sense of sharing various kinds of connection, in white western society we tend to assume that a couple is going to keep their five babies and struggle through with whatever minimal state support they might get. It is a reflection of how nuclearized our ideas of family are, that people have to take care of their own. (interview with feminist legal specialist in child custody law August 1993).

A third criticism is that very little is known yet about the effects of IVF on the physical and psychological development of children born through such technologies. However, feminist do point out that since it is women who bear the children and are largely responsible for raising them, that they are the ones most likely to have to cope with any long-term problems. Risk management is only just becoming an important field of medicine, as is increased emphasis on informed consent by patients. A recent French study reported at a conference examining medical, psychological and legal issues raised by artificial reproduction, held in Brussels in July 1994, found high rates of deformities in IVF births. The survey demonstrated no single type of handicap. Paediatrician Pierre Lequien found 5.1% of 394 children included in the study had "serious malformations...This is higher than the national average of 2%, but also higher than the level observed in comparable surveys" (Reuters 3 July 1994).

Another study conducted on children born between 1982-1986 at Case Western Reserve University, in Cleveland, also found a litany of ills, such as retardation, poor eyesight and inattentiveness. These children had been premature babies, who had survived
due to care in newborn intensive care units. *(The Vancouver Sun*, September 22, 1994:A15). Although unsubstantiated, the increased incidence of multiple births and associated low birth weights and premature deliveries with IVF may have had some influence on these figures.

### IV REPRODUCING DISABILITY: A FAULTY PARADIGM

(i) **Defective "genes", women as "defective": Choice and Coercion**

One of the strongest responses from the feminist community in relation to NRTs has come from the Canadian Disability Rights Coalition (CDRC) and The Disabled Women's Network (DAWN). They have raised a number of concerns about the ability to create pre-embryos, mainly from the perspective of the medical genetic propensity of pre-implantation screening technology to construct disability in terms of quality management. This medical strategy has the effect of institutionalizing disposal of medically determined "damaged goods" in the name of eradication of defects from the (re)production line.

CDRC and DAWN at their first national conference in November 1989, identified as a crucial issue NRTs and their effects on the rights of people with disabilities. They constructed a final report to CRCNRT which they submitted in July 1992. It was based on four position papers by three feminist lawyers and a DAWN representative. It identified two major initiatives - removing the eugenic component and enhancing reproductive autonomy for all women (Goundry 1992).

The report argued that the eugenic component in NRTs directly discriminates and devalues people with disabilities. Eugenic language is riddled with a lexicon of "perfect babies" and "defective genes".
There is a strong "eugenic" component in the new reproductive technologies. The emphasis of the detection technologies in particular on the production of "perfect babies" by eliminating "defective" fetuses. This form of modern day eugenics has a number of disastrous implications for existing persons with disabilities. First, the emphasis on eliminating disability diverts public attention and resources away from disability discrimination, that is, the social, economic and legal consequences of disability are ignored and remain entrenched. Second, a public policy which supports detection technologies for the purposes of eliminating fetal anomalies, reinforces the discriminatory view that existing persons with disabilities are inherently lacking in value as human beings (Goundry 1992:1).

The language of "good" and "bad" embryos is commonly used in detecting single gene disorders in pre-embryos, thereby giving justification to the perceived advantage of easier disposability, just because they are not implanted at the time of diagnosis. This thinking in no way recognizes the physical and emotional experiences involved in the creation of those pre-embryos in the first place, as is discussed in Chapter 4. A flagrant eugenic component is obvious here in that it is simpler to select those pre-embryos, the "good" ones, which are wanted from those "bad" ones, which are not. Mori argues that one of the problems for medical ethics today is that today's society is on shifting moral ground as "we are assisting a change from an ethics of sanctity of human life to an ethics of the disposability of {mere biological} life" (Mori 1987:631).

Common-sense language has been assigned a specialized meaning in the context of screening technologies. Building on Schneider's (1968(1980):4) insights about the polysemic nature of words in scientific language, Rapp (1994) has demonstrated similar strategies used in genetic counselors' "science-speak".

Thus, a "positive family history", an "uneventful pregnancy", or "unremarkable family background", even the concept of "reassurance" or the notion of "ethnic background" hold specific meanings in counseling discourse. Often these invert common-sense understandings: A "positive family history", for example, is anything but, as it refers to the presence of
a serious, genetically transmissible condition. It is rare that a woman codes her own pregnancy as "uneventful", although this label marks the counselor's assessment that no further testing is indicated (Rapp 1994:7-8).

A similar inversion is noted in the language of "good" and "bad" embryos. The limited confines of meanings in the scientific domain tend to suppress other meanings that the word may have. At a subliminal level, the language thus justifies the actions.

Clearly there are other issues here because as you mentioned earlier on there is a eugenic context to the whole thing. You used the term "good embryo" yourself. It's about deciding which are "good" and which are "bad" embryos. But it's that simple, once you decide which are "good" ones, you are also deciding which are "bad" ones, so talk about this as only being positive or only being negative eugenics makes no sense to me to make that kind of distinction, because it's both. And Jacques Testart {French IVF specialist} said the same thing and he stopped doing this for that reason. Most feminists that I know would argue the same thing. When you start to come down to it, how can you say that selecting good embryos is positive eugenics and discarding bad ones is negative eugenics, if you are doing the same thing, by selecting one embryo. you are doing positive and negative eugenics. It is a field that is full of such ridiculous distinctions in some ways, yet people get so caught up in the logic of those distinctions at times, because they provide such useful rhetorical shields, that I think we often lose sight of what is important. (interview with feminist scholar and activist November 1993)

(ii) The Woman in the Body

The second issue raised by CDRC is reproductive autonomy for all women. In their recommendations to CRCNRT, they pointed to the particular meaning of reproductive rights for women with disabilities. This meaning is informed by

a historical experience of oppressive attitudes and discriminatory practices in relation to their sexual and reproductive lives. Forced sterilizations and prescription of unsafe contraceptives have marked the lives of generations of women with disabilities. In short the exercise of reproductive autonomy has not been part of the historical experience of women with disabilities

15 This is Emily Martin's (1987) term.
which is a product of the fact they are both women and disabled" (Goundry 1992:13).

Further recommendations have demanded that women must retain control over their bodies, even to the point of including the choice to have a baby with a disability. For some women lack of control over their reproductive autonomy has meant denial of the opportunity to bear a child. For example, a past act of enforced reproductive violence against a "disabled" woman has been made in a recent law suit in British Columbia. Leilani Muir, who was sterilized as an institutionalized teenager in Alberta in 1959 under the Sexual Sterilization Act is now claiming damages. She was erroneously labeled as mentally defective, due in no small part to her abusive childhood, and admitted to The Provincial Training School for Mental Defectives in Red Deer, where the Alberta Eugenics Board approved the removal of her fallopian tubes (Tibbetts 1995a:A1). This is a precedent setting case, as many other women are similarly poised to demand reparation.

Feminists argue that the language of choice has centered broadly around the abortion debate and has to be rethought in the context of NRTs because

being a feminist you certainly can't talk about these technologies. without talking about abortion and the ways in which that shapes what we say. Because so much of that abortion discourse has been so limiting in some respects with respect to the word choice because now, of course, with a critique of NRTs, choice and who chooses which choices we can choose between has come to have a very different meaning. I think abortion activists and the pro-choice campaign has to reason the word choice. (interview with feminist activist November 1993)

Many feminist critics fear the replay of the eugenic heritage in the new technologies. In particular they query the risks for women who make the choice to engage in the huge social experiment, which is developing to control the beginnings of life. For example, how will superovulatory therapy affect women's health; what are the peri-natal and social effects of producing multiple families from multiple embryo transfers; what are the effects
for the health of those children born through such technology? What will be the effects when pre-embryos are manipulated before implantation for treatment of identified genetic disorders? What are some of the racial and socioeconomic factors which drive which type of woman will have access to the various technologies? Many of these issues are raised by feminists as they try to come to terms with the meanings for women of the production of pre-embryos external to women's bodies.

A particularly repetitive commentary emerged from the majority of women, whom I interviewed, feminist or non-feminist. The symbiotic association of a woman with her embryo/fetus was almost always considered significant, regardless of the pro-choice or pro-life ideological perspective. That a woman might for whatever reason decide to relinquish that tie by abortion was irrelevant to the understanding that the maternal/fetal bond was a primary, extraordinary relationship. This form of sociobiological reductionism stood in contrast to the criticism that reproduction is as much a cultural construct as a biological one, therefore women are supposed to think that pregnancy is important. As Schneider (1968(1980)) has pointed out biological processes are of course subject to cultural construction, but what is significant is the symbolic aspect behind that cultural construct. In this case it is the uniform valuing by my informants of the symbiotic relationship between embryo/fetus and woman. Destroying that relationship by separating pre-embryos from women's bodies through IVF and reinforcing that division in developing legal arguments about fetal personhood presents a very real threat to women's reproductive autonomy. It erodes the concept of women's control over the beginnings of life.

In the accounts that I collected from feminist participants, in which I discussed the evolving status of the embryo, I was impressed by the significance that women participants gave to the phenomenon of implantation in the gestational woman. Conception usually
was equated with implantation, the start of a pregnancy, whereas the moment of fertilization, if there can be one moment in a biological process, was of less interest. Conception as a symbol denoted symbiosis, a unified relationship between woman and fetus. Apprehension was expressed because of the technological ability of IVF to separate the pre-embryo, to reify it as an external entity, because of its potential political agency, when it is no longer associated with "the woman", who normally provides the gametes, gestates, gives birth and becomes the social mother of that pre-embryo. This fear was well expressed in the following comment by a prominent Canadian human rights activist:

I think of an embryo as a part of a woman's body and I think all constructions of it are politically charged, but the ones that don't see it as a part of a woman's body are certainly politically charged and extremely dangerous, not only for women, but for humankind. (Interview with feminist human rights activist August 1993)

This political construction is consistent with Raymond's argument in which she emphasizes the ethical underpinnings of law and public policy. She calls for the rejoining of ethical and political issues because otherwise "values such as the dignity and integrity of a woman's body have no political meaning and politics has no ethical grounding" (Raymond 1993:200). In particular reproductive issues about self-determination have to be taken seriously at three levels, the moral, the public policy and the legislative, in order that women's bodily integrity is kept central not peripheral to legal reasoning (Ibid:201).

Strangely, despite a controversial and high profile four year CRCNRT public process and two volume report, there has been a marked silence for nearly two years from

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16 I have used the term "woman" rather than "mother" throughout this thesis when referring to a woman in various stages of reproduction, prior to the actual birth of an infant, when she actually becomes a mother. I am grateful to feminist legal scholar, Nitya Iyer, for making this distinction, because the transposing of the term "mother" for "pregnant woman" has the conceptual effect of making the "woman" in the "mother" disappear.
the federal government. Nothing appears to have been done about a new National Regulatory Commission as called for as a priority in the report. One feminist critic described the lack of government initiative as an "intellectual property" problem, that is hard for the public or government alike to access:

So far we don't have any government discourse on this at all. Why? I think because they don't have a clue what to do with it. (I ask) What about Dawn Black? She's in the opposition. They are turning a blind eye to what's going on. But then they are not discussing day care either, so why would they discuss this type of thing. - What government is doing is treating this as though it's all private - It suffers from the public/private split, with this falling into what is supposedly the private realm, and therefore not something for government to be addressing. And of course its intellectual property questions that have to do with medical professionals, who regulate themselves. So we should stay out of it; so government are taking no positions, and not looking at the dangers. The bedrooms just happen to be expanding into the clinics. (interview with feminist human rights activist August 1993)

17 In July 1995 the federal government introduced an interim report calling for a moratorium on nine of the technologies. However, a National Regulatory Commission was promised but not instituted at that point.
CONCLUSION

The feminist critique about IVF and the creation of pre-embryos focuses on both the specific and individualized risks for women, who use the technologies, and the more general concerns about the tendency for reification of the pre-embryo to make women invisible, as is occurring with an increasing fetal subjectivity. The separation of gestation from conception is analogous to the separation of sex from conception. Each process leads closer to a future reality of replacing human biology with artificial reproduction. The eugenic component of this strategy for women alarms some feminists because they envisage a time when they are no longer the symbolic gatekeepers to the "natural" process of human reproduction and women will become not only irrelevant to family life, but also to the perpetuation of the human species.

Depending on the viewpoint taken, some feminists say that IVF should be discontinued until the social implications are more fully understood, while other feminists discuss the choices that women should have over access to such technologies. More complex still is the response of disability rights activists representing CDRC and DAWN, who on the one hand challenge the right of disabled women to have access to IVF, and demand that the gatekeepers to the technologies, the physicians, develop a more disability centered understanding. On the other hand advocates see the technology as a threat to sex equality rights for disabled women and as a faulted enterprise in thinking that it is possible to eliminate disability as a category from the human gene pool. So in accepting that the issues raised by feminists are as multi-faceted as the polyvocal voices of Canadian women, I attempt in this chapter to treat as equally valid all of these accounts. I do this from the standpoint of a feminist ethical methodology, which in the discipline of anthropology means privileging the culturally situated experiences of women. There are many truths,
and most certainly not one scientific truth, which itself is demonstrably gendered, as the feminist critique of science constantly reminds us. I refocus and sharpen the anthropological lens and by decolonizing privileged discourses, which are oppressively obstructive to women's best interest, I give precedence to the variety of feminist voices. These exist in a particular historical and cultural context in which a medical technology creates a cultural category, which in the hands of science, law and the marketplace becomes strangely antagonistic to women.
CHAPTER 7
THE PRE-EMBRYO AS SYMBOL:
ON THE THRESHOLD OF NEW BEGINNINGS

This thesis has argued that the new social category of the pre-embryo, emerging from *in vitro* fertilization technology, is generating highly specific kinds of discourses in bio-medical, legal and feminist interpretations. These discourses are situated within the unwieldy controversial terrain of NRTs and they demonstrate the critical values and the problematic symbolic significance of the pre-embryo as a newly emergent cultural symbol. These debates are instructive because they generate knowledge about fundamental values in Canadian society. They are morally charged. This is demonstrated by the fact that the discourses present values that are apparently conflicting, and therefore these struggles over values are translated into struggles over power. Struggles over values are interesting to anthropology because they represent the meanings and social consequences of the various new reproductive technologies (Melhuus 1992).

The conclusions I have reached identify four overarching issues which tie the three discourses together. These can be paired as "research science" and "clinical therapy", "risk" and "routine", "ownership" and "autonomy", and "culture" and "nature". I have argued that these are significant elements of the contested values placed on the pre-embryo as a newly emergent, biological, social, ethical and legal entity. These issues are framed in terms of tensions between polarities, which is a common tendency in Western thought. These cultural tensions are the result of unmediated oppositions between "research science" and "clinical therapy", between "experimental risk" and "routine therapy", between "ownership" (property) and "autonomy" (personhood), and between "technological reproduction" (culture) and "natural reproduction" (nature). The situation of the pre-embryo has highlighted these oppositions which have been previously hidden.
When the status of the pre-embryo is viewed from the standpoint of a vacillation between these opposing constructs, it is not surprising that cultural debate occurs.

Cultural ambivalence is built out of a sense of personal and social human security about beliefs and practices, and an opposing sense of uncertainty about future consequences of less knowable beliefs and practices. In the realm of human procreation, on the one hand there is confidence, a cultural immunity, in the everyday life experienced in making babies and forming families the "natural" way, the acceptance of routine medical procedures and the place that institutionalized technologies play in medical health care. There is an assumption that respect for bodily autonomy permits rational choices to be made by people who choose to access technologies related to either assisted procreation or the detection of genetically transmissible diseases. In general, people believe that medical treatments are safe and performed in the "patient's best interests" and in general, this is proved to be the case. However, the reverse is also true, in that there is a concomitant cultural apprehension, an uneasiness about using advanced medical technologies on human beings. When technology intervenes in procreation, it is construed as unnatural, coercive, experimental and therefore risky for human subjects. Consenting patients in this model are seen as research subjects, stripped of their bodily autonomy and conscious decision-making capacity. What seems like free will to make informed choices in one instance becomes coercion to take a chance in the face of limiting choices.

Generally stated each of the discursive frameworks I examine present a particular set of issues, which the other discourses under discussion see as more or less problematic. For example, the biomedical discourse encompasses two components, clinical practice and scientific research, which have quite different interests in the pre-embryo leading to conflicts in meaning. However, biomedicine constructs these aspects as complementary to each other in terms of gaining knowledge about and treatment of human diseases. The former, clinical practice is concerned with the therapeutic aspects of IVF, which envisages the pre-embryo as a means of providing a baby for an infertile couple; a symbol of family
life and family continuity. The latter, scientific research, interprets the pre-embryo as a biological cluster of cells, with a versatile use as a purveyor of genetic knowledge. Scientific research at its core represents the continuing fascination of embryology with understanding the mechanisms of how human life begins and how science may intervene in that process. IVF treatment is one means of putting this into practice. The "clinical" and the "scientific" approaches are presumed to be commensurate with one another.

The main issue for the legal discourse is captured by an ambivalence about categorization of the pre-embryo as "person" or as "property". Presently laws pertaining to personhood or laws pertaining to property or contract law are inadequate for purposes of definition. The explication is confused at present both by jurisprudence and case law with respect to how the fetus, as somewhat analogous to pre-embryos, may be defined and treated under Canadian law. While on the one hand the fetus has some degree of protection under the laws of person, on the other hand it still falls under property law, in that certain groups of people with a vested interest in it manifest an intensification of interest and control over its destiny the further along it is in its biological development. The dilemma rests on a basic presumption of ownership, interests in and control of the developing human entity at various stages prior to birth.

The concerns raised by the feminist discourse are less clearly defined in its representation of a diversity of views. But all the feminist views have the interests of women as their central organizing theme. The crux of the matter, however, is often phrased in terms of the dichotomy between choice and coercion, a reality often faced by women when they undertake reproductive technologies. The salient perspective pertains to reinforcement of the view that women must be autonomous, self-determining people, architects of their reproductive destinies, as opposed to objects of others' controlling interests, whether these be the prevailing interests of their pre-embryos or fetuses, their partners, IVF clinics, reproductive brokers or for that matter the state. A second perspective revolves around the degree of risk that women take when they engage in
assisted procreative techniques and whether or not they are unwitting research subjects of experimental programmes, which they believe to be routine procedures, in which they engage in a fully informed manner. This dilemma rests on the cultural values that underlie the meanings about choosing to use technologies that may put women at risk in order to conform to societal expectations. This is a conflict in Western values between the value placed on producing children and forming families, and the belief that children should not be brought into the world with genetic abnormalities which could be avoided.

Risk perception, however, is a cultural phenomenon and there is a common tendency to overlook dangers and to act under the influence of other countervailing cultural imperatives in society's confidence with modern technology (Whittaker 1994b:21). For example, infertile couples in their intense desire for a child voluntarily choose to engage in a technology, which they know may put women at risk or increase the risk of abnormalities in any resultant offspring.

Clearly, the context in which choices are made is of primary importance. The cultural ambivalence expressed in the disability rights discourse reinforces, on the one hand, people's rights to use reproductive technologies to become parents if they so choose and yet, on the other hand, remains skeptical about detection of genetic problems with all the new screening technologies, because of the way in which it diminishes the human dignity of those already living with disabilities. The eugenic thrust of the research is also profoundly worrying for disability rights groups, who resist the experimental aspects of the new genetic embryo research not only on the grounds that it may well be risky and result in iatrogenically caused disabilities, but because of its propensity to select certain types of traits over others, according to some predetermined medical evaluation of who should or should not be born.
I SCIENTIFIC RESEARCH AND CLINICAL PRACTICE

The two components of biomedical discourse, "clinical practice" and "scientific research" are both concerned with finding cures to disease - one for infertility and the other for genetic disorders. But as I mentioned in Chapter 3, the technical treatment of IVF did not just become morally significant in the late 1970s, it was part of an ancient preoccupation with scientific research about the beginning of life (Yoxen 1990). The research end of the research/treatment continuum has always been profoundly more challenging than the clinical treatment aspect and it is this venture which drives IVF into new terrains of research, rather than remaining focused on improving the technologies already in use. The solutions to infertility always seem to lie in some new technology on the research horizon, which ironically can most often be applied to newly defined infertile populations - for example, infertile men, aging women, gays and lesbians, and women with recurrent pregnancy loss syndrome.

The medical/technical discourse which I describe in this thesis primarily centres on the clinical application of IVF, which is a largely unsuccessful treatment modality. The therapeutic focus is formulated on assisting infertile couples and on generating "success" rates, with the ultimate goal of a healthy "take-home baby". IVF staff do not see themselves as doing biomedical science, which is performed by scientists who work more specifically on pre-embryos in remote research laboratories. However, in both "clinical practice" and "scientific research" the same in vitro fertilization technology is used to create pre-embryos, but for different agendas; the first claims to help infertile couples produce babies and the second claims to provide genetic information to help solve problems of genetically transmitted diseases.

This research set out to examine a conservative model of IVF therapy, as practiced in the University of British Columbia programme. Its primary concern is to treat infertile couples, living in stable heterosexual relationships. But during the lengthy course of my
data collection and analysis, the technology has moved on relentlessly. New information is just being published about state-of-the-art technologies which have built on IVF’s ability to create extra-uterine embryos. I have mentioned briefly some of these technologies in Chapter 3, because they represent the impetus of current research to chart new territories, or perhaps I should say map new genes. The tension between "research" and "therapy", even if both have the same ultimate goal of promoting cure, is an uneasy alliance, one favouring the exciting adventurous journeys of science and the other more monotonous and less challenging domain of daily treatment.¹

If the components of "clinical practice" and "scientific research" are separated out into their particular agendas a less complementary arrangement between the two can be created. It helps explain, in part, why the pre-embryo appears as a cultural anomaly. In the routine clinical application of IVF technology, "clinical practice" is envisaged to be first and foremost about assisting infertile couples to become parents. The pre-embryo, constructed through IVF technology as a therapy, is a symbol of fertility, of new life, a means of making a nuclear family, and of family continuity, an integral part in an endless chain of ancestors and descendants. It signifies blood relationships, a network of kin, a connection both across generations, by filiation (marriage), and over generations by descent. It is a part of a social universe, or as Schneider (1992) would state it, a symbol of enduring social solidarity.

In contrast, "scientific research" represents a preoccupation with understanding the mechanisms of how human life begins and how science may intervene in that process. It interprets the pre-embryo, not as a potential person, but as a biological cluster of undifferentiated, non-sentient, non-rational, totipotential cells, with a versatile use as a

¹ I believe that in part this quest for greater challenge is the motivation behind some of the University of British Columbia IVF Programme staff accepting appointments at the new private Genesis Clinic in Vancouver, which opened for IVF services in July 1995. It promises to offer some of the more controversial treatments which have been unavailable in the university programme.
purveyor of genetic knowledge. In this instance, the pre-embryo is a powerful hereditary symbol, in which the mysteries of each unique genome are wrapped up in the double helix of chromosomes and DNA. This pre-embryo also connects family past and family future, within its new genetic blueprint. At syngamy a unique hereditary map is constructed. In its new combination of chromosomes, it carries the legacy of ancestral biological strengths and weaknesses. In this process sometimes previously unexpressed genes surface on the hereditary blueprint, manifesting a genetic anomaly. In nature, these "defective" genes are often discarded in the natural biological wastage through inability to fertilize, or to implant in the uterus, or through spontaneous abortion, miscarriage or neonatal death. However, in the grip of research science the pre-embryo is reserved as a symbol of salvage, whose knowledge can be extracted. It can be manipulated to ascertain if it is the purveyor of an X-linked genetic disorder. If it is a carrier, it can then be discarded, or it can be kept for further research projects. In the near future it may become a research candidate for germ line surgery - a new form of patient, that will be operated on even before it is implanted in utero. But that is another story. For now the research pre-embryo is a symbol, not of future life, but of sudden death, with a familiar eugenic ring to it, not worthy of existence in the judgment of biomedical science. It is certainly not a symbol of enduring kinship relations.

The continuing fascination with embryo research has thus vacillated between research and therapy, back to research and on to new therapies, with the ultimate goal of developing new treatments for human diseases. The long-term venture is of course the eradication of disease, which given the money poured into the human genome project, some researchers would actually envisage as a realistic endeavour. Skeptics, which include among their ranks feminists and disability rights activists, have explained the false reasoning of this enterprise in that genetic abnormalities represent a small percentage of diseases and disabilities, most of which occur later on in life. They maintain that the
money would be better spent on remediying the problems already existing in the disabled population.

Research on pre-implantation embryos is often justified as morally more acceptable because, although each individual cell in a pre-embryo has its own genome, the cells are all undifferentiated and not yet vested with criteria for personhood as some ethicists might argue. Thus research on a minuscule cluster of cells can be objectively warranted in the absence of any recognition of the strenuous IVF ordeal that women have to experience to produce those "mere" cells. It is reasoned that pre-implantation screening does not place women in the same dilemma of having to undertake a pregnancy for a designated period of time in order for one of a number of later screening technologies to be applied. Neither does it involve the decision-making about whether or not to have a therapeutic abortion in the event that the test is "positive", or more correctly that the test has a negative result in detecting a manifested genetic abnormality in the fetus. In this way the emotional value and physical cost of creating IVF pre-embryos is minimized. Obviously in both scenarios women and their partners are subjected to considerable stress. "Scientific research" and "clinical practice" become inextricably intertwined in a common goal to fight disease and find cures, such that the risks taken by people who engage in advanced technologies are masked by the clinical reassurance of routine practices aimed at helping solve health problems.

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2 Singer and Wells (1984:87-92) have argued that there is no moral basis to make a distinction between sperm and ova that are wasted through menstruation, masturbation or insemination with contraception and the wastage of surplus embryos. Inglesias (1983:67) argues to the contrary that pre-embryos are human beings and must be given legal status Moral theologians Tieffel (1987:31) and Ramsay (1975) likewise believe pre-embryos to be persons and should be protected from unjustifiable research.
II ROUTINE AND RISK

The dilemma that McTeer (1992) points out about science's right to discover and society's right to protect itself presents a particular dilemma in the last decade of the twentieth century. It places medical therapy in a precarious relationship with scientific development. The accepted risk attached to the scientific endeavour in the hermetically sealed sterile, objective world of the laboratory, working on animal models or dead or discarded embryonic tissue, is of a qualitatively different nature to the risks that are taken in the clinical realm, when these technologies are applied to human beings. In the particular case of IVF, it is about an uneasy alliance between science-in-the-making and therapy-in-the-making, because humans have largely replaced animal models in the exercise. Separating risky science from routine therapy is a challenge which has been largely ignored in society's fascination with the technological imperative and often unjustified expectations about biomedicine's capacity to cure. When people engage in IVF treatment they generally assume that while its success rates may be poor, it is nevertheless a routine, safe technology. After all approximately 150,000 babies have been born worldwide as a result of assisted conception techniques, mostly related to IVF and clinics are continually opening up despite receiving no public funding in most countries. If there are dangers there is scant evidence of it in the press, except for the occasional television documentary on the Canadian Broadcasting Corporation television, such as On the Eighth Day or radio shows like Ideas (Sinclair 1991).

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3 France (20,000), the United States (17,000), Britain (15,000) Australia (12,500) lead the field in IVF births. In Canada, where the infertility is estimated to be around 10%, about 4,000 babies have been born. A recent survey found that the Canadian attitude towards IVF is that it is a hotly debated subject fraught with many ethical issues. It is seen as a luxury to some and a treatment of "disease" to others. (Infertility Newsletter July 1995)
The fine line between what is acceptable patient treatment and what is pure scientific research often collapses in the search for cures. This has been demonstrated through the two dimensional movement toward making medical practice appear more scientific. One dimension is "clinical science" or "clinical epidemiology", which demonstrates the development of increasing and "better" clinical science for medical practice. The other dimension, "clinical decision-making", makes clinical judgment "more rational, explicit, quantitative and formal" (Gordon 1988:257-258). Both of these trajectories embody specific forms of understanding about what represents clinical, rationally directed expertise. One source involves medical knowledge as is found in textbooks or simple scientific methods, the other is medical legitimation formed from clinical experience (ibid). Gordon questions whether these symbols of "art" and "science" are not just protective mechanisms hiding much that is neither artful nor very scientific (ibid:257). Medical practice is essentially arbitrary, which would seem to be particularly true for IVF therapy, otherwise the success rates would be significantly higher.

The current acceptance of IVF as a technical medical treatment for some forms of infertility has quickly become institutionalized and accepted as routine therapy, despite its lamentable success rates. IVF clinics do not construe their techniques as arbitrary and largely experimental, and patients do not imagine that they are research subjects. They do not see that the consent forms they sign are mainly constructed to protect the interests of clinics and to give IVF clients a general rather than a specific idea of what they are getting themselves into.

Wagner, a Canadian researcher with the World Health Organization, has pointed to the fact that chlamydia, a sexually transmitted disease, that is known to cause high rates of infertility, is not even a reportable disease in Canada. It is precisely this sort of lack of prevention which breeds the infertility market, on which science develops the pertinent technology and then industry markets what it calls cure. However, the performance of the technological is rarely subject to close scrutiny in terms of success rates.
There has been a hype of ideas with little attention given to the scientific evaluation of performance of this technology (IVF). If you read the world literature the success rate is around 10%...between 5 to 15%...still an 85% failure rate on the other side of the coin. Doctors insist this a standard treatment procedure and therefore should be funded by taxes. Well then they turn around and say, but it's research, and that we are going to do research to make it better. Well is it research or is it treatment? It's important that governments and people know. If it's research, then women are research subjects, and they should be told they are research subjects, and give their permission and all the other things that protect them from being research guinea pigs. (Marsden Wagner, quoted in NFB:992)

The risks attached to IVF therapy have not all been assessed. Iatrogenic causes can effect both women and the children born from the pre-embryo state. The increased incidence of multiple pregnancies and births, low birth weights and peri-natal problems are already well documented, there being research which suggests that children born from IVF have five times more problems than normal babies in the first few days of life, and twice the problems in the first few weeks. Less is understood about effects of damage to pre-embryos during their creation, cryopreservation and embryo replacement, in part because those pre-embryos often do not survive the long journey up to birth. The success rates with frozen embryo are too small yet to assess the health profiles of children born from cryopreservation. Concerns about the relationship between superovulation treatment and ovarian cancer are just beginning to be raised and nothing is known about the effects of pre-implantation biopsy on future children, or in the future, what will be the effects of gene surgery and germ-line genetic engineering. What is certain is that the latter is going to be a massive social engineering enterprise, the cultural risks of which one hardly dare contemplate.

But returning to present concerns, if IVF is still experimental, then how did science get out of the laboratory and into the clinic so easily? How did the "genie get out the bottle", such that rigid research controls on risky experimental procedures are translated into safe clinic service? The answers are obviously complex and deserving of a more specific study. However, I will make a few notable points. Firstly, it has to do with who
funds the research. Scientific research and its clinical application is increasingly being funded by corporate business. This trend is particularly noticeable in the case of NRTs, where the costs are largely underwritten by investment from the pharmaceutical/medical/instrument complex. Pharmaceutical companies, such as the multi-national corporation, Serono, which markets Pergonal, and its more recent competitor, Organon, which markets a competing drug are massively wealthy and their interests percolate into every aspect of the reproductive technology business, from community based infertility awareness groups to post-graduate training courses in exotic hideaways to lure clinicians and researchers to use their products. Serono is a powerful presence in the American Fertility Society, the world's largest fertility association.

Secondly, in Canada not only is research funding from governments diminishing, such as the Medical Research Council budgets, but so is the national health budget. Federal-provincial allocations have been incrementally decreasing during this decade, such that now each provincial government must fund fifty percent of the provincial health budget. In turn this cost is passed on to individual hospitals. As "closer to home" health care policies are encouraging community health control, the funding for much needed high cost technical machinery in hospitals is having to be found in other funding strategies, such as endowment funds, charitable health donations, lotteries, walk-a-thon to name but a few strategies.

Paradoxically, during the time that hospital budgets have been decreasing, these advanced technologies have been expanding in hospitals and clinics. Insidiously, what were once considered "experimental" technologies have undergone a process of what Koenig calls "routinization" (Koenig 1988; Barley 1988). There is an implicit assumption by both biomedical health providers and the general patient public that once an experimental technology has reached the stage of being routinely implemented in a clinical setting with predictable outcomes, that all of the dangers in human application have been eliminated.
Recently anthropologists (Mueller and Koenig 1988; Koenig 1988; Rapp 1991, 1993, Bassett 1993) have begun to examine the cultural meanings and social impact of a diversity of medical technologies, which have arisen from a growing moral imperative to use technology in biomedical treatment. Once technological treatments are accepted as a regular part of medical practice, a pattern emerges whereby the technology becomes people driven, in contrast to the normally accepted assumption that it is the technology that motivates the people. Often as technologies used on patients during the experimental stages gradually shift into common place usage, the meaning of medical technology changes too as the new machines increasingly become part of the treatment paraphernalia (Koenig 1988:466). The place of technology in the growth of medical knowledge and practice is always context dependent and not deterministic, as Bassett (1993:236) notes in his technology-centered approach to the electronic fetal monitor. Instead it is used by different interest groups in the hospital and community to further their own agendas, which often had little to do with providing the ultimate care for patients.

In the case of the IVF programme I examined, I discovered that the sperm manipulator had remained unused for years in the laboratory to the point where it is now defunct, because a suitably qualified person has been unavailable to use it for treatment of male factor infertility with IVF. Now that treatment of male infertility is becoming a significant new treatment of IVF, the meaning of the machine has changed and the IVF programme will now have to purchase a new machine. Without the state-of-the-art sperm manipulator, the University programme will not be able to remain competitive with the new Vancouver Genesis clinic, which is a much greater threat than that of losing patients who continue to cross the border to clinics in Washington State and California.
III. PROPERTY AND PERSON

A fundamental problem of categorization continues to resist a tidy definition of the pre-embryo for cultural, legal and ethical purposes. In Western thought there is a predisposition to separate "things" and "persons" into different conceptual universes. Physical objects and the rights attached to them become commoditized, while people, men, women, children and now more commonly late term fetuses are placed in a natural universe of singularization or individuation (Kopytoff 1988:64). Because the latter are unambiguously singular, they are marked as sacred. It is reasoned by some religious and pro-life groups that this singularization applies equally to pre-embryos by fact of moral values being infused with the "moment of conception". This argument is morally hard to swallow, not only because conception is an incremental biological process, but because we commonly regard "person" as a being capable of cognition, consciousness and interaction. However, although a pre-embryo lacks even the most rudimentary characteristics of a "person" or any rights-bearing entity, it might as a symbol of human life be owed some respect by virtue of its potential to become a person through existing characteristics (Robertson 1988:182).

If legal determinations based on moral values about the degree of respect merited by the pre-embryo are still in the early stages of definition in Canada, the confusing American case law has been of little use in refining the definition of "person" or "property" in relation to the pre-embryo. In the cases that have come before the courts (notably Reas, Davis, York and Kass), the arguments have been framed less around the inherent value of pre-embryos in their own right, but more as a contest for control between interested parties, particularly the men and the women who voluntarily create the pre-embryos from their own gametes.

The cultural ambivalence about pre-embryos as more like "person" or more like "property" can only be resolved by placing the pre-embryo in different cultural contexts. In one instance its characteristics for "potential personhood" may outweigh its
characteristics for "property", and in another instance the opposite may pertain. For example, the discourse of research science certainly does not envisage a pre-embryo as an autonomous person, but rather as a piece of inanimate research material. Any respect accorded it must be in relation to the biological parents who provide the gametes to create it. The clinical practice discourse is more likely to accord the pre-embryo a greater degree of respect in that it has the potential to become a "person" as a result of clinical attempts to provide a child for an infertile couple. But again the pre-embryo has to be placed in the context of its unique relationship to the couple and to the clinic. Although a couple may experience intense personal loss of some part of themselves, their potential child, in the event that an pre-embryo is created which is damaged and has to be discarded, they accept the clinic's right to make that decision. The anxiety-free rational decision of the clinic biologists to discard a non-viable pre-embryo is predicated on "sound medical judgment". In this way there is a swift and subtle shift from parental possession of the pre-embryo and control to clinic ownership and control occurs. The York case demonstrated a similar custodial relationship to the frozen embryos they refused to allow to leave their facility. Clinic personnel construct a fiduciary relationship with the pre-embryos they create and store, but only for as long as those pre-embryos are "good" ones.

In the context of the feminist discourse about pre-embryos as "person" or "property", another set of issues are activated, which place women and their pre-embryos in a polarized relationship. The pro-choice feminist discourse argues that a woman's personal autonomy overrides the interest of her fetus if she chooses to have an abortion - she has the sole right to decide what happens to her conceptus. This is somewhat at odds with the liberal feminist claim that a natural symbiotic relationship exists between a woman, and the fetus she will gestate, give birth to and rear as her child. In general a woman constructs an incremental increase in rights for the fetus the further along it is in the gestation. The Interveners for Legal Education and Action Fund in the Sullivan and LeMay Case (The Midwives Case) attempted to make this point in bringing a feminist
reasoning to this complex relationship between a fetus and a woman in the process of parturition. When these ambiguous meanings about the social character of "person" and "property" are extended from fetuses to IVF extra-uterine embryos the context of the social relations surrounding the pre-embryo becomes even more significant. In particular, the relationship of a pre-embryo to different sets of parents, biological, gestational, putative and social becomes complicated, as can be seen in surrogacy arrangements and ovum donation. The difficulty commonly arises over whether to give pre-eminence to the genetic or gestational connection between a woman and her pre-embryo/fetus. The status of the father is rarely challenged.

Concepts of parenthood, paternity and maternity, are tied up in these controversial debates in the same manner as was recognized in the earlier debates in anthropology. The legal responsibility that a man has for his children are similar to those juro-political distinctions made by Maine, Morgan and Radcliffe-Brown, in which the relationship between rights in and over persons and right in property were formulated. Of course, the scholars of the past were thinking about control over wives and children and the perpetuation of the lineages in uncoded societies and not about the future control over alienated parts of themselves, such as sperm or their frozen embryos. In the past it was always possible to know who was a child's biological mother, because it was not possible to separate conception from gestation. Now with surrogacy arrangements and ova donation it is less clear which mother, genetic or gestational is the "real" mother (Keesing 1993).

Control over the products of conception from conceptive technologies speak to a very basic idea in Western society (but not all societies as anthropologists have pointed out) that men, who have legally sanctioned sexual access to the women with whom they cohabit, also have the right to the children those women bear. The limited amount of regulation of pre-embryos presently available has demonstrated the persistence of this gendered assumption. For example, the British Warnock Report (1984) in its
consideration of the post-humous implantation of frozen embryos or semen of a dead man into his consenting widow, viewed the arrangement as psychologically fraught with problems for the woman and subsequent child. It maintained that this would be an irregular arrangement to deliberately rear a fatherless child, as though this does not happen all the time in family separations. The spate of virgin births in England whereby single and lesbian women choose to have children through artificial insemination has raised a similar controversy (Cannell 1990). Concomitantly in Warnock when a widower wished to have the pre-embryos he created with his wife replaced in his new infertile partner, the Commission considered the practice acceptable (Shore 1992). This reinforcement of patriarchal attitudes about ownership of women's bodies and the idealized notion of motherhood sends out a strong symbolic message, which a combined medico-legal discourse reaffirms in its normalization of family life, through the preservation of marriage and heterosexuality and middle class aspirations. Although only a few people use reproductive technologies, such as IVF, the portent touches society much more widely about how we value family life and relations.

The reinforcement of paternity has recently been demonstrated in that in some Australian states a genetic father always remains legally responsible for his offspring created through artificial donor insemination. The social father has no legal responsibility to the children he rears. This has prevented Australians from arranging for adoptions and artificial insemination with IVF (editorial in The Medical Post 1992, 37:21). Conversely, however, in 1995, the judge in the American Kass case reversed the judgment in Davis and refused to consider a divorcing man's legal right to his pre-embryos, neither would he discuss any support obligations or other legal claims that the husband might have against his wife, until a live birth had occurred.

Fox (1993) in his "The Case of the Reluctant Genetrix" argues that NRTs have removed us too remotely from traditional notions of family and parenthood. He wonders how much does an individual "own" of himself or herself, when past acts lead to
unforeseen future considerations. "If I may sell an ovum, have I any rights or duties
towards the end product? If I donate (or sell sperm) have I any obligations to its eventual
bawling and gurgling consequences" (ibid:304). He believes that by and large people are
not motivated by long-term genetic consequences, a fact which is well demonstrated in the
anthropological literature, where cultures do not entertain the idea of paternity and where
children can be born to a dead man through the institutionalization of the levirate.

However, if the law begins to favour women's rights to control not only their in
utero fetuses, but also their extra-uterine pre-embryos, there will be questions raised about
women's rights to control them in other circumstances. For example, what will a woman's
right be to undertake a pregnancy, then terminate that pregnancy, when the fetus has well-
developed ovaries, solely for the purpose of creating a supply of ova to create pre-
embryos? Or what will it mean for the commodification of fetuses by gestational carriers,
where the surrogate contract absolves the gestational woman from any legal rights
whatsoever to the child she gestates? Will commercial fetal ova donation become a
brokerage business like gestational surrogacy, and will, as seems to be already the case
with the latter, poor women from minorities be the providers of these products and
services? Given the shift towards a growing market in human organs and tissues, it seems
very likely that ova will join sperm in the commodity market and that gestational
surrogacy will cover a wider range of women available to sell their reproductive services
across the life span.

So the gender inequalities and struggles for control over pre-embryos are
increasingly being played out on the unrefereed new playing fields of assisted procreation,
as well genetic screening technologies. Smart (1989:161) maintains that legislation of
NRTs rather than making things better, particularly for women's reproductive experiences,
may in effect worsen conditions. In what she calls the "juridogenic nature of law", she

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4 See the current American case of Arredondo v Nodelman (1995).
draws an analogy between the iatrogenic potential of medicine to create illness and disease in an attempt to cure, to a similar strategy in the field of law. More laws may have a deleterious effect on women's control over their reproductive interests. An unfortunate inconsistency has been that feminists have often wished to use the seemingly unbiased mechanisms of law-making to further their causes for elimination of some concepitive therapies, such as IVF. In this sense they may not see the feminist engagement with law as antithetical to the values and politics of the women's movement. Smart calls for a new feminist initiative which de-centres the power of law, not by promoting law reform but rather by gaining insight into the social impact for women of this particular mode of social regulation.

The past legacy of medico-legal controls over women's reproductive capacities has been a persuasive mode of culturally regulating women in their reproductive lives. The hegemonic collusion of law and medicine to regulate and employ surveillance strategies has ensured control over who, how and where women may conceive, gestate and give birth. The new legislation which has been enacted so far in the United States and Britain in relation to NRTs, the most notable being surrogacy contracts, has shown the perpetuation of the gendered nature of the regulations. While the law views women objectively as "natural" gestators, men or contracting couples, are seen as rightful agents of control, the owners of the product.

I have shown that the cultural tendency to polarize the pre-embryo as either "person" or "property" is context dependent. It is "potential person" in relation to couples experiencing conservative IVF technology, not for any particular moral reason, but because of the symbolic connection of marriage with parenthood and all of the affinal and consanguinal kinship relations that involves. But the pre-embryo also is "property", a symbol of control and ownership, in the context of scientific research, in custodial claims of clinics and in the minds of couples who contract for gestational surrogacy, where they one hundred percent own the genetic material. In the case of surrogate motherhood,
(such as the Baby M case) the equal fifty percent genetic connection of contracting father and surrogate mother to the fetus she carries results in a conflict of interest between both biological parents, and leaves the social mother and wife of the genetic father in an ambivalent situation of having to adopt her husband's child. Again and again the category of motherhood is shaped by fatherhood, and not vice-versa as Barnes (1977) demonstrated in his contrast between cultural interpretations of parenthood. As the social relations around an expanding array of concepitive and genetic technologies becomes more complex, the struggle for power to control, to own, to have interests in pre-embryos intensifies, and there can be little doubt that as pre-embryos are increasingly entering the marketplace as circulating commodities that they are predominantly being constructed as much more like "property".

IV REPRODUCTIVE TECHNOLOGY (CULTURE) AND NATURAL REPRODUCTION (NATURE)

If reproductive technology symbolizes "culture", manifested in its masculine form, then natural conception and birth equates with "nature", manifested in its feminine form. "Culture" is activating, energized, the "subject" of control, while "nature" is passive, recipient and the "object" of cultural control. The old controversies of the nature/nurture debate continue to cause uncertainty today, and perhaps more so with the increasing take over of human reproduction by technological processes. For some there is a concern that ultimately "technology" will overwhelm "nature", and natural reproduction will cease to exist. It will have been replaced by socially engineered, laboratory made pre-embryos, whose gene structure has been tinkered with to produce certain socially desired people for specific jobs, such as Aldous Huxley imagined in the 1930s. In an overpopulated world, perhaps social policies will even extend to the requirement that people obtain a license to create a child, in a similar way to the present "One Child China" policies. The preference,
of course, will be for perfect babies of the desired sex, with the best of both the parents' inherited traits, or perhaps with gene surgery, other much more desired traits. At the bottom of society's love affair with technology is a deep fear about the futuristic implications of its potential to alter society forever.

Usually IVF treatment is viewed as a happy marriage of "technology" and "nature". In a fortuitous alliance, a reproductive technology assists in the laboratory creation of pre-embryos and then after embryo transfer the natural aspects of reproduction, the biological processes of gestation and birth take over resulting in a child, both of whose parents are the genetic and social ones. A point that is missed in this social construction of the technological conception and natural implantation, gestation and birth is that the technological procedures in the laboratory component are ones in which "technology" assists "nature", as opposed to "technology" replicating "nature". As yet it can only do half the job. The technology cannot make ova in the human ovaries, it can only induce pharmacological superovulation and maturation of ova. The technology cannot trigger syngamy and subsequent cell division, it can only mix the sperm and ova together in the petri dish in a nutritive environment and wait for nature to activate fertilization. An extraordinary revelation has been that cell division in the early stages is solely under the endocrinal control of the ovum. Furthermore, the technology cannot ensure implantation in the uterine wall, it can only replace "good" pre-embryos with great care in a uterus that is pharmacologically prepared.

The tension between "technology" and "nature" is well represented in the cultural mystique about the power of reproductive "technology" in its masculine and orthodox manifestation to colonize and subvert the natural aspects of reproduction, which just happens by analogy to be located in the female reproductive body. Parts of women's bodies and by extension the whole female body has been the site of an essentialist perspective, which has been endorsed by legal regulation of medically created facts. As the feminist critique of male, objective science makes apparent, women's reproductive
capacities have been identified as closer to the body and to nature (Harding 1986). The technological enterprise of IVF and its more recent corollaries symbolizes an androcentric endeavour to fragment women's body into individual parts as "wombs", "eggs", "embryos", then to re-sort those pieces to construct a new model based on perfecting people. This enterprise can be envisaged as a giant social engineering project in quality control and provides a cultural venue, where certain privileged people, as defined by those in control of the technology, become the consumers of the natural products of other underprivileged people, again defined by the same power brokers. This is a strategy far removed from the past control that women had over their pregnant bodies, when only they held the key to the mystery of conception hidden within the confines of their bodies, if only for a short period of time -or at least for the first trimester.

There is a repetitive theme in the feminist discourse about "technology's" ability to alienate the pre-embryo from its accepted maternal/fetal biological symbiotic relationship with its genetic and gestational mother. As I have come to see it, the problem appears to lie in that realm of reification and objectification of the pre-embryo as symbolically "other" from "mother". The technology of IVF creates two separate biological and social units, the "unpregnant mother" and her "ungestated fetus". This dual construction provides an easy and socially sanctioned conduit for pre-embryos to come under the control of both research science and legal sanctions, as well as commercial ventures, in contrast to the control of the woman who "naturally" produces them. In the process of the pre-embryo's physical and legitimated removal from the confines of a woman's body, women lose their autonomous control over that which is normally viewed as an inalienable "natural" relationship between mother and fetus in pregnancy. Symbolically women's bodies become no more than the uterine empty spaces of the Petchesky (1987) spaceman metaphor over which the fetus exerts dominion. The common denominator is that women become secondary to their product. Figuratively speaking, when this reasoning is transferred to the in vitro pre-embryo, rather than the in vivo fetus, the pre-embryo is seen
as the message (genomic knowledge), and woman merely the transporter, (the chromosomal messenger).

It is a particularly Western phenomenon that exists in the increasing propensity of technology to polarize the maternal/fetal relationship. Paradoxically, this reflects the loosening of women's control over their pregnancies, just at a time when there is greater assertion by women through social movements, such as midwifery and abortion debates, to reappropriate that control.

This particular circumscription of women's experiences during pregnancy are clearly delineated in the constraints placed on gestational surrogates. While every pre-embryo created for individual therapeutic purposes is a unique entity, in the case of surrogacy arrangements, it is a very special pre-embryo and the recipient of a particular set of fiduciary criteria. It has been specifically created for transfer to a gestational carrier, who has a moral obligation to ensure its safe journey through the processes of pregnancy and birth. These culturally constructed aspects are made explicit in the case law, more particularly in the United States than Canada, where it has been developed and refined more quickly than in many other less litigious jurisdictions. Reproductive brokerage agencies have clear rules about what their surrogates may and may not do during pregnancy, including being virtual prisoners in their own bodies through restrictions to not take a holiday without prior permission, otherwise it will be viewed as kidnapping another couple's child. The crude message is that any woman's uterus can gestate a fetus, and it is the rights of the contracting parents and their pre-embryo-come-fetus that are significant. The law in the United States, following on from the Baby M case, has been particularly forceful in endorsing the legitimacy of contract in other cases. Symbolically,

5 Constraints on contracting gestational surrogates are discussed in the film On the Eight Day, Part 2 (National Film Board of Canada, 1992) in which administrators of a California Surrogacy Company are interviewed.

6 In Arredondo v Nodelman, NY Supreme Court, Queens County (1/26/1995) a genetic mother is declared the legal mother of twins born through a gestational carrier.
the pre-embryo created through IVF, even if it is carried by a gestational surrogate, is precious cargo. It remains the inalienable possession of the genetic, and contracting parents. This says a considerable amount about how Western culture values the genetic product of the biological process of making babies, in comparison to the biological process of gestation. The gendered dimensions of nurturing, whether this be fetuses or children, are made culturally explicit by the valuation of product over process. The "best interests of the child" model is particularly persuasive in ensuring a moral universe around the product in all stages of its development.

The indications for the social and legal devaluing of gestational carriers in opposition to contracting parents have congruence with the growing business in providing babies for post-menopausal women, who become pregnant with donated ova. The message here is that even the aging uterus can be hormonally prepared to incubate the fetus, and that the child is fifty percent genetically related to the social parents. The significance is that it is the father who contributes that genetic component and that it is his child. Conversely, the gestational elderly woman evokes the imagery of those women who Dworkin (1983) described as forever "wombs", "incubators", "selective breeders", "a caste of child bearers". The ideology of family and motherhood, at any cost, even beyond the normal reproductive life span, is thus reinforced.

To take this perverse devaluation of women's reproductive bodies and gametes further, the use of aborted female fetuses as sources of immature ova and the retrieval of ova from newly dead women, or even perhaps institutionalized women brings in a coercive element. Since it is already established that the majority of surrogates and gestational carriers are often poor women, from racial minorities, or even "off-shore breeders", it is probably realistic to assume that these categories of women are likely to be the ones who

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7 An account was given to me by an Australian researcher about Filipino women being flown to Australian for embryo transfer, then gestating the fetus at home and returning to Australia for the delivery and relinquishment of the baby to the contracting couple.
are going to be tempted by remuneration to carry a fetus for subsequent abortion and tissue and organ donation, or who might be the unsuspecting victims of institutional manipulation. As the previous discussions about eugenic policies in Canada, and more recent juridical control over pregnancy attest, feminist cautions are correct in seeing these new forms of fragmentation of women's bodily parts as part of an old strategy to control reproduction, in which law and medicine often collude.

While contraception has separated sexual intercourse from conception, now IVF eliminates the biological reality of sexual intercourse and replaces it with a cultural construction of conception which is primarily concerned with manipulation of male and female gametes. Separated and fragmented from their genitors, these primary units of human life likewise become part of a new cultural construction of made-in-the-lab babies. Techno-science replaces both father and mother, the progenitors and the nurturer, even if it is only for a transitory period in the laboratory. This situation could well be extended in the near future as the in vitro technology for culturing pre-embryos is refined and if the law permits an extension of the present fourteen day limit for maintaining pre-embryos in vitro for research purposes.
V. CONCLUSION

This thesis has combined an ethnographic approach to the science and technology of IVF with a discourse analysis from a feminist anthropological perspective. It examines the controversies surrounding the cultural construction of the IVF pre-embryo. I have used the data derived from a study of the IVF programme at the University of British Columbia as it existed between the summer of 1993 and the spring of 1994. It indicates the ways in which an advanced and experimental reproductive technology, IVF, is made to seem routine and user-friendly by the standardized implementation of each part of the IVF process. The arbitrariness of the technology is unseen.

I have provided a historical review of the scientific fascination since classical times with the beginnings of life, which interest is now being accelerated with greater authority through a new generation of genetic screening technologies. The creation of supernumerary pre-embryos through IVF technology has opened up a window of purview into the structure of genes, the keys to life. The pre-embryo is the bearer of significant genetic knowledge about the future child, which has the potential to precipitate a new social engineering project, in which determinations will be made about who may or may not be born. The eugenic thrust of this technology is profoundly disturbing and worthy of consideration by anthropologists, who are interested in how cultural values are inculcated into society.

Anthropological inquiry of the pre-embryo as a cultural protagonist in this evolving enterprise will be important, as it is going to become more valued in an increasingly geneticized society, where people for both personal, social and political reasons are going to need to know the genetic make-up of their potential children. Futuristic as it may seem, it is not out of the question that in the future most pre-embryos will need to be screened before societal sanction is given to go ahead with a pregnancy. Then for all time gestation will have been separated from conception, in the same way as conception has now been
largely separated from sexual relations. When the present cultural polarities surrounding
the cultural construction of the pre-embryo are deconstructed, it becomes apparent that a
complementary union of research science and clinical therapy is erroneous, because each
has a different interest in the pre-embryo. The risks attached to engaging in experimental
technologies like IVF are masked by the routine action of the daily practices of IVF
programmes, or should I say clinics, because the latter assumes a clinical service, while the
former implies a clinical application of an experimental programme (note University of
British Columbia IVF programme as opposed to Genesis Clinic).

With respect to the present level of cultural indecision about whether to view pre-
embryos as person or property, there seems to be a movement towards constructing pre-
embryos as more like circulating commodities. This is occurring in two ways; firstly, in
the promotion of the baby-making venture to create families for new combinations of
people wishing to have children, for example previously ineligible infertile couples, the
elderly and same sex couples; secondly, in the desire for scientific research to gain further
knowledge about inherited diseases, for which it needs a supply of pre-embryos. In the
process of this enterprise women's bodies will become increasingly fragmented as they
become ova providers or ova recipients and pre-embryo gestators. In this way women's
bodily autonomy is threatened. This research has taken a critical feminist anthropological
approach to understanding a new medical reproductive technology, in order to provide
insight into the present level of cultural values which are emerging in response to the
human IVF pre-embryo as an intensely interesting and versatile new social, legal, ethical
and economic cultural category.
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amniocentesis  A procedure in which a needle is used to withdraw a small amount of amniotic fluid that surrounds the fetus in the uterus. Ultrasound monitoring is used to guide the needle through the woman's abdomen into the amniotic sac. The fluid can be tested for alpha-fetoprotein. In addition, since the amniotic fluid contains fetal cells, these cells can be grown in cell culture and analyzed for a variety of genetic disorders. This takes two to four weeks. Amplification of the genetic material can shorten the time needed to obtain results. The test is usually done at 15 to 16 weeks' gestation but can be done as early as 12 weeks.

anovulation  Absence of ovulation, when an egg is released from the woman's ovary, generally around the midpoint of the menstrual cycle.

chorionic villus sampling  A procedure for obtaining fetal tissue. A small amount of chorion (outer membrane surrounding the embryo and fetus) tissue is removed through the pregnant woman's abdominal wall or cervix, using a catheter under ultrasound guidance. Like amniocentesis, CVS can be used to detect biochemical DNA, and chromosomal abnormalities, and for sex determination, but it cannot detect neural tube defects. CVS can be done as early as the eighth or ninth week of pregnancy, and the results are usually known within a week (although confirmation after cell culture is advisable).

clophiphene citrate  A fertility drug used primarily in women with menstrual irregularity. It is like estrogen and binds to estrogen receptors in the brain, thereby fooling the pituitary into releasing the hormones necessary for ovulation. Its possible adverse effects include dry cervical mucus, an increased risk of multiple pregnancy, ovarian enlargement and sometimes infertility by affecting the woman's menstrual cycle. It is also used in in vitro fertilization as an ovulatory stimulant.

cloning  The process of producing a group of cells (clones), all genetically identical to the original ancestor cell. This may be achieved by asexual reproduction (without union of egg and sperm), as in plant cuttings. Another type of cloning is achieved by nucleus substitution (also called nuclear transplantation). The nucleus is removed from an unfertilized egg cell and replaced with a new nucleus taken from a donor embryonic cell. A third method, also used in agriculture, is by embryo division. In gene technology, cloning is the process of producing multiple copies of a single gene or segment of DNA. See also genetic engineering.

fertilization  is not an event but a process, beginning with the first contact of the sperm with the external surface of the zona pellucida and lasting for at least twenty
four hours, during which time a sperm penetrates the egg - the anucleated one cell stage. There is no such thing as a "moment of conception.

**genetic engineering** Isolating genes, replicating them outside their own cells, and altering their structures and their relationships to the rest of the genetic material in a directed way. The means include cloning (isolation of specific genes (e.g. for insulin) and replicating them in bacteria or other vectors), directed mutation, and transfection (transfer of a particular gene from its own cell line to another - either within or between species). These techniques have led to an understanding of how genes act or are regulated, and to introduction of economically valuable traits into domestic animals and plants. They are now being used to introduce genes that produce a therapeutic product (e.g. that kills cancer cells, or produces a compound lacking in a genetic disorder) into cells that will transport the product to genetically defective tissue lacking the product.

**genome** The total genetic material contained in the chromosomes of an individual's cells. The human genome contains about 100,000 genes.

**GIFT** Gamete intrafallopian transfer is a technique of assisted reproduction in which a woman's mature eggs are removed by laparoscopy or by catheter under ultrasound guidance and the reintroduced with sperm into the fallopian tubes.

**gonadotrophins** Hormones that stimulate the testes or ovaries. Examples are follicle-stimulating hormone, human chorionic gonadotropin, human menopausal gonadotropin and luteinizing hormone. These can be administered to women with ovulatory dysfunction to stimulate the ovary.

**Gn-RH: gonadotropin-releasing hormone** Also known as luteinizing hormone releasing hormone (LH-RH). The hormone released from the hypothalamus that causes secretion of gonadotropins from the pituitary gland. It can be pulse-injected to stimulate ovarian function in women with infertility caused by deficient gonadotropins. However, there is risk of hyperstimulation of the ovaries.

**hCG: human chorionic gonadotrophin** The hormone produced early in pregnancy (detected in one of the pregnancy tests) that keeps the corpus luteum producing progesterone, which prevents menstruation from occurring. It can be extracted from the urine of pregnant women and used in conjunction with other substances as a treatment for infertility by triggering ovulation. (see ovulatory stimulants)

**hMG: human menopausal gonadotrophin** A hormone preparation that can be extracted from the urine of newly menopausal women and injected to stimulate ovaries and testes. It contains two hormones: follicle stimulating hormone and luteinizing hormone.

**hyperstimulation** A syndrome that may include ovarian enlargement, gastrointestinal symptoms (nausea, vomiting, diarrhea), abdominal distention, and weight gain. Severe cases may be further complicated with cardiovascular, pulmonary, and electrolyte disturbances, requiring hospitalization.
idiopathic infertility  Infertility in which no organic problem has been identified in either partner.

morula  A fertilized egg after a few days' growth, when the collection of cells resembles a mulberry in shape (Latin, morula) and is smaller than the period at the end of this sentence. This is the stage before the blastocyst.

oligospermia  scarcity of sperm in the semen.

oocyte  an egg cell produced in the ovaries. Its process of formation is call oogenesis.

ovaries  paired female sex glands in which egg cells are developed and stored and the hormones estrogen and progesterone are produced.

ovulatory stimulants  these so called fertility drugs include bromocriptine, clomiphene citrate, gonadotropins, and gonadotropin-releasing hormone, used in treatment of ovulatory disorder; in in vitro fertilization to produce eggs for retrieval (superovulation) and sometimes in donor insemination, to regulate timing of ovulation. As a fertility treatment, ovulatory stimulants increase the risk of multiple pregnancy and may cause a serious condition - hyperstimulation syndrome.

ovum (pl. ova)  the female egg or oocyte, formed in an ovary.

parthenogenesis  development of the egg into a complete organism without fertilization with sperm. It occurs naturally in some less complex species, but not in humans.

pre-embryo  the period of development from the end of the process of fertilization until the appearance of a single primitive streak.

prenatal diagnosis  testing before birth with the aim of determining whether a fetus has a specific trait, usually a malformation or disorder for which the fetus is known to be at increased risk because of maternal age or family history; sex of fetus can also be detected.

preimplantation diagnosis  diagnosis of genetic disorders or sex before fertilization or before the zygote is transferred to the uterus. One type involves analysis of the polar body of an egg that is heterozygous (having two different forms of a gene at a particular gene locus) for a known genetic disorder. If the polar body has the normal form of the gene, it may be inferred that the egg has the abnormal form and vice versa. Another type involves analysis of the DNA of one of a few cells of a zygote (e.g. following IVF). The zygote may continue to develop and, if the disorder is absent, can be placed or replaced in a woman's uterus.

progesterone  A steroid hormone produced by the ovary after ovulation, and by the placenta. It promotes development of the endometrium (uterine lining) essential for implantation of the embryo and continuation of the pregnancy. Progesterone may be used
to treat luteal phase defect. Its effectiveness in preventing miscarriage in such cases has not been adequately proven.

**semen** Fluid secretion containing sperm that is emitted during ejaculation. Also called the seminal fluid, more than half of which is produced in the seminal vesicles, the paired glands at the base of the bladder.

**sperm** The free-swimming male reproductive cell produced by the testes that interacts with the egg, resulting in fertilization.

**syngamy** The process through which the twenty-three chromosomes of an oocyte cell and the twenty-three chromosomes of a sperm cell combine so that the cell has forty-six chromosomes.
COMMON ABBREVIATIONS

AFS  The American Fertility Society
ART  Assisted reproductive technology
CC   Clomiphene citrate
DI   Donor insemination, previously called AID, artificial donor insemination
DIPI Direct intraperitoneal insemination
FISH Fluorescent in situ hybridization
GIFT Gamete intrafallopian transfer
GnRH Gonadotrophin-releasing hormone
HCG Human chorionic gonadotropin
HMG Human menopausal gonadotrophin
ICSI Intracytoplasmic sperm injection
IUI Intrauterine insemination
IVF in vitro fertilization
PCR Polymerase chain reaction
PGD Preimplantation genetic diagnosis
POST Peritoneal ovum and sperm transfer
PROST Pronuclear stage tubal transfer
PZD Partial zona dissection
SART Society for Assisted Reproductive Technology
SUZI Subzonal insertion
TPET Tubal pre-embryo transfer
ZIFT Zygote intrafallopian transfer
### APPENDIX A

**THE HUMAN PRE-EMBRYO: VERSATILITY OF CREATING FAMILIES**

<table>
<thead>
<tr>
<th>1. Simple IVF</th>
<th>father(b,s)</th>
<th>pre-embryo</th>
<th>mother(b,s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Donor Insemination / with IVF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(case 1)</td>
<td>father(s)</td>
<td>pre-embryo</td>
<td>mother (b,g,s)</td>
</tr>
<tr>
<td></td>
<td>father(b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(case 2)</td>
<td>father(b)</td>
<td>pre-embryo</td>
<td>mother (bs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(gs)</td>
</tr>
<tr>
<td>(case 3)</td>
<td>father(b)</td>
<td>pre-embryo</td>
<td>mother (gs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(b)</td>
</tr>
<tr>
<td>(case 4)</td>
<td>father(b)</td>
<td>pre-embryo</td>
<td>mother (bs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(s)</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>mother (g)</td>
</tr>
<tr>
<td>3. Simple Surrogacy</td>
<td>father(b,s)</td>
<td>fetus</td>
<td>mother(b,g)</td>
</tr>
<tr>
<td>(no IVF)</td>
<td></td>
<td></td>
<td>mother(s)</td>
</tr>
<tr>
<td>4. Egg Donation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(case 1)</td>
<td>father(b,s)</td>
<td>pre-embryo</td>
<td>mother(b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(g,s)</td>
</tr>
<tr>
<td>(case 2)</td>
<td>father(bs)</td>
<td>pre-embryo</td>
<td>mother(b)</td>
</tr>
<tr>
<td></td>
<td>father(s)</td>
<td></td>
<td>mother(g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(b,g)</td>
</tr>
<tr>
<td>(case 3)</td>
<td>father(b)</td>
<td>pre-embryo</td>
<td>mother (b)</td>
</tr>
<tr>
<td></td>
<td>father(s)</td>
<td></td>
<td>mother(g)</td>
</tr>
<tr>
<td></td>
<td>father(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Embryo Donation</td>
<td>father(b)</td>
<td>pre-embryo</td>
<td>mother(b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(g)</td>
</tr>
<tr>
<td></td>
<td>father(s)</td>
<td></td>
<td>mother(s)</td>
</tr>
<tr>
<td>6. Gestional Surrogacy</td>
<td>father(b,s)</td>
<td>pre-embryo</td>
<td>mother(b,s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mother(g)</td>
</tr>
</tbody>
</table>

**KEY:**
- b denotes biological; g denotes gestational; s denotes social parent.
- italicized *mother* and *father* denote a co-habitating same sex couple.
The chart shows in 1. Simple IVF the biosocial relation of father and mother to their pre-embryo, in that they fulfill the roles of genital, genitor/genetrix and social parents. In 2 the four examples involving artificial insemination by donor (AID) combined with IVF, the semen donor may or may not be anonymous. The situation of IVF for both female and male factor infertility, is represented by the scenario in 2. Donor Insemination, case 1. It is similar to artificial insemination by donor, in that there are two fathers, the genital one who donates the sperm, and the putative (genitor) and social father, who is the partner of the woman, who has provided the oocytes for insemination, gestated the embryo and become the social mother of the child. Similarly in case 2, the genital father, the sperm donor fulfills no other role, in the case of a lesbian relationship, where both women become the social parents of the resultant child. However, while one woman provides the oocytes and performs the role of genital mother, the other woman gestates the embryo and as such performs the role of gestational surrogate, the genetrix. If both providing gametes and gestating an embryo/fetus are given equal status for defining motherhood, then each woman has invested the same degree of biological association with their child.

In case 3, this scenario can be complicated further, when one woman in a lesbian partnership fulfills only the role of social mother, while her partner, who may be unable to provide the gametes, can fulfill the role of gestational mother. The donated embryo is the product of the fertilized gametes of a third party man and woman. In case 4, where neither woman in a lesbian relationship can gestate an embryo, a third party woman, a gestational surrogate fulfills the role of gestating the pre-embryo, which is the result of one of the lesbian women's oocytes, which have been fertilized by a third party semen donor. While case 2 may be an option for younger lesbian couples wishing to create a family with as close a biological association as possible, the scenarios in cases 3 and 4 offer solutions to older lesbian couples, who in the past have not been able to create their own families, other than through adoption. This latter situation is currently only just
becoming legally acceptable, and usually in the situation of one woman in a lesbian relationship adopting the custodial child of her partner, who may have been previously married to a man. In other cases this child has resulted from self-insemination with donor sperm, or else 'one-night' heterosexual unions may have been resorted to in order for one of a lesbian pair to produce an offspring.

In 3, simple surrogacy with no IVF, a contract is made between a couple and a surrogate, who agrees to be inseminated with the contracting man's sperm, to carry the subsequent fetus, then give the neonate up for adoption by the contracting couple. This is the scenario that occurred in the infamous Baby M case, where Marybeth Whitehead, the biological mother, who was termed 'the surrogate', reneged on her contract with devastating consequences. (See Fox 1993, Chesler 1988).

In 4, three oocyte donation cases are represented. In case 1, the contracting couple are provided with the oocytes of a third party. The resultant pre-embryo created through IVF is then gestated by the wife of the man who inseminates the oocytes, and both become the social parents. Case 2 involves an arrangement made by a gay couple, one of whom inseminates the oocytes of a woman, who may or may not be the gestational mother. This may provide the pre-embryo with up to four parents. In case 3, a gay couple may arrange for oocytes donated by one woman to be inseminated by a third party male, and the subsequent pre-embryo is then gestated by another woman. In this case the pre-embryo has five potential parents.

In 5, embryo donation, the pre-embryo resulting from fertilized gametes of a man and a woman is gestated by a gestational surrogate, who then gives the resulting child to the social parents, in an arrangement that is similar to adoption. In this case there are also five separate parents. In the last situation, 6, a gestational surrogate carries a pregnancy for a couple who both provide the embryo from their gametes and become the social parents. This is the bizarre arrangement that Singer and Wells (1984) construct as a futuristic arrangement for biological/social parenting without pregnancy.
APPENDIX B

UNIVERSITY OF BRITISH COLUMBIA. IVF PROGRAM
SCHEDULE OF FEES AND CHANGES

Revised August 8th 1988

1. OVULATION INDUCTION
   • Hormonal assay $489.00
   • Physician follow-up visits 150.00
   • Ultrasound examinations 210.00
     • Sub-total 840.00

2. PHYSICIAN RELATED PROCEDURAL FEES
   • Oocyte pick-up 200.00
   • Surgeon 200.00
   • Anaesthetist 200.00
   • Embryo Replacement 50.00

3. GAMETE LABORATORY AND SUPPORT SERVICES
   • Costs associated with gamete laboratory and nursing and secretarial support 1,460.00
     • Sub-total 1,460.00

   TOTAL 2,750.00*

4. HOSPITAL STAY (DAYCARE)
   • Oocyte pick-up 205.00
   • Embryo replacement 205.00

   Sub-total 410.00*

5. INJECTION (Shaughnessy Emergency) 48.50**
   • Sub-total 48.50

6. MEDICATIONS***

   * Payable by certified cheque or money order to UBC, Dept. of Obstetrics and Gynaecology on the first day of treatment.
   ** Payable to Shaughnessy Hospital on admission
   *** Medications are paid for directly to the pharmacy with standard reimbursement procedure through Pharmacare.