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A Feminist Perspective on the Precautionary Principle and the Problem of Endocrine Disruptors under Neoliberal Globalization Policies

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by

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ABSTRACT

Industrialization and "development" during the last 200 years have led to an increase of pesticides, an intensified use of synthetic chemicals, higher levels of environmental pollution, and more exposure to hazardous working conditions. Environmental toxins, many of which are endocrine disruptors, are stored in fat tissue, increasing reproductive health risks for both women and men. Women's bodies are particularly vulnerable as sites for creating, growing, feeding, and nurturing the next generation. And yet, women's lives are consistently devalued, especially in a capitalist economy, so that a woman's rights to her own reproductive health are no longer guaranteed.

In this thesis I first review ecological destruction, environmental policies, and food safety/security issues for women. I then examine neoliberal globalization as an active participant in the destruction of the environment and an attack on global health. I discuss how utilizing feminist theory effectively, and actively, will ensure women the right to their health. I employ postmodern feminist and refigured ecofeminist theory to demonstrate how a feminist perspective is necessary in the development of policies that address the problem of endocrine disruptors in terms of women's reproductive health and the health of future generations. Finally, I suggest that the precautionary principle must include a feminist perspective to fully succeed.

Prologue

It was Thursday, November 4, 2004 when I learned I was pregnant. My husband and I were overjoyed to know that we were going to have a baby. During the first few weeks of pregnancy my days became a bundle of mixed emotions; I was charged with an exciting energy that was clearly an adrenaline rush because I was also exhausted in a way I had never before experienced. My body suddenly felt so different even though it looked the same. I had to pee *all* the time, my breasts ached, almost all food was nauseating, water tasted too thin in my mouth, *everything* smelled ten times stronger, and I was teeming with a constant fluttering – nervous energy perhaps – inside of me. A perpetual overachiever, I instinctively (and to my amazement) slowed down. My class deadlines became secondary as nausea and fatigue consumed me and my body forced me to rest. Everything I ate went directly to the growing baby, leaving me with an emptiness that was reminiscent of a tapeworm living off of me. My breathing patterns changed and I could sense my pulse rate more intensely through my movements. Even my brain felt fuzzy; I wanted so desperately to write, but my mind would wander and my words seemed superficial and flat.

Pregnancy brought me to experience a deeper connection to myself, as this growing baby inside was a physical, emotional, and spiritual experience that was mine alone. While I sensed that I was clearly connected to something greater than myself (perhaps the Divine) through the sheer miraculousness of creating another life inside of my body, I was also more introspective, as this pregnancy was most certainly about me.

And yet, at the same time, I grew cautious and sensitive to my surroundings and other people. I was distracted and insociable; people who demanded my attention were irritating, but not enough attention hurt my feelings. I felt a new distance from my husband due to the solitary physical experience of growing a baby, but at the same time, I became incredibly dependent on him for support and participation in my experiences, which brought us closer together as soul mates. I felt as though I was losing myself as I was finally beginning to find myself. Pregnancy consumed me – my emotions, my thoughts, and my body – and the baby was barely the size of a small bean.

Pregnancy is a profound experience.[1] Many of the changes I experienced can be explained by the functions of the placenta (Steingraber, Having Faith 32). I have come to be in great awe of the placenta. The placenta transfers nutrients and oxygen from the pregnant woman's body to the fetus and removes waste from the fetus back out into the woman's body. The placenta is also involved in a variety of hormonal activities such as readying the breasts for lactation and taking over production of progesterone (previously the responsibility of the ovaries) (Steingraber, Having Faith 31). The placenta, the brain, and the testicles are the only known barriers in the human body that can block potentially damaging substances.[2] And yet, contrary to a long-held popular belief, the placenta is not impenetrable. The placental membrane consists primarily of the pregnant woman's blood and works as a barrier to prevent bacteria and unneeded hormones from reaching the fetus. Toxic chemicals, however, often easily pass through the placenta, despite their capability to cause serious harm.[3] Pregnancy locates women in a strange place: it is the beginning of her bodily capacity to protect her baby, and at the same time, a potential source of harm often beyond her control.

Early in my pregnancy my world changed rather quickly and in several unexpected ways. For instance, as I went to clean the bathrooms one afternoon, I stopped myself in a panic. I realized that I did not know which was more dangerous to my growing baby: the dirt that had accumulated or the chemicals in the cleaning products I was about to use. I could not clean the bathrooms. A simple walk around the neighborhood now felt like a perilous adventure. The "Warning: Pesticide Application" signs seemed more threatening, car exhaust was doubly noxious, and the smelly waste management processor on the corner next to the playground made my head spin with nausea and fear. The world seemed like a different place, and one that made me feel especially protective of the little "Bean"[4] growing in my womb.

Since living in a toxic-free bubble was not an option, I had to find ways to negotiate my fears with a realistic way to go about my day. I ate organic food when possible. I held my breath whenever trucks passed by that released lots of dirty exhaust into the air. I circumvented cigarette smokers. I did *not* clean the bathrooms. However, I did administer flea medication, an insecticide, to my cat. I did eat fish, occasionally raw fish, and fish known to have high levels of mercury and other PCBs. I did go for walks around my neighborhood, despite the pesticide applications. I have always been an advocate for environmental sustainability, but once I became pregnant, I acquired a new sense of urgency for the removal of toxicants from our environment. I am confounded to have to mediate these threats to my health and the health of my child and angry that these dangerous toxic exposures are beyond my control. Why am I forced to live amongst dangerous threats to my health and the health of my growing baby? Why is women's health not valued as a basic human right, to be protected and respected over the economic

interests of governments and corporations? I am concerned with these questions, not only as a scholar, but as a woman, a mother, and an inhabitant of the Earth.

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[1] I am speaking from my experience and certainly recognize that not every woman experiences pregnancy in the same way.

[2] I believe that because the female body does not have a protective blood barrier unless pregnant (and even then it is permeable), that environmental toxins have a greater potential for impacting female reproductive health and the health of their babies. Whereas the male testicles always have a blood barrier to protect the reproductive system (although sperm can also be harmed by toxins), the female body is essentially "open," meaning that there is no blood barrier to keep toxins from harming the reproductive system at any time in a woman's lifespan.

[3] These toxins are able to pass through the placenta due to low molecular weight, electrical charge, and fat/lipid solubility. If a toxic chemical is relatively small and fat-friendly, it will more easily pass through to the placenta. Bigger chemicals might be metabolized by the placenta before passing through, which could be good or bad, depending on whether this process makes them more toxic. Also, some toxins (cigarete smoke, PCBs, and car exhaust/nickel) can interfere with/damage the transport systems of the placenta and affect the fetus that way. See Sandra Steingraber, Having Faith: An Ecologist's Journey to Motherhood (NewYork: Berkley Books, 2003) 34-35.

[4] This is the nickname we gave to our baby before birth. On the ultrasound my husband and I could see the baby was jumping and sliding around in my uterus – like a little Mexican jumping bean!

Introduction

In this modern era many people tend to think about our bodies independently from the environments in which we live. We think of ourselves as rational, intelligent beings, distinctly separate from those animals farther down on the "food chain." With the progression of science and technology, we have become even further disconnected from our habitat. We are less likely to hunt, grow, and even prepare our own food; more likely to take drugs (prescription or otherwise) with unknown long-term effects; more likely to live in urban settings or near contaminated areas that expose us to greater pollutants; and more likely to experience occupational and family stress. "Modern" living carries with it a much higher risk of potential environmental health problems, while at the same time, reduces our conscious interaction with and deeper understanding of our environment.

As our world becomes more and more technologically advanced, the globe appears to be getting smaller. "To the far ends of the Earth" does not seem so far anymore. We can easily hop on a plane, get in a car, use our mobile phones, and turn on our computers to reach what we once considered a remote destination. While this may be the reality of many, it is not the reality of all people. To many people living in the Third World, access to the rest of the world is contingent upon "development." Proponents of globalization promise solidarity between nations, an end to poverty, and an overall better way of life (Khor Kok Peng). Nevertheless, the execution and expansion of globalization is not without severe consequences. These consequences directly impact the health of people across the planet, from the First World to the Third World, however currently

disguised. In a world where corporations are involved in controlling the global economy, the impact of globalization on the environment is a significant women's issue, especially in regards to reproductive health and the health of future generations (Shiva, "World on the Edge"; Schettler, et al.; Petchesky).

As each year passes, there are unprecedented threats to our environment and our health. The policies created and implemented today are determining the quality of life in the future. Scientists do not know if environmental damage in connection to our health is reversible. Likely it is not. Women's bodies are particularly vulnerable as sites for creating, growing, feeding, and nurturing the next generation and yet, women's lives are consistently devalued in a capitalist economy in such a way that a woman's right to her own reproductive health is no longer guaranteed (Oakley; Wargo).

The relationship between the health of the environment and the health of human beings, as well as animals, plants, and other sentient beings, is fundamentally and precariously symbiotic, inextricably linked. The problem of endocrine disruption due to the irresponsible uses of chemicals is one that needs to be addressed for all of humanity. Due to the generational nature of some endocrine disruptors, biological differences between male and female bodies, and the simple fact that females are currently the sole carriers for future generations, I contend that we must begin to think creatively and beyond corporate interests to protect the health of all humans and our future generations. Both ecofeminists and postmodern feminists have provided illuminating perspectives on body and identity politics, which offer a useful framework for examining the links between the health of our environment and the health of our bodies.

In the following chapters, I will address the problem of endocrine disruptors as a dilemma of global proportions and offer what I hope to be a creative (and feminist) perspective on the employment of the precautionary principle to ensure the health of our future generations. Chapter 1, "Endocrine Disruptors: A Feminist Issue," will provide a framework for this discussion by providing examples of specific environmental disasters that have made a particularly impressive impact on our planet and its inhabitants. In addition, the discriminatory behaviors that characterize the economic, political, and social powers of modern societies have led to the commodification of poor and minority populations in both industrialized and "developing" nations. I contend that in addition to sex and gender differences, race and class are additionally significant categories of analysis when examining the ways that environmental degradation discriminates. My specific area of interest under environmental destruction is the impact of endocrine disruptors on reproductive health, so this chapter will also clarify the definition of endocrine disruptors, how they work in the body, and offer examples of the effects of several important common endocrine disruptors. Finally, I will discuss the current limitations of research on endocrine disruptors and explain the significance of these shortcomings in terms of women's health.

Chapter 2, "The Problem of Neoliberal Globalization," will explain the context in which endocrine disruptors has become a global health problem for all humans and animals on this planet. In a global economy influenced by Western ideas about how "development" should progress, everything from seeds, natural resources, and knowledge to social services, medicine, and pollution has become a commodity. Neoliberal globalization encourages a free and unrestricted global marketplace where the focus is on

profits and consequences are secondary. Global health problems cannot be realistically addressed and resolved under the control of self-interested industrialized nation-states functioning under the rubric of neoliberal ideology.

This chapter will begin with an explanation of the definition and general practices of neoliberal globalization. There are many practices characteristic of neoliberal globalization that effectively drive the wedge deeper between the world's rich and the world's poor, not only in terms of economies, but in the realm of work, family, education, human rights, health, and livelihoods. While these issues are all relevant, my focus is on health and so this chapter will describe several neoliberal globalization practices that specifically impact the environment and health. Furthermore, I will investigate the connection between neoliberal globalization and the problem of endocrine disruptors as it relates to women's health and the health of future generations.

Chapter 3, "Ecofeminist and Postmodern Feminist Perspectives on Women's Health," will provide the theoretical framework for my concluding argument. Ecofeminists generally share the perspective that women's lives are affected by the degradation of the environment, making ecofeminism a useful starting point for an investigation into the significance of endocrine disruptors on women's health. Ecofeminist theories, however, are far from ideal, and so I also suggest that postmodern feminist theory can offer additional theoretical tools that are useful for examining knowledge production as it relates to women's bodies and environmental degradation.

This chapter will begin by briefly explaining the origins of ecofeminist thought and describing some early ecofeminist perspectives. Next, this chapter will examine the dichotomies connecting women to nature and men to culture, within ecofeminist

standpoints. An ecofeminist critique of the gendering of "nature" and the commodification of "development" is particularly relevant in terms of endocrine disrupting chemicals, especially with regard to the oppressive nature of environmental degradation in connection to women's bodies. Ecofeminist theory has often been criticized as essentialist by linking women's oppression to their reproductive bodies, and yet, this connection is instrumental in politicizing the ways women's health is at stake. I will discuss the essentialist/anti-essentialist arguments within ecofeminist and postmodern feminist theoretical perspectives. Finally, this chapter will draw on postmodern feminist epistemological methods that are useful for deconstructing the historicized locations of "woman" as subject, a necessary project for advocating for women's health rights.

Chapter 4, "A Feminist-Inspired Precautionary Principle," will integrate the previous chapters to explain the crucial role of feminist theoretical perspectives in guiding a thoughtful application of the precautionary principle that confronts the issue of endocrine disruptors for women's reproductive health, especially under neoliberal globalization policies. The precautionary principle essentially demands proof of safety prior to conducting an activity that carries human or environmental risks. This chapter will describe four main components to the precautionary principle and their relevance to addressing endocrine disruptors and women's health. Furthermore, I will assert that a feminist perspective is critical for the precautionary principle to truly succeed in promoting environmental sustainability and thus, justice for women's health.

Chapter 1: Endocrine Disruptors: A Feminist Issue

A Brief "His"tory of "Man"-Made[1] *Environmental Disasters*

Environmental disasters may take many forms, from those that have immediate impact on large communities such as natural disasters, toxic waste spills, nuclear explosions, and the destruction of our forests and waterways, to those that will be uncovered as time goes by such as air, wind, ground, and water pollution through the careless use of toxic chemicals. Certain local uses of chemicals are destined to have global impacts. Many of the current laws governing "modern" [2] societies protect the perpetrators from accountability, while simultaneously preventing dissemination of information to the public regarding these environmental abuses. In the end, we are all losers when it comes to the connections between our health and environmental destruction. But in the short run, women, children, poor people, and people of color are most affected.

Rachel Carson's book, The Silent Spring, published in 1962, spawned a new concern for how environmental degradation may affect our health and well-being. Carson, a scientist, writer, and ecologist, wrote The Silent Spring in an effort to inform the public about the potential lasting harmful effects of the haphazard use of synthetic chemicals on humans, animals, and our environment. Carson argued that herbicides and pesticides accumulate through the food chain and become ubiquitous, posing a potential threat to any species that comes into both direct and indirect contact with these chemicals.

She stressed the importance of diversification of plant and animal species and advocated strongly for our "right to know" as inhabitants of this planet (15-37). At that time, in the era of the Cold War, the government and chemical industry criticized Carson as a hysterical woman concerned about the birds, a quintessential response from a culture obsessed with scientific knowledge and its power over nature (Mellor 15).

In addition to Carson's book, several toxic disasters and environmental concerns in the 1970s and 1980s demonstrate a modern disregard for our natural world and the health of its inhabitants in favor of the advances of industrialization. In 1979, a nuclear accident at Three Mile Island power station in Pennsylvania increased fear about the dangers of nuclear power. In the use of technology employed to control and manipulate nature, capitalist interests were valued higher than the safety and health of humans, animals, and the environment (Merchant, Earthcare 89-90). While several studies have examined the effects of the Three Mile Island disaster on the psychological well-being of nearby residents, as well as the incidence and prevalence of radiation-related cancer among residents living within a five-mile radius of Three Mile Island, there is still a lack of research on potential generational health effects on residents in the area (Holzman).

Around the same time as the Three Mile Island accident, a similar catastrophe occurred in Love Canal, a blue-collar neighborhood near Niagara Falls, New York. A mile-long area, originally made into a canal trench, was purchased by a chemical company that used it as a waste dump and then later sold it for one dollar to the city of Niagara Falls. In 1954 a school was built on the site. Almost 25 years later Lois Gibbs, a resident of Love Canal, became concerned with her children's health. Upon further investigation, Gibbs discovered that within Love Canal her neighbors were experiencing

an extraordinarily high incidence of miscarriages, reproductive cancers, stillbirths, birth defects, and other rare diseases. Gibbs believed that there was a direct link between the toxic waste site and the troubling health problems experienced by her own family and neighbors. State authorities dismissed her complaints, so Gibbs organized the women in her community to demand relocation. The New York State Health Department finally began to investigate, and subsequently discovered that chemicals had exuded into the soil and groundwater (Lettig 16; Mellor 20-22; Merchant, Earthcare 157). Love Canal was primarily a blue-collar neighborhood, and the social and political values of the community's leaders reflected the systemic patriarchal notion of the power of culture over nature, giving initial credence to an influential corporate chemical industry. Krauss describes the contradiction the women of this community faced: "blue-collar women recognize the power they wield in bringing moral issues to the public, exposing the contradiction between a society that purports to value motherhood and family, yet creates social policies that undermine these values" (113). As I will discuss in chapter 3, the range of women's social, cultural, and economic positions and experiences are all epistemologically significant to understanding the impacts of environmental degradation on women's health.

The worst nuclear disaster in the history of the world occurred in 1986 in the Ukraine when Chernobyl's nuclear power plant exploded, releasing massive amounts of radioactivity into the environment. The impact of the accident at Chernobyl was global, but primarily affected the Ukraine, Russia, and Belarus. People living in the aftermath of Chernobyl face serious social, psychological, health, and economic problems:

> Life expectancy for men in Belarus, Russia and Ukraine, for example, is some ten years less than in Sri Lanka, which is one of the twenty poorest countries in the world and is in the middle of a long drawn out war. Overwhelmingly the most important reason for this is the combination of poverty, poor diet and living conditions, and lifestyle factors such as tobacco and alcohol use. These factors may also, to some degree, be reinforced in the affected areas and communities by the psychosocial effects of the accident (Report Commissioned by UNDP and UNICEF with the support of UN-OCHA and WHO 48).

Daily life for women living near Chernobyl changed drastically after the incident occurred. Mies writes, "I met many women in April 1986 who felt that the Chernobyl event had destroyed their *joie de vivre*, as if radioactivity had already penetrated and broken their bodies. They reported not only depressions, but also feeling sick; to look at children and the glorious spring made their stomachs turn and ache" ("Who Made Nature" 92). Women were rightly concerned with food contamination, as well as the health of their children. Since the explosion there has been a significant increase in thyroid cancer among children. Many people were relocated, but the psychological effects of a disaster of this size are long-lasting. (United Nations Scientific Committee on the Effects of Atomic Radiation [UNSCEAR]).

Race and class as categories of analysis

Traditionally, environmentalism has been viewed in the United States as a white issue; however, environmental degradation is very much a class and race issue since corporations and the government direct waste sites to poor, minority communities. The largest toxic waste site in the United States is located in Sumter County, Alabama, a low-income black community. In addition, the region between Baton Rouge and New Orleans is nicknamed *Cancer Alley* due to the "136 chemical companies and refineries" located in this predominantly black area (Riley 192). According to Oakley, "66 per cent

of all cancer-causing chemicals emitted into the air come from factories in the most deprived 10 per cent of the country" (138-39). Furthermore, Indian reservations in the United States are particularly vulnerable because they do not have stringent environmental regulations and, due to high poverty levels, they are easily bribed through the promise of money and jobs. Many of these tribes are "torn between the economic gains and the integrity of their land" (Warren, Ecofeminist Philosophy 15). Environmental racism is no accident; companies seek out poor communities in which they can dump their waste because they expect less resistance from these groups of people, as well as easier regulations to circumvent. And now, through globalization, corporations are moving their companies to Third World countries where regulations are even easier to manipulate and the people have even less clout against these powerful economic forces (Oakley 137-41). The interconnectedness of class, race, and gender allow for poor, minority women to be most susceptible to the negative effects of environmental pollution.

In addition to living in close proximity to dangerous toxic waste, people of color and poor people, in the United States as well as in "developing" countries, also work more intimately with toxic substances.[3] Overexposure to occupational chemical hazards is often the result of weak enforcement of lax safety regulations that include lack of protective gear and proper cleaning facilities, inability to read and/or understand labels on the chemical containers, and reuse of the "[a]ttractive, leak-proof containers" for carrying and storing food and water (Dharmaraj and Jayaprakash 94). A study[4] conducted in Tamil Nadu, South India demonstrates the horrifying extent of this exposure to pesticides for these Indian women who are more often than not illiterate and living in poverty: "The

same hands that apply pesticides nurse babies at the breast, wash vegetables, cook the food, and feed the children. A cycle of poisoning occurs every day in most of these huts. With hardly two or three changes of clothing, women live with chemicals day in and day out. No one had heard of re-entry intervals between spraying and working in the field. Both are done simultaneously" (Dharmaraj and Jayaprakash 94). This is only one example among countless others of how the interlocking systems of oppression (racism, classism, and sexism, among others) compound the effects of environmental pollution and hazardous working and living conditions for many people across the globe. Corporations *do* discriminate (against race, class, gender, etc.), but the negative effects of the destruction of the environment *do not* discriminate (these effects impact everyone, regardless of race, class, gender). I will now turn to the specific problem of endocrine disruption and its global impact on human health.

A what-estrogen?

Over the last 200 years, industrialization, "development," and "science" have led to a greater increase of pesticides in our foods, an increased use of synthetic chemicals, higher levels of environmental pollution, and more exposure to hazardous conditions at work and at home, in the United States and globally.[5] Many of these environmental toxins are known as environmental estrogens, endocrine disruptors, estrogenic xenobiotics, or xenoestrogens. Daston, et al. define estrogenicity as "the property of producing biologic responses qualitatively similar to those produced by the endogenous hormone, estradiol-17ß" (466). According to Schettler, et al., "endocrine disruptors are chemicals that mimic or block hormones or otherwise interfere with normal hormone activity, often at extrememly small doses. . ." (151). Steinmetz, et al. define

xenoestrogens as "nonsteroidal, man-made chemicals that can enter the body by ingestion or adsorption and mimic the actions of estrogens. These chemicals share no structural homology with estradiol and include substances such as pesticides and industrial by-products" (2741).

Xenoestrogens essentially mimic or interfere with estradiol-17ß, the most powerful estrogen already found in the human body. When a hormone is released into the bloodstream, a protein carrier helps to transport the hormone to a receptor found along the cell wall. Once the hormone and the receptor bind together, the cell's DNA knows to activate specific genes. The hormone and receptor fit together perfectly to enable the hormone to function the way it should.[6] A synthetic compound in the environment that disrupts or interferes with this normal hormonal process is named an endocrine disruptor (Hollander). Endocrine disruptors (specifically xenoestrogens) can have a number of different effects on the reproductive system. For example, some

> endocrine disruptors mimic a hormone by binding to its receptor and activating the same response that the natural hormone would or a stronger response, and some stimulate the production of more hormone receptors; all of these substances can amplify the effects of the endogenous hormone. On the other hand, some compounds bind to a receptor and trigger a weaker effect than the naturally occurring hormone would, and some produce no biochemical effect but prevent hormonal action simply by occupying the appropriate hormone's site on the receptor (Hollander 83).

Endocrine disruptors interfere with the normal function of hormones, which in turn, may cause harm to the body.

Biological Differences Matter

Biological differences between men's and women's bodies[7] most likely influence the ways in which endocrine disruptors affect the body. Within most cultures, the female

body on average is physically smaller than the male, and with higher percentages of body fat. Many environmental toxins are stored in fat tissue in the body, which could mean an increase of potential risk for women in particular (Beauregard; Mattison). Beauregard explains that "Because women possess a greater percentage of body fat than do men, they may be more heavily burdened. Pregnancy, breast-feeding, dieting, menopause, and aging can serve to release stored toxins into the blood, posing health risks to women and their offspring" (190). In addition to the harmful effects endocrine disruptors may cause to a woman's body, xenoestrogens, unlike most natural estrogen, cross the placental barrier, potentially endangering the fetus as well (Bhatt 71).[8]

For a variety of historical, cultural, and institutional reasons, sociocultural interpretations of biological differences are generally used to dictate gender roles in most societies, which contribute to the diversity and extent of human exposures to environmental toxins. Depending on the country and community, exposure to pesticides (through agricultural work, subsistence farming, gardening, amount of food intake, and variety of foods consumed) is typically incongruent between women and men. Furthermore, body composition differences (such as blood flow, epidermal thickness, pulmonary function, cardiac output, total body water, plasma volume, and body fat, among others) between pregnant and non-pregnant women and men affect the extent of absorption of chemicals into the body and the distribution of these chemicals throughout the body (Mattison).[9] Therefore, women's social and cultural roles, combined with their biological body compositions, must be considered concomitantly when researching the impacts of environmental toxins on women's health, as well as when developing and implementing health policies.

"Fifty Ways to Lose Your Fertility"[10]

DES (diethylstilbestrol) is a particularly useful example of the effect of xenoestrogens on women and their children. According to Hollander, "DES is the only synthetic hormone with a proven role in reproductive health disorders" (84). DES was prescribed from the late 1930s through the early 1970s to over 4 million women in the United States to prevent miscarriage (The Boston Women's Health Book Collective 636). DES mothers have an increased risk of developing breast cancer and DES daughters have an increased risk of developing vaginal cancer (clear-cell adenocarcinoma) (Hollander 84). DES sons are also at risk for reproductive disorders, including lowered sperm count, testicular cancer, and undeveloped testes (The Boston Women's Health Book Collective 637-38). Beauregard explains the significance of the effects of DES: "DES is somewhat unusual because it is even more potent than the body's own estrogen, in contrast to most other estrogen-like substances, whose effects are weaker. The DES story was special as well because its deleterious effects were first discovered in humans" (198). DES research will need to continue in order for us to comprehend the effects on future generations.

Chemicals such as dioxin, DDT, and PCB are also endocrine disruptors that can affect our hormonal systems. According to Beauregard, "Dioxin refers to a class of more than 200 compounds, the most potent of which is TCDD, or 2,3,7,8-tetrachlorodibenzo-p-dioxin" (196). A dioxin-containing herbicide called Agent Orange was used during the Vietnam War to destroy the forests that provided protective cover and food for the Vietnamese forces. In addition, men who were exposed to Agent Orange reported skin irritations and other illnesses such as leukemia and lymphoma (Beauregard). Flesch-Janys quotes L. Wayne Dwernychuk's work stating that "Health studies suggest that

inhabitants of the village situated nearest the most highly contaminated former base experience a higher level of birth defects relative to other villages studied in the valley" (150). Research has also linked dioxin to endometriosis and its presence can be found in breast milk, a potential risk for infants (Beauregard; De Vito and Gallo).[11]

DDT, an agricultural pesticide that is now banned in the United States, and DDE, the "chief breakdown product" of DDT (Hollander 84) are also believed to have a deleterious effect on reproductive health. Hollander states that "women with the highest concentrations of DDE were four times as likely as those with the lowest concentrations to have breast cancer," according to a study involving 14,290 women in New York City years after DDT was banned (84). Another study found that DDT was directly related to a higher incidence of preterm births (Longnecker, et al.).

Furthermore, a DDT spill in the 1980s at Lake Apopka, Florida had serious effects on the reproductive systems of alligators. DDT and DDE residues were found in large quantities in alligator eggs and led to a reduced mortality rate (Daston, et al. 471). According to Bhatt, "Other abnormalities – the females had abnormal eggs and far too many, the males had what looked like ovaries, and juvenile male alligators had penises one-half to one-third the normal size – were tentatively tied to the effects of estrogenic chemicals" (72).[12] Birds, mammals, and fish in the Great Lakes ecosystem have also revealed the toxic effects of endocrine disruptors on reproductive health (Bhatt 72; Daston, et al. 471-72; Colborn, Dumanoski, and Myers). These findings are suggestive of the types of effects from these toxicants on human reproductive health.

PCBs (Polychlorinated biphenyls), also banned in the United States, were once used in plastics, electrical equipment, and adhesives, and have been linked to fertility

problems and birth defects (Hollander 83). PCBs "are one of the most persistent and widespread of the xenobiotics in the ecosystem because of their chemical stability and their ability to bioaccumulate" (Danzo 1252). Therefore, even though some pesticides such as DDT and PCBs are no longer used in the United States, they continue to pollute the environment and its inhabitants as they work their way up the food chain. According to Colborn, Dumanoski, and Myers, "Humans also carry PCBs and other persistent chemicals in their body fat, and they pass this chemical legacy on to their babies. Virtually anyone willing to put up the $2,000 for the tests will find at least 250 chemical contaminants in his or her body fat, regardless of whether he or she lives in Gary, Indiana, or on a remote island in the South Pacific" (106).

Many of the *in vitro* studies, as well as empirical evidence, reveal a potential, albeit controversial, connection between endocrine disruptors and breast cancer. According to Beauregard, "Breast cancer incidence has risen by 24% since 1973 [to 1991] in a manner that cannot be explained solely by better detection. Thirty percent to 50% of women with breast cancer, the second most common cancer in women, have no recognized risk factor" (191).[13] So much is still unknown about the causes of breast cancer, and certainly the relationship between endocrine disruptors and breast cancer is yet to be completely understood, but basic knowledge about the link between estrogen and breast cancer may provide some illumination.[14]

Higher levels of estrogen in the body appear to be related to an increased risk of breast cancer. Even "cumulative, long-term exposure to the body's own estrogen (estradiol-17ß) may increase the risk of breast cancer" (Beauregard 191). Women whose lifespan of menstruation is longer, due to earlier onset and late menopause, have more

estrogen released into the body, and a higher risk of breast cancer. Meanwhile, in women whose ovaries have been removed, breast cancer risks are less prevalent (Beauregard 191). Estrogen replacement therapy (ERT) and hormone replacement therapy (HRT), by exposing women to different types and levels of estrogen, may also make women more vulnerable to breast cancer. Assuming this is true, endocrine disruptors could potentially have the same effect.

High-fat diets and obesity also have been linked putatively to breast cancer. Due to the tendency of many endocrine disruptors to aggregate in body fat, women with higher amounts of body fat may be at a higher risk for breast cancer. "Additionally," according to Hollander, "the increased odds of the disease that have been found among women with diets high in animal fat and with high levels of alcohol consumption may be explained by the fact that the fat tissue can manufacture estrogen, and alcohol can increase the hormone's production" (84). Also, when endocrine disruptors bind to the hormone receptors on the cell, cell division may occur more rapidly, resulting in the possibility of cancer developing in the body.

In addition to the endocrine disruptors mentioned, nutrition, electromagnetic fields, air pollution, smoking, radiation, and other chemicals and pesticides also may be considered to have a detrimental impact on reproductive health. Phytoestrogens, "estrogen 'mimics' that occur naturally in some plants" are also of special concern for reproductive health (DiDiego, et al. 58). Humans have been using plants and herbs for centuries to control their reproduction (Colborn, Dumanoski, and Myers 78). Plants that make estrogens may in essence be producing "oral contraceptives to defend themselves," particularly from the animals that consume them (76). "By lacing their leaves with

hormonally active substances, they suppress the fertility of the animals that feed on them" (77). Research also indicates that some plant estrogens may actually protect against some diseases such as breast and prostate cancer by replacing the natural (and stronger) estradiol found in the body; however, phytoestrogens function differently in the body than do synthetic endocrine disrupting chemicals, indicating the need for more research in this area (Colborn, Dumanoski, and Myers 75-82; DiDiego, et al. 58-59; Schettler, et al. 187-88). The following quotation adds urgency to the need to test endocrine disruptors for their impact on reproduction:

> There are thousands of other compounds in the environment that have not been tested for their effects on reproduction; many of these may prove to be endocrine disruptors. The exposure of humans to environmental toxicants that may be hazardous to their reproductive systems is, therefore, likely increasing. Also of importance is the fact that many toxicants accumulate in the fatty tissues of the body. Therefore, continued exposure of human populations to ever increasing numbers and amounts of environmental toxicants may have accumulative effects on reproductive health. These effects may not manifest themselves until future years (Danzo 1258).

How bad could it be? The Research Challenge

The truth of the matter is, we do not know. Several difficulties impede risk assessment when researching endocrine disruptors. First, the effects of endocrine disruptors on exposed people are often delayed, or are manifested in future generations, rather than the generation that was initially exposed. Second, the effects differ depending on stages of development in conjunction with exposure (Bhatt 73). Third, there are multiple estrogen receptors, making it difficult to differentiate (Degen and Bolt 438; Turner and Sharpe 72).

Finally, endocrine disruptors do not affect us in a vacuum; we are typically exposed to more than one endocrine inhibitor at any one time. Simultaneous effects of

combined endocrine disruptors may be profoundly different from the effects of a sole endocrine disruptor, as they are often studied in the laboratory. Danzo explains that "since xenobiotics can act through several steroid-dependent and other (Ah receptor, metabolizing enzymes, thyroid hormone receptor etc.) pathways, the possibility exists for augmenting the effects of even low concentrations of weak environmental hormone agonists and antagonists" (1258). Phytoestrogens in our diet may (or may not) further aggrandize the difficulty in risk assessment of endocrine disruptors. In addition, different levels of endocrine disruptors may have significantly diverse effects. Jacobs explains that, "Endocrine disruption can occur at levels far lower than those of traditional concern to toxicologists. Sometimes high doses shut off the effects that occur at low levels, and sometimes low and intermediate doses produce greater effects than those observed at high doses" ("Unsafe Sex" 177). Variances such as these make researching endocrine disruptors a complicated matter.

Other research dilemmas may include methodology as well. For example, McLachlan and Korach at a Symposium on Estrogens in the Environment, III, revealed the following:

> A most surprising finding was that estrogenic xenobiotics are not only found in the environment but are also contaminants (e.g., nonylpheno, bisphenol A) of laboratory plasticware, such as flasks and Petri dishes. In these cases, materials used in the plastic-manufacturing process were found to alter growth of MCF-7 breast cancer cells due to their estrogenic activity. The biological activities are weak, but when it is considered that 300,000 tons of alkyl phenol polyethoxylates are introduced into the environment each year, the magnitude of the problem becomes potentially more significant (3).

Researchers need to design their methods more carefully to reach reliable conclusions. Also, much of the research on endocrine disruptors has been done in a laboratory rather

than studying the effects on those who have already been exposed. According to Turner and Sharpe, "Most environmental oestrogenic chemicals have been identified based on one or more *in vitro* screening systems (human breast cancer cells, fish hepatocytes or transfected yeast cells) and there is relatively little data on their bioactivity *in vivo*, in particular whether they are able to exert effects at environmentally relevant concentrations" (71). Considering the large number of people exposed to endocrine disruptors, *in vivo* studies, while not necessarily simple, are possible. Researchers need to conduct long-term and in-depth studies on people living in environments with high exposure to endocrine disruptors to determine the effects on reproductive systems.[15]

Most of the available research on the topic of endocrine disruptors indicates that the primary focus of study of the effects of endocrine disruptors is on animals or men. Numerous articles in medical journals revealed that much of the research on endocrine disruptors is focused on sperm count and male reproductive disorders.[16] In our capitalist, patriarchal world, the fear that men will not be able to procreate properly is indicative of why research on xenoestrogens has been directed in this way. Historically in the United States health research and studies assessing health risks and illnesses on men, have been (and still are) extrapolated to women's health as well.[17] The lived experience of so many women suffering from health problems in particular communities is enough reason to intensify research on the effects of endocrine disruptors in women.

Because women's reproductive processes encourage endocrine disruptors to enter into the blood stream more frequently than they would in men, improved research focusing on their effects on women is imperative. Additionally, an increase of women working in hazardous industries exposes more women and their children (in utero and as

infants and children living in their communities) to potential health risks (Bhatt 70; Jacobs and Dinham). Although the United States is seriously failing at protecting its workers from these exposures, the risks are even higher in "developing" countries where government legislation does not effectively protect workers and where citizens have less access to adequate health care (Jacobs and Dinham). While women may potentially be at a higher risk than men, women are still consistently underrepresented in research studies. I will return to the importance of quality risk assessment that includes women as research subjects in chapter 4.

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[1] Typically, I prefer gender-neutral terms to describe events that imply the inclusion all people. However, because these environmental disasters occurred in, and partly due to, patriarchal societies, I feel it is appropriate to use the words "His"tory and "Man"-Made as my implicative meanings here are intended.
[2] By "modern" I mean primarily Western industrialized nations. Large production companies and transnational corporations are typically established in these societies and benefit them.
[3] See Robert D. Bullard, "Anatomy of Environmental Racism," Toxic Struggles: The Theory and Practice of Environmental Justice, ed. Richard Hofrichter (Salt Lake City: The University of Utah Press, 2002) 25-35. Also see Miriam Jacobs and Barbara Dinham, eds., Silent Invaders: Pesticides, Livelihoods, and Women's Health (London: Zed Books, 2003).
[4] The study consisted of interviews with 100 women agricultural workers from ten villages and included observations of the work environments as well. One third of the women were pregnant and another one third of the women were breastfeeding. Half of the women worked in the fields throughout the year and the other half spent at least six months of every year working in the fields. All the women experienced direct or indirect exposure to a variety of pesticides, some known to cause birth defects and other health problems. See Daisy Dharmaraj and Sheila Jayaprakash, "Day in, Day out: Lack of Protection in India," Silent Invaders: Pesticides, Livelihoods, and Women's Health, ed. Miriam Jacobs and Barbara Dinham (London: Zed Books, 2003) 92-95.
[5] Pesticide application has been common since the middle of the nineteenth century. See John Wargo, Our Children's Toxic Legacy: How Science and Law Fail to Protect Us from Pesticides (New Haven: Yale University Press, 1998) 6.
[6] A lock and key example is a common analogy for the way the hormone and receptor bind together.
[7] The human body exists in a variety of forms, and the categories of man and woman (or male and female) used to define a person's sex based on genitalia, are rigid and uncompromising. Not all human bodies are easily defined by these narrow categories; the male/female, man/woman binaries do not capture the diversity of human experiences in relation to genital formation and appearance. My point here applies to all human bodies, although the variety of ways that endocrine disruptors affect the many types of human bodies is still unknown to a great extent.
[8] Research suggests a potential link between pesticides and congenital malformations in children whose mother was exposed to endocrine disrupting chemicals EDCs during pregnancy. See Ana M. Garcia, "Birth Defects in an Agricultural Environment," Silent Invaders: Pesticides, Livelihoods, and Women's Health, ed. Miriam Jacobs and Barbara Dinham (London: Zed Books, 2003) 159-66. Male exposure to EDCs may also produce adverse reproductive effects such as low sperm count and decreased FSH levels. See Xiping Xu and Sung-II Cho, "Reproductive Health and Pesticide Exposure," Silent Invaders: Pesticides, Livelihoods, and Women's Health, ed. Miriam Jacobs and Barbara Dinham (London: Zed Books, 2003)

167-76. See also Rogelio Recio, et al. "Pesticide Exposure Alters Follicle-Stimulating Hormone Levels in Mexican Agricultural Workers," Environmental Health Perspectives 113 (September 2005): 1160-63.
[9] For more detailed information, see Donald R. Mattison, "Gender Differences in Response to Drugs and Environmental Toxicants," Health and Disease Among Women: Biological and Environmental Influences, ed. Roberta B. Ness and Lewis H. Kuller (New York: Oxford University Press, 1999) 33-58.
[10] Borrowed from the title of chapter 5 in Theo Colborn, Theo, Diane Dumanoski, and John Peterson Myers, Our Stolen Future: Are We Threatening Our Fertility, Intelligence, and Survival? – A Scientific Detective Story (New York: Plume, 1997) 68.
[11] Two important connections between TCDD (dioxin) and endometriosis are the hormonal and immunological relationships. See Linda S. Birnbaum and Audrey M. Cummings, "Dioxins and Endometriosis: A Plausible Hypothesis," Environmental Health Perspectives 110 (2002): 15-21. Also see Audrey M. Cummings, Joan L. Metcalf, and Linda Birnbaum, "Promotion of Endometriosis by 2,3,7,8-Tetrachlorodibenzo-p-dioxin in Rats and Mice: Time-Dose Dependence and Species Comparison," Toxicology and Applied Pharmacology 138 (1996): 131-39. For information regarding the limitations of using rodents to study endometriosis, see Sherry E. Rier and Warren G. Foster, "Forum: Environmental Dioxins and Endometriosis," Toxicological Sciences 70 (2002): 161-70.
[12] A growing number of studies are beginning to examine a potential alteration of the offspring sex ratio by exposure to endocrine disruptors. For example, see Tarmo Tiido, et al., "Exposure to Persistant Organochlorine Pollutants Associates with Human Sperm Y:X Chromosome Ratio," Human Reproduction 20 (2005): 1903-09. Although the research in this area seems to be conflicting, a potential connection raises some interesting questions for feminists. If endocrine disruptors prove to be sex-altering chemicals, how will we change the way we think about biology, sexual difference, gender, and sexuality?
[13] Kuller reports that "From 1973 to 1991 the incidence of invasive breast cancer in the United States increased 25.8% in whites and 30.3% in blacks" (201). See Lewis H. Kuller, "Epidemiology of Breast Cancer," Health and Disease Among Women, ed. Roberta B. Ness and Lewis H. Kuller (New York: Oxford University Press, 1999) 201-24.
[14] The connection between EDCs and breast cancer continues to be a controversial topic. Some studies suggest that EDCs increase the risk for breast cancer. See Lennart Hardell, "Environmental Organochlorine Exposure and the Risk for Breast Cancer," Silent Invaders: Pesticides, Livelihoods, and Women's Health, eds. Miriam Jacobs and Barbara Dinham (London: Zed Books, 2003) 142-47. Dieter Flesch-Janys, "Explaining Breast Cancer and Chemical Links: Health Hazards for Women Workers," Silent Invaders: Pesticides, Livelihoods, and Women's Health, ed. Miriam Jacobs and Barbara Dinham (London: Zed Books, 2003) 148-58. For a review of several studies that fail to show a correlation between EDCs and increased breast cancer risk, see Stephen Safe, "Endocrine Disruptors and Human Health: Is There a Problem," Toxicology 205 (2004): 2-10.

There are several reasons for the difficulty in finding conclusive evidence linking environmental toxins to breast cancer. First, the timing and extent of exposure to chemicals is difficult to accurately define and measure, especially since particular periods of time in a women's lifespan (such as puberty) increase her sensitivity to chemical exposure. Second, because of the many toxic exposures humans face daily, a suspected relationship between breast cancer and particular chemicals may primarily be a signal for another exposure or multiple exposures. See Ted Schettler, Gina Solomon, Maria Valenti, and Annette Huddle, Generations at Risk: Reproductive Health and the Environment (Cambridge, MA.: The MIT Press, 1999). Finally, I suspect an overall lack of research in this specific area may be indicative of the corporate politics propagandized by chemical companies in order to avoid accountability for the potential seriousness of the impacts of toxins on public health.
[15] Scientific researchers often study an issue within a population, observe a problem, and then nothing comes of the results. However, one would hope that the ethical intentions of conducting research is with the intention of suggesting policy (and other) changes, especially with regards to public health, to improve the quality of life for all sentient beings. Unfortunately, politics often influence results or prevent research studies from being conducted, especially when corporations and governments are economically invested in the silencing of the results. I will return to this problem briefly in chapters 2 and 4.
[16] See Recio, et al.; Tiido, et al.; and Alberto Mantovani and Francesca Maranghi, "Risk Assessment of Chemicals Potentially Affecting Male Fertility," Contraception 72 (2005): 308-13. See also review articles

of many studies: D.J. Handelsman, "Estrogens and Falling Sperm Counts," Reproduction, Fertility and Development 13 (2001): 317-24. And, Alex C. Vidaeff and Lowell E. Sever, "In Utero Exposure to Environmental Estrogens and Male Reproductive Health: A Systematic Review of Biological and Epidemiologic Evidence," Reproductive Toxicology 20 (2005): 5-20.

[17] For historical information regarding the lack of participation of women in clinical research, see Tracy L. Johnson and Elizabeth Fee, "Women's Health Research: A Historical Perspective," Women's Health Research: A Medical and Policy Primer, ed. Florence P. Haseltine and Beverly Greenberg Jacobson (Washington, DC: Health Press International, 1997) 27-43.

Chapter 2: The Problem of Neoliberal Globalization

Endocrine disruptors clearly pose serious health threats for all humans and animals across the globe, and the impact of these chemicals exists in part because of economic, political, and social structures that advance their distribution and discourage accountability for damages. Modern globalization practices focus on encouraging development in such a way that corporate and governmental accountability fall by the wayside; in an attempt to develop a global economy, globalization policies have prioritized profits over the health of our environment and its inhabitants (Guest and Jones; Petchesky). Before I address specific globalization practices as threats to our health and our environment, I believe it is important to define more clearly the term "globalization."

A basic definition of globalization states that it is an "international movement of capital, goods, and labor" (Bayes, Hawkesworth, and Kelly 1). A slightly more developed classification defines globalization as "the creation of a global capitalist market and an inter-state system regulated by international law" (Feffer 3). However, neither of these two definitions expresses the substantial social, political, and cultural effects on all people, and especially on those people in "developing," or Third World countries. For the purposes of this thesis, I find a more holistic and inclusive definition by Mittleman to be the most useful:

> As experienced from below, the dominant form of globalization means a historical transformation: in the economy, of livelihoods and modes of existence; in politics, a loss in the degree of control exercised locally – for some, however little to begin with – such that the locus of power gradually shifts in varying proportions above and below the territorial state; and in culture, a devaluation of a

> collectivity's achievements or perceptions of them. This structure, in turn, may engender either accommodation or resistance (6).

Today's world is globalizing faster than any other time in history, and with this process comes a transnational transformation of economies, politics, the environment, and overall way of life. The ideology of globalization is steeped in a market-oriented, patriarchal capitalist notion of how "development" should accelerate the maximization of profits and "boost" the economy, without considering the negative impacts on human (or animal) health, such as the added pervasiveness of endocrine disrupting chemicals in our environment. The practices by chemical companies, along with the lax regulations of governments, suggest a focus on profits over people, and, as I will discuss shortly, ultimately threaten public health.

The Commodification of Life

Who supports globalization practices? Certainly the United States and most First World countries benefit in the short term from globalization.[1] The World Bank and the International Monetary Fund (IMF) work to facilitate global trade with Third World countries through the undemocratic imposition of structural adjustment programs (SAPs) and restrictive and conditional loans on these countries. Loans provided by the IMF often come with stipulations that usually result in cuts to social services. With women and children being the majority of the world's poor, these social services affect them most directly. A loss in access to these social service programs such as health care and education, forces women and children deeper into poverty and often sickness, requiring even more services that do not exist (Jaggar). This problem will become more formidable as increased numbers of women and children experience serious health

problems from exposure to endocrine disrupting chemicals (through agricultural occupational labor, environmental disasters, and household products, as well as through generational effects). This downward spiral is especially devastating in Third World countries where once shared natural resources are being commodified and placed on the global market, forcing women to go farther for food, water, and fuel, leaving less time for "productive" wage-earning work (Jaggar).

The World Trade Organization (WTO) works to negotiate trade issues between nations by supporting free trade. Through free trade globalization opens borders, benefiting the First World by allowing developed countries to permeate the markets of developing countries, creating a dependency on international commodities.[2] Globalization also concedes to deregulation and privatization, assisting transnational corporations (TNCs) in crossing borders where they can avoid stringent labor rights and environmental regulations, and can abandon polluted land and air for other nations to remedy on their own. It makes sense then that these global institutions, although predominantly controlled by wealthy nations, are in favor of both the structure and ideology of globalization. Unfortunately, the lack of accountability by the institutions, governments, and corporations that are invested in neoliberal globalization policies, impact all human health across the globe. Endocrine disruptors are a health concern for all people (even the leaders of the institutions, corporations and governments who create and promote these policies), especially because the effects on our reproductive systems are often multigenerational and the extent is unknown.

Present-day globalization is steeped in a neoliberal hegemony that emphasizes privatization, deregulation, and essentially, the cutting of social services. The intent of

neoliberal globalization is to create a global marketplace where everything is a commodity to be bought, sold, or traded for a profit, regardless of the implications this practice will have on people. For example,

> Neoliberalism requires that governments provide for the free movement of capital, the free movement of goods, unrestricted labor markets, responsible banking systems, stable monetary policies, limited fiscal policies, attractive investment opportunities, and political stability. Neoliberalism provides rules for economies, not for societies (Bayes, Hawkesworth, and Kelly 3).

Neoliberal ideology functions under the philosophy that nation-states belong in the marketplace as businesses, and the goal of every human is to maximize her or his participation in this marketplace; everything carries a price tag.

Implications of Neoliberal Globalization on Global Health

Several of the fundamental aspects that comprise neoliberal globalization deeply affect the environment and women's health. Much of the literature covering the impact of globalization on health and the environment concerns the spread of infectious diseases, access to social services, and food safety/security.[3] Globalization has made it easier for people and economies to travel across the globe, but not without consequences. An increase in travel between nations is a public health concern due to the spread of infectious diseases such as SARS, TB, West Nile Virus, HIV/AIDS, and now, avian flu.[4] Industrialization and modernization of the agricultural industry has led to the mass abandonment of traditional farming practices and an unprecedented accelerated shift to urbanization as former farmers move to cities in search of work. City living involves larger populations living closer together: a breeding ground for rapid spread of disease and increased levels of pollution.[5]

The health industry in particular suffers in countries that have SAPs imposed on them. Subsidies are prohibited and the medical costs are transferred to the citizens, many of whom are too poor to pay for medical services, medicines, and supplies (especially after losing their jobs to private companies that have taken over their industries). Moreover, the wealthy lending nations force poorer nations to put economic trade issues over the health of their people (Fort, Mercer, and Gish). If a nation's government cannot make decisions about the needs of its own population, then it really has no autonomy and is essentially enslaved to wealthy nations that are clearly more invested in profits than people. Privatization of health care has decreased both access to care and quality of care, and increased costs of both care and medicine (Macarov).

In addition to social services such as health care, education, and social welfare programs, privatization concedes control of natural resources into the hands of transnational corporations (TNCs) that evade both environmental regulation and a sense of ethics.[6] Privatization leads to deregulation, placing significant power in the hands of transnational corporations (TNCs) and reducing government control, another element of neoliberal ideology. Deregulation perpetuates market fundamentalism through allowing financial institutions greater access to the global economy. Free trade encourages a free market and deregulation provides TNCs with the power to take advantage of any instability in the economy and capitalize on it.[7] The level of power maintained by TNCs across the globe is exorbitant. Oakley asserts that

> Forty-nine of the 100 biggest economies in the world today are nation states, and 51 are transnational corporations (TNCs) . . . The biggest TNCs have annual sales which exceed the output of most developing countries; the UN Centre on TNCs lists 600 with annual sales of more than $1 billion, equal to more than a fifth of

> the world's total industrial and agricultural production; 74 of these account for more than 50 per cent of total sales (141).

With this magnitude of wealth, TNCs have been able to essentially appropriate and control several significant global industries.[8] TNCs maximize their profit by relocating overseas and using cheap labor through global assembly lines and sweatshops.[9]

TNCs are often abdicated from environmental and social accountability, a significant concern with regard to the control and responsible use of endocrine disrupting chemicals. One such example is Union Carbide, a transnational American company that set up a chemical plant in Bhopal, India in 1970 to produce pesticides. The plant was not profitable and the company ceased operations, but without maintaining the safety system, resulting in an explosion on December 3, 1984 that killed thousands of people in ghastly ways within a few hours, and approximately 20,000 since then from exposure ("What Happened in Bhopal?").[10] The local water and soil are still so heavily contaminated with lead, mercury, and organochlorines, that birth defects, reproductive disorders, and other disabilities continue to impact each generation. Women continue to experience severe reproductive health problems, including menstrual irregularities, spontaneous abortion, premature menopause, increased rates of cervical cancer, and pelvic inflammatory disease, among others (Sarangi 264-71). Aside from the health atrocities that continue to plague the inhabitants of Bhopal, the company has managed to avoid just reparation for the damages it caused these people. Through legal maneuvering years of postponing court dates, Union Carbide (now Dow Chemical) has managed to escape the fulfillment of legal, financial, and ethical responsibilities for this tragedy (Seager 96-101; "What Happened in Bhopal?"). Furthermore, Union Carbide claims that the chemicals are a

"trade secret" and refuse to fully disclose the contents of the explosion, leaving doctors and health care facilities with a huge and extraneous challenge in deciding how to best treat the survivors ("What Happened in Bhopal?"). In chapter 4, I will describe some possibilities for avoiding future environmental disasters and for demanding corporate responsibility.

Environmental Degradation and Future Generations

In addition to low wages and long hours, laborers of TNCs often face serious hazardous working conditions through exposure to toxic chemicals. Many Third World countries have sold off their land to transnational agricultural corporations or succumbed to neoliberal pressures of free trade to expand their exports, resulting in the loss of more traditional, sustainable farming practices in favor of practices that support TNCs and are typically more destructive to the environment. The agricultural industry is one of the largest in "developing" Third World countries and has an enormous economic impact. Approximately 112 million people are dependent for work in the chemically-laden agriculture industry in Latin America, as well as almost half of Central America's population (Wesseling 32-33). Wesseling explains that the "use of pesticides is one of the most burdensome occupational and environmental health hazards in developing countries because this intrinsically dangerous technology is promoted in settings that lack resources to control it" (32).

Dangerous agricultural practices pose serious threats to the health of women and their children. As discussed in chapter 1, body composition and social and cultural roles are significant factors for levels of exposure to chemicals. For example, "Both local environment and differences in body fat are likely to have a greater impact on women,

who typically spend more time in the home and locality, and naturally store more fat-soluble toxic material, even when exposed to the same amount as men" (Jacobs, "Introduction to Part II" 99). Many of these toxins are endocrine disruptors and, as discussed above, have a severe impact on the reproductive system, possibly for many generations to come.

Furthermore, the generational nature of these environmental toxins is a global concern due to their tendency to bioaccumulate. In many instances, the toxins travel far from their source and build up in concentration as they go (Colborn, Dumanoski, and Myers). Oakley explains that these "worst environmental toxics, known as 'Pops', or persistent organic pollutants, are extremely toxic in small amounts, and they also travel long distances via air currents, thus endangering people and wildlife all over the world" (137). Due to their long molecular chains, these toxins are not easily broken down and when they do, they often break down into more hazardous chemicals that their original forms (Oakley 137). Women across the globe are deeply affected by environmental degradation: "Household products, industrial pollutants, plastics, and packaging wastes invade the homes of First World women threatening the reproduction of daily life, while direct access to food, fuel, and clean water for many Third World women is imperiled by cash cropping on traditional homelands and by pesticides in agribusiness" (Merchant, Earthcare 7).

TNCs also control and manipulate seeds through their use of patents in the agricultural and biotechnology industries. Corporations such as Monsanto are patenting seeds and selling them to farmers in developing countries. According to Shiva, "most plant diversity originates in the Third World, and seeds and plant materials that today are

under the control of the industrialized world, were originally taken feely from the farmers to whom they will now be sold back as patented material" ("The Effects of WTO"). In addition, through genetic engineering, huge corporations are altering the genes of the seeds to make them sterile, forcing farmers to purchase new seeds each year and criminalizing them if they attempt to stockpile seeds that were originally their own! This corporate hegemony, called biopiracy by Shiva and others, is increasing the dependency of developing nations on TNCs and reducing a requisite level of autonomy in food security that is paramount to women's lives as sustainers.

A significant amount of money in the global economy is being directed to multinational biotechnology corporations for researching genetically modified organisms (GMOs), but the research appears to be directed toward new developments rather than testing for safety and possible dangers, including potential endocrine disrupting properties. GMOs also have a significant negative impact on biodiversity, which is an enormous threat to women's health (Shiva, "The World on the Edge" 124).[11]

Free trade, deregulation, and privatization are all hegemonic devices with which TNCs and First World countries can gain control over the "development" of the Third World and its resources. Globalization is clearly meant to guarantee First World/North survival through commodifying natural resources and people of the Third World/South. Jaggar reinforces the detrimental effects of neoliberal globalization:

> Despite its rhetoric of freedom and prosperity – freedom of enterprise, freedom from the red tape of government regulation, freedom from onerous taxation, and, above all, freedom of trade – the present system of neoliberal globalization has brought little freedom, democracy, or prosperity to most women in the global South. Instead, the current neoliberal framework traps billions of people in situations of political and economic deprivation, increasing their health

> vulnerability and condemning them (and their families) to lives of illness and premature death (206).

The significance of global policies that do not consider impacts on human health is yet to be truly understood. The irresponsible use of chemicals and the manipulation of food in agricultural and biotechnology industries are global concerns. The use of endocrine disrupting chemicals in one country does not prevent them from affecting the environment and human and animal health in other areas of the world.

These problems are of specific concern to women across the globe as the bearers of future generations. Shiva uses the term "maldevelopment," or "development deprived of the feminine, the conserving, the ecological principle," to describe how "development" is androcentric, as well as anthropocentric, and at the root of inequality and injustice, and ultimately, poverty ("Development" 191). Women's subsistence work (including reproductive labor) cannot be sold as a commodity on the global market, and is therefore considered devoid of any real value. The problem with this patriarchal notion of what constitutes "productive" work is that it also contributes highly to environmental degradation and results in the feminization of poverty among communities whose subsistence methods were effective prior to "development." I now turn to ecofeminist and postmodern feminist theoretical perspectives to reinforce the urgency of the problem of environmental degradation for women.

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[1] Long-term impacts of globalization policies may demonstrate that the careless use of endocrine disrupting chemicals affect all sentient beings across the globe, and therefore, everyone loses.

[2] The intention of free trade is to increase trade between nations through the removal of tariffs and regulations that prevent easy access to the global marketplace. The North American Free Trade Agreement (NAFTA), the 1994 agreement liberalizing trade between the United States, Mexico, and Canada, resulted in over 41,000 lost manufacturing jobs in the U.S. alone, and even more in Mexico. A new model, the Free Trade Area of the Americas (FTAA), seeks to extend the scope of NAFTA to include the entire western hemisphere (except Cuba), which would amplify the negative impacts across the globe. See James H.

Mittleman, The Globalization Syndrome: Transformation and Resistance (Princeton: Princeton University Press, 2000) 140.

[3] For specific examples see Meredith Fort, Mary Anne Mercer, and Oscar Gish, eds., Sickness and Wealth: The Corporate Assault on Global Health (Cambridge, MA: South End Press, 2004); Greg Guest, ed., Globalization, Health, and the Environment: An Integrated Perspective (Lanham: AltaMira Press, 2005); and Vandana Shiva, Stolen Harvest: The Hijacking of the Global Food Supply (Cambridge, MA: South End Press, 2000).

[4] John Eyles and Nicole Consitt, "Canadian Cases of Public Health Implications of Global Environmental and Economic Change," Globalization, Health, and the Environment: An Integrated Perspective, ed. Greg Guest (Lanham: AltaMira Press, 2005) 159-79. For information about HIV/AIDS as a ramification of globalization, see Paul Davis and Mereedith Fort, "The Battle Against Global AIDS," eds. Meredith Fort, Mary Anne Mercer, and Oscar Gish, Sickness and Wealth: The Corporate Assault on Global Health (Cambridge, MA: South End Press, 2004) 145-57; and Rosalind Pollack Petchesky, Global Prescriptions: Gendering Health and Human Rights (London: Zed Books, 2003), 76-132.

[5] Mary Anne Alababza Akers and Timothy Akers, "Urbanization, Land Use, and Health in Baguio City, Philippines," Globalization, Health, and the Environment: An Integrated Perspective, ed. Greg Guest (Lanham: AltaMira Press, 2005) 181-99.

[6] Land typically used by women in developing and Third World countries to feed the community is being appropriated by men for development of cash crops. Women are forced to leave their lands, losing critical food security, and find other work (often at a TNC with low wages and poor labor standards) to support their families. The privatization of water also places basic human rights under the control of greedy corporations such as Monsanto and Coca-Cola. These corporations actually sequester these natural resources belonging to Third World countries and then sell back these essential resources for a profit. If natural water sources are no longer free to local communities, women, who are traditionally responsible for providing water and food to their families in Third World countries, are forced to walk farther or use unsafe water sources to support their families. See Vandana Shiva, "The World on the Edge," Global Capitalism, ed. Will Hutton and Anthony Giddens (New York: Pantheon, 2000) 112-29.

[7] TNCs produce "one-third of world output," and "control 70 per cent of world trade, 80 per cent of foreign direct investment, and 70 per cent of patents and technological transfers. Deregulation has clearly benefited these corporations." See John Feffer. "Challenging Globalization: An Introduction," Living in Hope: People Challenging Globalization, ed. John Feffer (London: Zed Books, 2002) 9.

[8] For instance, "Six TNCs handle about 85 per cent of the world grain trade; 11 account for 81 per cent of world agrochemical sales; 15 control 85-90 per cent of the world cotton trade, 3 account for 83 per cent of the world trade in cocoa; and 5 are responsible for 70 per cent of the trade in tobacco leaf." The land used for tobacco leaf alone could feed the entire world's population with grain for at least six months. Ann Oakley, Gender on Planet Earth (New York: The New Press, 2002) 141.

[9] Because of free trade and deregulation, TNCs can avoid many of the labor standards and environmental regulations that they comply with in First World countries. TNCs can also relocate easily, so if workers begin to organize or unionize to demand better wages and decent labor rights, the corporations simply move their factories to another country where the people are wiling to work under horrible conditions for even less pay. Many countries are reluctant to create and enforce environmental regulations as well, for fear that the corporations will relocate, leaving many workers unemployed. See Mark Ritchie, "Trading Away the Environment: Free-Trade Agreements and Environmental Degradation," Toxic Struggles: The Theory and Practice of Environmental Justice, ed. Richard Hofrichter (Salt Lake City: The University of Utah Press, 2002) 209-18.

According to the 1986 film Global Assembly Lines, approximately ninety percent of all workers in off-shore production are women. These women agree to forced production quotas to avoid being fired from their jobs and there is a general assumption that young women laborers are best because they "can take a lot of abuse" on their bodies. See Global Assembly Lines, dir. Lorraine Gray, prod. Lorraine Gray, Anne Bohlen, and María Patricia Fernández Kelly, Videocassette, New Day Films, 1986. Bankers also capitalize on women's labor by making "high-risk, high-interest loans to Third World governments" and encourage overseas companies to move to Export Processing Zones with a promise of cheap labor. This type of banking is masculinized, as it capitalizes on women's cheap labor through systematically denying women

labor rights as well as the right to organize. See Cynthia Enloe, Bananas, Beaches and Bases: Making Feminist Sense of International Politics (Berkeley: University of California Press, 2000) 158.

[10] The number of deaths is uncertain. Union Carbide claims approximately 3,800 deaths within the first hours to a few months, while workers who gathered the dead bodies claimed between 5,000 and 15,000. Since people continue to die even today from exposures to the chemicals, the number of actual deaths is nearly impossible to calculate. Union Carbide also claims the explosion was the result of a discontented employee and not attributable to the company's failure to maintain its safety systems. See Joni Seager, Earth Follies: Coming to Feminist Terms with the Global Envrironmental Crisis (New York: Routledge, 1994) 96-101; and "What Happened in Bhopal?" The Bhopal Medical Appeal, 2005, The Bhopal Medial Appeal and Sambhavna Trust, 18 March 2006 <http://www.bhopal.org/whathappened.html>. The Bhopal Medical Appeal reports that the chemical gases instantly left many people nearly blind and attacked their nervous systems: "'People lost control of their bodies. Urine and feces ran down their legs. Women lost their unborn children as they ran, their wombs spontaneously opening in bloody abortion.' According to Rashida Bi, a survivor who lost five gas-exposed family members to cancers, those who escaped with their lives 'are the unlucky ones; the lucky ones are those who died on that night'" ("What Happened in Bhopal?").

[11] GMOs also contain "antibiotic resistance markers," which point to another frightening possibility that resistance to antibiotics spread quickly, resulting in diseases of epidemic proportions (Shiva, "The World on the Edge" 122-24).

Chapter 3: Ecofeminist and Postmodern Feminist Perspectives on Women's Health

When thinking about the problem of endocrine disruptors for women's reproductive health, I initially gravitated toward ecofeminist perspectives as a method for framing my analysis. The ecological feminist, or ecofeminist, movement began in the 1970s concurrent with both the development of second wave feminism and the environmental movement. The term ecofeminism was first coined by the French feminist Francoise d'Eaubonne in her 1974 book, *Le Feminisme ou la Mort*. D'Eaubonne felt that there was a critical connection between the oppression of women and the destruction of the Earth and believed that real progress and liberation from women's oppression was not possible without a joining of the feminist and environmental movements (Tong 251; Warren 21).

Since d'Eaubonne first authored the term, ecofeminism has become as diverse as the feminist philosophy and theory it derives from, and so, in the context of this thesis, I will focus on those aspects of ecofeminism most relevant to my discussion of environmental estrogens and women's reproductive health. Ecofeminist theory offers a valuable set of ideas to explain the significance of the relationships women have with their environments. For example, many women, especially in "developing" nations, are intricately tied to their immediate environment for daily subsistence (work, food, family); deforestation, air and water pollution, agricultural pesticides, and "productive"[1] labor all have direct implications on these women's lives and health. Women living in industrialized nations experience the effects of environmental degradation through

different types of exposure, such as working in or living or working near a chemical plant, using household cleaners, and eating food that has been sprayed with a variety of chemicals.

As I investigated the many theoretical perspectives being discussed by ecofeminists, I found myself asking new questions and raising new concerns. In this chapter I will examine some of the dilemmas ecofeminist theory presents as a framework for studying endocrine disruptors; not only does it offer useful insights, but also it employs problematic constructs including hierarchical dichotomies (nature/culture, woman/man, passive/active, emotional/rational) and prima facie essentialist perspectives (eg: idea that women are closer to nature than men, biological determinism). As a potential resolution, I will theorize how postmodern feminist perspectives can reframe ecofeminist discourse to better attend to the issue of endocrine disruptors as an important global human issue.

Ecofeminism stemmed from a post-Enlightenment environmentalism[2] developed in 1973 and termed "deep ecology," by philosopher Arne Naess. Deep ecology challenged humans to move beyond anthropocentric (human-centered) environmentalism and to view the earth as being intrinsically as valuable as (or more than) human life, and to respect the interconnectedness of all life. While most ecofeminists share the belief (with each other and with deep ecologists) that humans need to learn how to live more harmoniously with our environment, many ecofeminists take this concept further and criticize deep ecologists for failing to examine the connection between androcentrism (male-centeredness) and the exploitation of "nature" and its relatedness to the patriarchal oppression of women. (Mellor 130-49; Merchant, Earthcare 203-06; Tong 250-51;

Warren 83-84). While deep ecologists emphasize equality and "mutual coexistence of all living forms," their focus further perpetuates androcentrism by lumping the entire human race into one species (ignoring gender construction and class, race, and ethnic differences) that is at fault for the destruction of the environment and ignoring inherent environmental sexism[3] (Mellor 133, 139; Seager 231).

Ecofeminism may delve "deeper" than deep ecology by going beyond deep ecologists' shallow focus on humans as a singular category responsible for the destruction of nature, to acknowledge that there are complex differences within the human population and that these differences (of location, power, experience, etc.) play out differently, including differential access to the environment (Cuomo).[4] Take, for example, the problem of endocrine disruptors. Endocrine disruptors are ubiquitous in our environment and thus they affect the health of all humans (and animals). However, because different populations (nations, states, communities, corporations, workers, families, etc.) maintain various relationships to the environment, populations are not equally complicit in the production of, nor equally affected by the presence of endocrine disruptors; the relationship also differs within the population (race, gender, class, social and cultural roles, etc). Unlike deep ecologists, most ecofeminists are cognizant of these differences among humans. Finally, in the context of environmental toxins, if humans are concerned with their ability to continue to reproduce future generations, there is a utilitarian anthropocentric (human-centered) stake in environmental sustainability that cannot be ignored. Mellor explains that

> While it is important to have a 'deep' orientation to nature, and humanity's place in it, given that humanity is not an undifferentiated whole, it is essential to understand the construction of human-nature relations within the context of

> human-human relations . . . As a species, humanity has material need within an encompassing natural world that has its own dynamic. . . Human-nature relations are not realized as an 'idea', but realized materially as a living process (148-49).

The concept of interconnectedness and humanity's material reliance on environmental sustainability is essential to developing policy that truly protects women's reproductive health.

The Gendering of "Nature" and the Commodification of "Development"

One of the most controversial ecofeminist standpoints is the question of whether to and how to make a connection between "women" and "nature." This prevalent debate amongst ecofeminist philosophers is particularly interesting for examining the connection between women's health and endocrine disruptors. First, the term "nature" is controversial as it conjures up many different meanings and beliefs. The term originally derives from the Latin word *nascere,* which means "to be born" and it often invokes a religious notion of the natural world as created by God[5] (Merchant, Earthcare 33). The word "nature" is often used to describe a connection to the earth and what exists "naturally," versus something human-created. History, religion, language, and culture have all played a role in constructing perceived relationships between women and nature. Images of Mother Earth, goddesses of rebirth, and women as healers abound in many cultures, as do associations between women's cycles and the moon's cycles, and women as nurturers and providers of sustenance and fertility linked to the provisions of a fecund earth.[6] The Western Scientific Revolution of the seventeenth century brought a shift in values from respect for a nurturing and healing earth to reverence for rational, anthropocentric thought (Merchant, Earthcare 75-90). Oakley writes, "Nature was [now]

the place where men intervened, dissected and manipulated in order to know, and masculine science was alone capable of exposing nature's hidden laws" (136).

This "power over" relationship of a "masculine" culture over a "feminine" nature is a hot topic of discussion amongst ecofeminists and is of particular interest to me as I think about the politics of endocrine disruptors in our ecosystem. As discussed in chapter 2, neoliberal globalization policies are the product of patriarchal hegemonic systems. These policies encourage TNCs (specifically chemical companies) to develop (and widely disseminate) products to increase the economic productivity of agribusiness. Most of these chemicals are "scientifically" developed to control "nature" in order to serve a patriarchal, capitalist "culture." Additionally, many of these chemicals are not tested for endocrine disrupting properties or other potentially harmful effects they may have on humans, other species, and the environment.[7]

Many important feminist thinkers have long struggled to dissociate women's bodies from women's capacity to work and live as men do, but I am concerned with the usefulness of this project. Simone de Beauvoir, an early second-wave feminist, stressed the link between women's reproductive biology and patriarchal oppression by suggesting that only when women can dissociate from their reproductive responsibilities and enter the "cultural" world of men, will women be liberated from their oppression (Mellor 78).[8] Feminist anthropologist Sherry Ortner also connected women's biology to their oppression due to women's physical/biological ties to reproductive responsibility versus men who are presumed to be more readily able to dissociate from the natural (physical/emotional) world and identify themselves more with culture (mental/rational) (Alaimo 3-4). This position, however, can be critiqued for being ahistorical, and Alaimo

outlines the problem with this argument: "Ironically however, by presenting a seamless, cross-cultural narrative of women's oppression that originates in her body, Ortner naturalizes woman's oppression" rather than challenging the patriarchal socially constructed hierarchy of culture/man over nature/woman (3).[9] In contrast, several ecofeminists have examined specifically the negative societal value placed on women's relationship between their bodies and nature compared to the positive value placed on men's connection to culture. Some ecofeminists suggest that it is the placement of value that needs to change since they believe the women/nature connection to be inherently more just and worthy than the men/culture connection.[10] However, within this ecofeminist framework, the connections linking women to nature and men to culture remain unchallenged; I will return to this crucial point below.

Ortner's insights are interesting; however, because women's exposure to environmental toxins directly ties women's oppression to her body in such a way that constructionist perspectives cannot deny and current technology cannot undo on any global scale. As discussed in chapter 1, many environmental toxins are stored in body fat and are released into the bloodstream during normal reproductive events (lactation, menstruation, menopause, etc). Because women on average have higher percentages of body fat, and more life opportunities for these toxins to alter normal endocrine system processes than men, endocrine disrupting chemicals in the environment directly link women's oppression to their bodies through environmental destruction.

How can ecofeminists deconstruct the nature/culture dichotomy to elucidate and dismantle the hierarchical power dynamic inherent in this social construct while acknowledging the reality of women's corporeal connection to the ecosystem (as

different than men's) as well?[11] Oakley explains how the culture/nature and male/female dualisms are problematic because "the pairing of man/woman and culture/nature helps to legitimate man's domination of both women and nature. . . The triad of gender, women's naturalness as the Other, and the symbolism of nature as a wayward female whose secrets must actively be penetrated and mastered provides a highly plausible framework of connection and explanation. . ." (136-37). This framework of oppression explains, in part, how the problem of environmental toxins has yet to be appropriately addressed: in using gender as a category of analysis to analyze and deconstruct the "nature/culture" split, we can begin to understand how a patriarchy – especially one that values profits over people – assists in perpetuating a deleterious power-over relationship of culture/men over nature/women such as the abundant and careless use of endocrine disrupting chemicals throughout the world.[12]

Though there are many different ecofeminists, who maintain a variety of ecofeminist philosophies, all ecofeminists share a concern for women's lives as they are affected by the degradation of our environment. I believe that ecofeminist philosophy must fundamentally examine women's specific corporeal relationship to the environment in a world where sustainable living practices are mandatory for our survival as a species.[13] According to Mellor, "All ecofeminism is gynocentric to the extent that it opens up the question of human embodiment and its particular relevance to the sexed body and women's position in society" (74). One of the problems I have with many feminists' attempt to dissociate women from nature is that this perspective does not fully examine women's bodily relationships to the environment. The suggestion that women are just as much a product of culture as men not only maintains and refuses to challenge

the man/culture connection, but it dismisses any human connection that all humans have, regardless of their sex, to the environment. When analyzing the effects of endocrine disruptors on our reproductive health, I argue that we cannot deny the intricate relationship of our social and physical environments to our bodies; in this way, we are as much a product of our socially constructed culture as we are biologically tied to our environment.[14]

Essentialism/ Strategic Essentialism

The body politics inherent in the complexities of the nature/culture, woman/man dichotomies initiate another controversial ecofeminist theoretical discussion – that of essentialist and anti-essentialist discourse. I have always found the essentialist/anti-essentialist criticism of ecofeminism (by other feminists) to be disconcerting and downright exhausting.[15] Although the essentialist/anti-essentialist debates were a focus of 1980s feminist discourse and could be discussed at length, my discussion in this chapter will focus on the specific problem for feminists interested in developing a useful framework to discuss environmental toxins and women's health (Schor vii). The identity politics and difference debates that frame much of the critiques of essentialism bridge this issue between ecofeminist and postmodern feminist discourse and initiate new conversations.

Noël Sturgeon defines and describes the essentialism/anti-essentialism discussion in this way:

> Essentialism, or the positing of natural and ahistorical essences to define characteristic qualities or behaviors of individuals as members of groups, has been a central object of feminist critiques, because anti-essentialism is the epistemological method for deconstructing sexist notions of what women are

> supposed to be, as well as racist, classist, and heterosexist notions of what kind of woman counts as woman (12).

The argument of an essentialist position, as critiqued by some feminists, typically involves the assumption that the category and experience of "woman" is universal in some way, such as biological characteristics or socio-cultural locations and experiences. In discussing environmental degradation, ecofeminists have historically been quick to name women (specifically poor women, women of color, women in developing countries) as those most affected by the destruction, and so the most likely to be invested in protecting the environment as well as better able to carry out environmental activism. Many feminists (Mohanty, Scott, Sturgeon, Shiva, Mies) have written about (and critiqued) essentialism in the context of ecofeminism as the position that certain groups of women, often indigenous women or women in the Third World, have a particular locatable knowledge that brings them closer to nature than men.[16] While this is a fascinating discussion, I am more interested here in the essentialist dilemma of biologism as it pertains to women's corporeal relationship to their toxic environment.

A biological determinist approach to the body emphasizes the role women play in reproduction and mothering, resulting in various feminist agendas that prioritize new reproductive technologies to release women from the confines of their child-bearing obligations (as de Beavoir, Ortner, Piercy, and Firestone have suggested). Alternatively, other feminists (Daly, Griffin, and Starhawk) celebrate women's biological roles as valuable and spiritual connections to nature that men cannot experience equally. To speak of "woman" as an essential category, based on biology or other commonalities, is problematic in that it does not account for differences among women, both in terms of

biological and sociocultural experiences. Essentialist feminist analyses of women's experiences that reduce women to their reproductive bodies make the mistake of ignoring the power of social institutions as sources of oppression. Our hegemonic patriarchal market-driven society does not accord women the opportunity to participate in social and political decision-making positions; the dynamics of power must be shifted to redefine the current societal structure.[17]

And yet, a focus on the body, specifically women's reproductive roles, is instrumental in guiding policy that will keep women's bodies safe from the dangers present in the environment. To understand the function of the body as a location for exploitation, as well as a site for gender and identity expression, the body itself must be examined.[18] "Far from being an inert, passive, noncultural and ahistorical term, the body may be seen as the crucial term, the site of contestation, in a series of economic, political, sexual, and intellectual struggles" (Grosz, Volatile Bodies 19). The pervasion of endocrine disruptors into our bodies is an example of one such struggle. Furthermore it is not only the "domination of the body by biological terms" that must be contested, but also "the biology itself, rethinking biology so that it too is able to see the body in terms other than those thus far developed" (Grosz, Volatile Bodies 20). A new type of discourse, as well as consciousness, is needed to bring the consequences of environmental toxins to the forefront of our minds with a sense of urgency for the future.

"Woman" as a category of analysis is, in many instances, essentialist, and is therefore problematic for activists and policymakers working on human rights issues. However, activists and theorists arguing for equal rights believe that the mere existence of differences within the category "woman" does not justify disparate treatment or rights;

everyone should have the same rights regardless of differences. In contrast, for others, the acknowledgement of differences is necessary so as not to essentialize people into fixed categories (Scott, "Deconstructing Equality"; Scott, "Experience").[19] Sturgeon explains the problem with an anti-essentialist preoccupation with identifying differences among women in an effort to be mindful of a variety of experiences: "Inasmuch as 'difference' operates to modify some assumed 'sameness,' the process of producing various identities as indices of particular 'experiences' can even reinscribe the dominance of the unmarked category, the white, the middle class, the Western, the heterosexual" (14). Similarly, I contend that women's rights to the safety of her health, reproductive and otherwise, need to be measured and defined in autonomous terms that reflect the corporeal relationship of women to their environment, and not in comparison to men's, or animals'. The biological category of "woman" has crucial ramifications in the context of endocrine disruptors and our real world of policy necessitates the recognition of this category in order to create policy aimed at protecting women's health from toxins in the environment.[20]

Can feminist and other activists and theorists adopt a strategic essentialism to facilitate a useful discourse between difference and essentialist debates to allow for theory and practice to function both interdependently and concomitantly? A new discourse is imperative for women to obtain the power to negotiate for their right to live free from the effects of endocrine disrupting chemicals. Women must be able to condemn the existing patriarchal systems that are responsible for these injustices (lack of access to knowledge, lack of power to decide what chemicals we are exposed to, lack of

research that studies actual women rather than animals and men, lack of participation in decision-making, and the lack of valuing of women's bodies in particular contexts).[21]

I understand the essentialist nature of any discourse to be problematic and the dilemma for ecofeminist theorists seems to be the risk of elevating one side of the nature/culture dichotomy rather than deconstructing these categories themselves. And yet, I also find valuable resources within an essentialist approach to the extent that it allows for the formation and progress of political activist movements. For example, the unequal distribution of power and wealth has relegated women to reproductive and domestic spheres in many areas of the world. Thus, when decisions are made by those in power that directly affect the ability of these women to lead healthy and productive lives, a women's issue has arisen and a "strategic essentialism" may be necessary to propel a successful political movement that will effect change.[22] I will return to this concept in chapter 4 when I discuss the need for a feminist perspective within the precautionary principle. Especially in regard to endocrine disruption, I am advocating for a strategic essentialism that contextualizes women's bodies as a necessary project to approaching women's reproductive health safety. Spivak writes, "Biology doesn't just disappear, except it should not be offered as a ground of all explanations. So basically on that, you know, I'm a nonfoundationalist in that sense, especially when grounds are found to justify bad politics" (176). Strategic essentialism can be useful in avoiding, as well as opposing, any essentialist justification for "bad politics," when political and advocacy movements are cognizant and respectful of the many differences among women.

Postmodern Perspectives

Postmodern perspectives often follow anti-essentialist discourse, which for various reasons, can be both useful and problematic. Postmodern feminists do offer some valuable theoretical perspectives that could serve to revision ecofeminists' difficulty in coming to terms with dichotomous categories and essentialism. Specifically, postmodern feminist theory offers ecofeminists a useful analysis of knowledge production from which ecofeminists can begin to understand women's bodies as they relate to the problem of endocrine disruptors.

The formation of knowledge production, about women's reproductive health especially, is of central importance to how women's bodies are perceived and thus treated. In order to access and examine the knowledge offered us through women's bodies and experiences, feminist theorists must reevaluate the questions we ask. What counts as knowledge? A corporeal-issues approach (one that includes examination of human material connections to the ecosystem) to the epistemological question reinforces the need to more closely examine the oppression of women's bodies and to determine new ways to ask the questions.

Drawing on Marxist theory and psychoanalytic theory, feminist standpoint theorists, such as Nancy Hartsock and Dorothy Smith, were among the first to suggest that women as a social class possess a privileged epistemology due to their outsider status; women's marginalized positions allows them to understand their position within society, as well as the dominant position, in a way that men cannot, revealing the partial perspective inherent in abstract masculinity.[23] Hartsock contrasts abstract masculinity with a reality-based epistemology founded in women's experiences and called a feminist

standpoint (Hartsock). The marginalized experiences of "women" provide knowledge about the problems that exist within the social structures and demonstrate the need for women's liberation: ". . . by drawing out the potentiality available in the actuality and thereby exposing the inhumanity of human relations, it [the articulation of a feminist standpoint] embodies a distress that requires a solution" (Hartsock 304).[24] Feminist standpoint theory is significant in that it challenges the mainstream arrogant embracement of the scientific production of knowledge (Harding 242). Feminist standpoint theory has also been critiqued as problematic, however, for its privileging of women's experiences as singular, authoritative, and valid forms of knowledge that are seen as more complete than dominant (men's) perspectives, and in its potential failure to acknowledge the function of power structures within (and not just between) the hierarchies.

Focusing on experience as a way to justify epistemic privilege and validity consequently accepts and reinforces the dominant ideological construction of hierarchical categories. Taking these categories for granted circumvents the need to critically examine the discursive construction of these categories and their function in knowledge production. Rather than allow experience to equal knowledge, the actual construction of experience must be examined. Scott explains that "we need to attend to the historical processes that, through discourse, position subjects and produce their experiences. It is not individuals who have experience, but subjects who are constituted through experience" (Scott, "Experience" 25-26).[25] In order to attain this more valuable application of subjectivity, the creation of the social systems themselves must be

deconstructed to reveal the historicized location (including the power structures) of the knowledge being produced.[26]

Applying Scott's perspective to women's reproductive bodies and health requires a critical analysis of the discursive system that locates women within a toxic world. Women are living in environments that threaten their reproductive health and the health of future generations. This particular experience reveals a locatable form of knowledge emerging from within the hierarchical, oppressive, hegemonic structures that produce an environment in which women are exposed to reproductive health threats. Women's bodies are oppressed through the politically and economically-based mechanisms, namely neoliberal globalization policies, that absolve chemical companies from owning any responsibility for the abundant use of endocrine disrupting environmental toxins. Women across the globe experience threats to their health in different ways; so even a historicized experience offers an incomplete epistemological understanding.

A feminist standpoint deriving from women's experiences therefore must acknowledge this knowledge as partial in order to achieve feminist objectivity. Haraway eloquently explains this concept:

> objectivity turns out to be about particular and specific embodiment and definitely not about false vision promising transcendence of all limits and responsibility. The moral is simple: only partial perspective promises objective vision . . . Feminist objectivity is about limited location and situated knowledge, not about transcendence and splitting of subject and object. It allows us to become answerable for what we learn how to see (582-83).

A feminist objectivity must ask new questions to allow for a more expansive "vision"[27] that will cross the boundaries of limited categories of analysis in an attempt to understand how women's bodies are important sites for knowledge production.

In recognizing the limits of "vision" and in attempting to visualize from another perspective without appropriating or unnecessarily essentializing it, perhaps feminists can begin to understand the relationship of the human body to the environment differently, from a position that will allow a more useful feminist approach to take root. Examining the "view from below" is one feminist strategy for assisting the emergence of new epistemological perspectives.[28] Situated knowledges encourage and legitimate the view from below because the experience of the subjugated is locatable, and the construction of the category of the subjugated position is deconstructable.[29]

In some ways this chapter comes full circle. The connection between the nature/culture and woman/man dichotomies is problematic due to the power structures that maintain the subjugation of "women" and "nature" and the dominance of "men" and "culture" as dominant. In addition, the dualistic nature of these categories must be deconstructed; the rigidity omits many nonconformist experiences and also precludes the creation of a framework that disrupts the patriarchal construction of the hierarchies. These hierarchies under neoliberal globalization disregard the significant relationship women have to the environment and perpetuate careless use of chemicals. However, it is important not to reduce women to their biological capacities and ultimately connect women to nature through an "essential/ist" corporeal relationship. Anti-essentialist focusing on differences within categories is also problematic because it potentially reinscribes the hierarchies and thus, eliminates a useful platform for policy change. A critical epistemological inquiry is necessary for feminists (and others) to understand whose experiences are legitimated (and whose are not) as knowledge in neoliberal globalized societies and the power structures that determine this legitimation.

Postmodern theorists challenge the objectivity claims of scientific knowledge and purport that women's experiences, when located, offer situated knowledges that provide a more complete (although partial) view of the world. Situated knowledges and strategic essentialism can (and should!) work together to challenge neoliberal globalization policies that threaten the environment and women's health by creating new understandings and advocating for change. The success of this discourse within political and social projects that advocate for women's health rights is reliant on recognizing women's bodies and women's health relationships to the environment as epistemological subjects. The next chapter will describe the precautionary principle, what I believe to be the best possible approach to address the problem of endocrine disruptors as a gendered and urgent reproductive issue.

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[1] I use quotations here because I mean "productive" work as it is defined by "development" under neoliberal globalization. I want to make clear that women's subsistence labor is also productive work.
[2] The post-Enlightenment perspective of nature rejected "the modern conception of nature as machine, reverting to medieval and even ancient conceptions of nature as an organism that has intrinsic as well as instrumental value." See Rosemarie Putnam Tong, Feminist Thought: A More Comprehensive Introduction (Boulder, CO: Westview Press, 1998) 249.
[3] An example of environmental sexism inherent in deep ecologists' philosophy is the omission of the connection between women's reproductive roles and the politics of population control. See Mary Mellor, Feminism and Ecology (New York: New York University Press, 1997) 139. More specifically, in the context of this thesis, environmental sexism also includes the inattention to the ways in which women shoulder a disproportionate burden of the impacts of endocrine disruptors on their health, a perspective unaccounted for by deep ecologists.
[4] See Christine J. Cuomo, "Ecofeminism, Deep Ecology, and Human Population," Ecological Feminism, Ed. Karen Warren (London: Routledge, 1994) 88-105. However, Cuomo describes ecofeminists as able to acknowledge nature for its moral intrinsic value; therefore, ecofeminists are anti-anthropocentric.
[5] I want to acknowledge here a spirituality component of ecofeminist philosophy. This is beyond the immediate scope of this thesis, but I do believe that to hold the earth sacred helps us, as humans, to respect the integrity of "nature" and encourage sustainability practices. Or, as Joanna Macy suggests in World As Lover, World As Self, we *are* the environment and once this idea comes into collective consciousness, we will be less likely to cause harm and destruction to the environment. Environmental degradation is, in essence, self-destruction and self-induced suffering. Throughout time, humans have attempted to create separations from each other and the world we live in, and the consequence of this separation has become suffering, known to both sentient and non-sentient beings. See Joanna Macy, World as Lover; World as Self (Berkeley, California: Parallax Press, 1991).
[6] Not all constructions linking women to nature have been positive. Religion, history, culture, and language have also associated women's bodies and reproductive cycles to danger, pollution, uncontrolled sexuality, and fearful power.

[7] I will return to this problem of safety testing when I discuss the burden of proof in chapter 4.

[8] See Mellor clarifies de Beauvoir's view nicely:

> At the heart of 'male values' is the distinction between transcendence and immanence. The cultural world is created through transcendence of the immanence of humanity's embeddedness in nature and biology. Rejection of immanence means that human society is always constructed over and against the natural world. Far from celebrating women's connection with the immanence of the natural world . . . de Beauvoir saw women's biology as the source of their inequality. If women are to be free, they must escape their embodiment (78).

For de Beauvoir, once women transcend the limitations of their reproductive expectations, and thus become more akin to societally-valued men, women will be liberated from their unfortunate position as the "second sex."

[9] Whereas de Beauvoir and Ortner both ultimately link women's oppression to a natural corporeal connection to the earth, other feminists challenge this as an essentialist and biological determinist approach and turn instead to the social construction of gender for explanation. The concept of the social construction of gender attempts to liberate women from their oppression by identifying less with nature and more with culture. However, See Carolyn Merchant Earthcare: Women and the Environment, (New York: Routledge, 1996) for an explanation of how this is not a simple task: "But Nature as wilderness does not *become* male, nor does civilization *become* female in a reversal of the so-called universal association of female to nature and male to culture identified by Sherry Ortner. . . Nor are nature and culture, women and men, binary opposites with universal or essential meanings. Nature, wilderness, and civilization are socially constructed concepts that change over time . . . so too are the concepts of male and female and the roles that men and women act out. . ." (50). An attempt to liberate women through associating more with characteristics defined by "culture" not only fails to value that which is considered feminine or aligned with "nature," but also reinscribes both the dichotomy and the hierarchy inherent in the dichotomy.

[10] According to Tong, one such feminist Mary Daly believed that women's biology intrinsically connects women to nature. In discussing Daly's perspective, Tong asserts that "She claimed women have the capacity for a fully human life, a vigorous life lived in dynamic communion with animals, earth, and stars. Men, she maintained, lack this capacity. . . Because they are not able to bring life into the world and because they are incapable of bonding with nature, men substitute artificial life for flesh-and-blood life and, in acts of envious rage directed against women, seek not only to control and destroy women but also to control and destroy all that is natural" (256). Daly's essentialist analysis seems severe and, rather than allowing men to assume some responsibility for improving equality, she has placed the burden on women as if men are a hopeless mechanism leading to the whole world's demise.

[11] I use the term "deconstruct" here as Joan Scott defines it. See Joan Scott, "Deconstructing Equality-Versus-Difference: Or, The Uses of Poststructuralist Theory for Feminism," Feminist Theory Reader: Local and Global Perspectives, ed. Carole R. McCann and Seung-Kyung Kim (New York: Routledge, 2003) 378-90. She writes that deconstruction involves, "the reversal and displacement of binary oppositions. This double process reveals the interdependence of seemingly dichotomous terms and their meaning relative to a particular history. It shows them to be not natural but constructed oppositions, constructed for particular purposes in particular contexts. . ." (381).

[12] Dorothy Dinnerstein brought attention to the expectation that reproductive work is primarily a woman's responsibility. She believed that this ideology needs to shift so that women and men assume all responsibilities equally, including reproductive labor. In Dinnerstein's theory however, lies the assumption that men cannot be as intrinsically connected to nature as women are. See Tong 264.

Through her analysis of reproductive rights, Maria Mies has compared the colonization of women's bodies and women's work to the colonization of nature by capitalist patriarchy. See Maria Mies, "Self-Determination: The End of a Utopia?" Ecofeminism, ed. Maria Mies and Vandana Shiva (London: Zed Books, 1993) 218-30. In regards to women's connection to nature through reproduction, Mies writes, "While we women strove originally for liberation from exploitative and oppressive male-female relations, we now deal with the question of 'emancipation' from the uncontrolled reproductive potential of the female body, of 'emancipation' from our female nature" (221). Mies believes that in order to do this, culture (and men) must reconnect with nature (and women) in a way that is mutually respectful and honorable:

> women's liberation cannot mean separation from this corporality, a 'rise' into men's realm of transcendence; on the contrary, it must mean the attachment of men to these living connections, this dailiness, this burden, this immanence. For that, there is no need for new technologies but rather new relations between the sexes, where lust and burden will be shared equally. It is time that both women and men begin to understand that nature is not our enemy, that our body is not our enemy, that our mothers are not our enemies (228-29).

Also, for a discussion on the connections between militarism, tourism, and exploration, and the exploitation of women based on assumptions about masculinity and femininity, see Cynthia Enloe, Bananas, Beaches and Bases: Making Feminist Sense of International Politics (Berkeley: University of California Press, 2000).

[13] I am not suggesting that men do not also have a corporeal relationship to the environment that will be equally as critical to environmental sustainability and the future of human survival. Ecofeminists should examine all human bodily connections to the environment, including men, women, children, and people who do not easily classify into, and thus challenge, the men/women categories, such as intersex persons.

[14] Women "do" much more than reproductive work and of course participate in many life activities. I do not mean to reduce women to their bodies and their bodily experiences; however, for my purposes in this thesis, I am concerned specifically with women's reproductive capabilities (and difficulties) and the significance of female biology/anatomy in relationship to the environment.

[15] I use the term exhausting here because I find the debates around essentialism/anti-essentialism within feminist discourse to be cyclical in that there is never any true resolution as long as the debate stays within this framework. I have read and thought about essentialism/anti-essentialism and continue to struggle with the terms and their application to feminist theory and practice.

[16] Shiva has often been criticized as being essentialist for asserting that women have greater knowledge of environmental and sustainability issues; her work often focuses on the impact of globalization and development policies on Indian women's lives specifically.

[17] See Grosz's discussion of egalitarian feminism and social constructionism. Elizabeth Grosz, Volatile Bodies: Toward a Corporeal Feminism (Bloomington, IN: Indiana University Press, 1994) 15-17.

[18] Feminist queer theory also addresses issues of exploitation of and on the body as related to sexuality and gender expression. For more information on performativity and exploitation, see Judith Butler's work: Judith Butler, "Imitation and Gender Insubordination," The Second Wave: A Reader in Feminist Theory, ed. Linda Nicholson (New York: Routledge, 1997) 300-15; Judith Butler, "Performative Acts and Gender Constitution: An Essay in Phenomenology and Feminist Theory," Feminist Theory Reader: Local and Global Perspectives, ed. Carole R. McCann and Seung-Kyung Kim (New York: Routledge, 2003) 415-27; and Judith Butler, Undoing Gender (New York: Routledge, 2004). According to Butler, lesbians and gay men are part of abject communities that do not fit into the classifications accepted by society. She discusses the societal punishment of lesbians and gay men as a direct result of the visibility of an identity that does not fit into an accepted category or classification system. In other words, if a lesbian cannot "pass" for a "woman" she is a visible contradiction to the heteropatriarchal norm and suffers oppression in a variety of ways because of this identity. This form of social oppression directly attacks one's location within the human body.

[19] See Scott: "Placing equality and difference in an antithetical relationship . . . denies the way in which difference has long figured in political notions of equality and it suggests that sameness is the only ground on which equality can be claimed" ("Deconstructing Equality" 387).

[20] It is important for feminists to learn how to deconstruct the male/female dichotomous categories to begin to interrogate notions of the body itself, and to examine sex, gender, and sexuality in the context of intersex and transgendered people.

[21] See Elizabeth Grosz, "Sexual Difference and the Problem of Essentialism," The Essential Difference, ed. Naomi Schor and Elizabeth Weed (Bloomington, IN: Indiana University Press, 1994) 82-97. Grosz says that, "There can be no feminist position that is not in some way or other involved in patriarchal power relations; it is hard to see how this is either possible or desirable, for a purity from patriarchal 'contamination' entails feminism's incommensurability with patriarchy and thus the inability to criticize it" (94). Also see further discussion on page 95.

[22] For more examples of this use of "strategic" essentialism, see Noël Sturgeon, Ecofeminist Natures: Race, Gender, Feminist Theory and Political Action (New York: Routledge, 1997).
[23] See Nancy Hartsock, "The Feminist Standpoint: Toward a Specifically Feminist Historical Materialism," Feminist Theory Reader: Local and Global Perspectives, ed. Carole R. McCann and Seung-Kyung Kim (New York: Routledge, 2003) 292-307. Hartsock uses psychoanalytic theory to explain this concept of abstract masculinity. She suggests that boys must define themselves through separating their identity from their mother by transcending the female daily life characterized by household chores and care giving responsibilities, which, in turn, generates a hierarchal dualism of abstract/concrete.
[24] The brackets indicate what the "it" refers to from the previous sentence.
[25] For a discussion of the social construction of the field of science, see Carolyn Merchant, Radical Ecology: The Search for a Livable World (New York: Routledge, 1992) 105-106. This concept is applied to the scientific formation of knowledge as well because scientists and researchers are working from particular historical locations (and with particular goals/objectives) that must be recognized in order to situate and qualify this new knowledge. Merchant explains that "A reconstructive knowledge method will be dedicated to the social good, concern with public participation, and the incorporation of humane values into research goals" (106). If scientific knowledges were contextualized and guided by a commitment to improving the quality of life for all earth's inhabitants, then nature/science would be better able to merge, rather than functioning as dualistic categories immersed in power dynamics.
[26] See Joan Scott, "Experience," Feminists Theorize the Political, ed. Judith Butler and Joan Scott (New York: Routledge, 1992) 22-40. Because experience is always rooted in the historical construction of categories, experience will always be socially and politically produced (Scott 37). Thus, Scott suggests that it is the "analysis of the production of knowledge itself" that must be further examined (37). She writes, "Such an analysis would constitute a genuinely non-foundational history, one which retains its explanatory power and its interest in change but does not stand on or reproduce naturalized categories" (37). This type of an analysis is crucial if we are to continue to embrace women's experiences as valid forms of knowledge.
[27] See Donna Haraway, "Situated Knowledges," Feminist Studies 14.3 (Fall 1998): 579-99. Haraway explores how "vision" can be used as a metaphor to help us see and understand the world differently and to be responsible for what we learn how to see.
[28] For more detailed discussions of the view from below see Haraway; Chandra Talpade Mohanty, Feminism Without Borders: Decolonizing Theory, Practicing Solidarity (Durham, NC: Duke University, 2003); and Kathy E. Ferguson, The Man Question: Visions of Subjectivity in Feminist Theory (Berkeley, CA: University of California, 1993).
[29] The hormonal changes that occur in women's bodies as a result of environmental toxins demonstrate how bodies are also a form of situated knowledges; the resulting diseases and health problems are the products (and a blatant expression) of the oppression on our bodies. This analogy makes listening to our bodies an important epistemological strategy in the process of developing a more whole, inclusive perspective to women's reproductive health problems.

Chapter 4: A Feminist-Inspired Precautionary Principle

In chapter 1, I provided an overview of endocrine disruptors and their consequences to women's reproductive health. Chapter 2 described the proliferation of endocrine disruptors as symptomatic of a global economy where profits are deemed paramount over human rights. I contend that neoliberal globalization policies, coupled with scientific objectivity claims and patriarchal power structures, have brought humans face to face with environmental threats to their health. In chapter 3, I interrogated the nature/culture and women/men binaries and analyzed the importance of strategic essentialism and locatable knowledges versus essentialist or scientific objectivity claims. Ecofeminist and postmodern feminist theorizations are useful for situating women's experiences and knowledge within a fluid framework to advocate for protection from the harmful effects of endocrine disruptors. Now I will discuss this framework, the precautionary principle, which I believe is our best method for addressing endocrine disruptors as public health and environmental threats. The preceding chapters establish the foundation for the thrust of my project, which is to explain how feminist theory can facilitate (and is a *necessary* component of) the precautionary principle in confronting the problem of endocrine disruptors in a neoliberal globalized economy.

The precautionary principle dates back to the 1970s in the former West Germany and was created to address the need to develop and implement policies that would promote environmental sustainability (Jordan and O'Riordan 19). In 1998, the Science and Environmental Health Network gathered thirty-two scientists, philosophers, scholars,

environmentalists, and lawyers from the United States, Canada, and Europe to the first ever "Wingspread Conference on Implementing the Precautionary Principle" to discuss and establish methods for operationalizing the principle ("Wingspread Conference on the Precautionary Principle"). The participants developed a definition for the Precautionary Principle that states:

> When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the precautionary principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action (Wingspread Statement on the Precautionary Principle).

There are four main components to this definition: (1) scientific proof/knowledge, (2) burden of proof, (3) democratic decision-making, and (4) alternatives assessment. In this chapter I will discuss these components in the context of endocrine disruptors and women's health. In addition, I will demonstrate the need for the precautionary principle to include a feminist perspective if it is to realistically address the repercussions of environmental degradation on human health and women's reproductive health in particular.

"Sound Science" Leads to Risky Decisions

One of the most frightening aspects of endocrine disruptors is the uncertainty about their impacts on human health. Scientific information in this area is currently limited and controversial.[1] Despite the difficulties in researching the effects of environmental toxins discussed in chapter 1 (delayed manifestation of effects, exposure to multiple chemicals, existence of multiple receptor sites, timing of exposure,

extrapolating animal research to humans, disproportionate research focused on men versus women), science is often regarded as the authority on these chemicals and the evidence on which public policy is based.

Advocates of "sound science," such as industry leaders, suggest that scientific uncertainty should not prevent the use of particular technologies; public policy should not take precautionary action unless science can demonstrate specific and conclusive evidence of the causes of harm (Schroeder and Steinzor 72). Industry also plays a role in directing scientific research, which further limits objectivity. In the United States, industry is aggrandized through the Bush administration's stacking of national committees with industry leaders rather than national experts in the area, as well as the reduction of government and public spending on, and increased corporate funding of, university research programs (Schroeder and Steinzor 72-77).

Like feminist theorists, advocates of the precautionary principle value various forms of knowledge production, including, but not limited to scientific research. Barrett and Raffensperger explain that a precautionary approach recognizes that "isolated scientific disciplines cannot provide a strong basis for environmental policy. For such reasons, scientists must participate in research that is multidisciplinary (e.g., incorporates social sciences), multilevel (e.g., considers networks and relationships), and community-based (e.g., includes many different value judgments)" (115-16). Feminist standpoint theory challenges authoritative positions of the scientific production of knowledge and recognizes the epistemological value of women's experiences. When studying endocrine disruption, women's diverse experiences must be valued as legitimate and relevant, especially because women's societal roles typically expose them to environmental toxins

in particular and differential ways. Idealized scientific research is reductionist in that it does not examine the historical, cultural, social, and political context of the research subject (Barrett and Raffensperger 109). Postmodern feminist theorists (Scott, Haraway, Ferguson) reinforce the need to locate women's multifarious experiences within the hierarchical, oppressive, hegemonic structures that expose women to endocrine disruptors.

One of the criticisms of a precautionary approach is that it is anti-science because it promotes active caution in the face of scientific uncertainty of proof of harm. "Sound science" relies heavily on quantitative data for risk assessment of environmental and health problems (Barrett and Raffensperger). Alternately, a precautionary approach to risk assessment incorporates qualitative and quantitative data, "places increased emphasis on inductive, context-sensitive inquiries, such as case studies; and values experiential as well as experimental information, including traditional, folk, and local knowledge" (Barrett and Raffensperger 118). "Sound science" often results in uninformed and risky policy decisions because inconclusive research is used as rationale for industry's continuation (or commencement) of potentially devastating environmental toxicants. This is especially problematic due to the lack of women-centered research on the impacts of these toxins on the female body. The scientific and political pursuit for quantitative proof that endocrine disruptors are hazardous impedes policy that protects women's health as a human right; often an environmental disaster is requisite to demonstrate the existence of a legitimate health hazard (Barrett and Raffensperger 112-13).[2] In this sense, a precautionary approach actually encourages further scientific research in an effort to attain more conclusive information about safety and risks through the combination of several epistemological approaches. Furthermore, the delayed impacts of endocrine

disruptors demonstrate the imperativeness of multigenerational research (Barrett and Raffensperger 117). Postmodern feminist discourse advocates for situated knowledges to encourage the development of new research designs that incorporate locatable perspectives and that will essentially generate more information about endocrine disruptors.

Examination of the historicized social, political, and economic contexts of knowledge production allows researchers to acknowledge the limitations of the traditional scientific method and actively seek additional forms of valid knowledge production. A precautionary approach to science challenges the risks inherent in a reductionist method that generally seeks to isolate variables. This precautionary approach is particularly relevant to human survival and environmental sustainability now that Western globalization practices have truly extended across the globe, resulting in the potential for environmental disasters to become globally catastrophic in significance (M'Gonigle 131). The multi-generational and global nature of the impacts of endocrine disruptors is crucial enough to insist that the precautionary principle incorporate feminist perspectives into practice. A feminist precautionary approach would reinforce the usefulness of multi-dimensional, locatable epistemological methods and consider gender, race, class, and other differences. The healthy future of all sentient beings relies on a paradigm shift from a "linear" "sound science" approach that supports self-interested nation-states and industry giants, to a holistic "circular" approach that incorporates a variety of epistemological methods in an effort to promote sustainability on a global scale.[3]

Shifting the Burdens of Proof

Primum non nocere, or "first, do no harm" dates back to the teachings of Hippocrates, the "father of medicine," and is believed to be the first Western instance of the precautionary principle's ideology (Ozonoff 100).[4] Many practitioners of modern medicine still hold this concept in high regard by recognizing their professional responsibility to gain the full and informed consent of their patients before treating them with drugs or subjecting them to experimentation; indeed this is a matter of international law and human rights (Schettler, et al. 311-12). How then, is it legal, or even ethically acceptable, for chemical companies to produce and distribute potentially harmful chemicals into the environment without full disclosure of these risks to human health and consent from the affected parties?

One of the principal problems of deregulation and privatization is the lack of accountability from transnational corporations (TNCs). Safety testing should be a requirement for a product to be allowed to be placed on the market. Schettler, et al. describe the inconceivable practice of the Environmental Protection Agency (EPA) for safety testing:

> Under the Toxic Substances Control Act, before undertaking any action to control production and use of potentially harmful industrial chemicals, the EPA must demonstrate that the risks outweigh both the costs to industry and the lost benefits of unrestricted use of the chemical. Should the risks be unknown, as is the case with the vast majority of chemicals in commercial use, the agency has extraordinarily limited authority even to require meaningful testing. This statute clearly puts the rights of the manufacturer above the rights of workers, consumers, or exposed community members (311-12).

A precautionary approach demands the need for "proof of safety rather than proof of harm" (Schettler, et al. 313).[5]

Ecofeminist theory provides a compelling impetus for shifting the blame from consumers and citizens to industry giants such as TNCs. Watterson and Watterson explain how gender differences have been used as rationale for excluding women (and men) from particular agricultural employment opportunities due to potential reproductive health risks caused by particular occupational chemicals. Rather than excluding people from vital opportunities, the health threat itself should be removed. They recommend that "a shifting of the burden of proof on gender and reproductive hazards from employees, consumers and communities – who currently have to demonstrate that substances are dangerous – to manufacturers of chemicals. . . who should be able to demonstrate the safety of their products" is in order (Watterson and Watterson 231).

Neoliberal globalization reinforces patriarchal, hierarchical notions of societal gender roles, which facilitates corporate exploitation of women's relationship to the environment through the continued production and dissemination of endocrine disrupting chemicals. According to Jaggar, "The full health implications of the WTO's rejection of the precautionary principle are yet to emerge, but any resulting harm is likely to be felt disproportionately by women" (200). She believes that women's health is at a higher risk because poor women are unable to afford better and organic food options, and women are the primary caretakers of children, who are especially predisposed to diseases and malnutrition. A precautionary approach to "development" and globalization would have to take a global feminist standpoint if it were to succeed. "In terms of ethics, broad and difficult questions about future generations, inherent value, or impact on other cultures often remain subordinate to short-term goals of efficiency and productivity" (Barrett and Raffensperger 111).

One method to force corporations to envisage beyond the short-term economic gains enhanced by deregulation and privatization, and claim accountability for environmental and health damages, is to require them to pay upfront for potential risks and damages caused by their actions; this is called assurance bonding. If there is proof that no damage has occurred, the money is returned (Tickner 173). Environmental assurance bonding also provides incentives for companies to consider sustainable and less toxic alternatives to endocrine disrupting chemicals, a concept I will return to shortly.[6] Both governmental policies and consumer advocates must demand stronger corporate ethics and more stringent enforcement of environmental regulations of TNCs to shift the burden of proof.

Democratic Decision-Making

Current policies regarding environmental toxins are based on risk assessments responding to the identification of health problems and environmental degradation. A precautionary approach on the other hand, emphasizes the need for preventative measures to protect public health and promote sustainable living practices (Tickner). Breast cancer research is important and well-funded in the United States, but the majority of the research is in search of a cure or developing better treatment methods, rather than on the causes of breast cancer (Durnil 274). Durnil emphasizes this paradox by stating that "only one penny out of each cancer research dollar is spent on prevention" (274). Democratic decision-making regarding endocrine disruptors requires a paradigm shift from reactive research to preventative research.

Neoliberal globalization policies maintain structures that prevent women from accessing powerful positions in society that would allow them to participate in decision-

making processes, even when the decisions concern their own health. True democratic decision-making would facilitate the participation of women (and whoever is impacted by policy and risky practices) in the creation of policies and the direction of research projects. Tickner asserts that "decisions regarding whether to undertake or stop an activity are public descisions because of their potential to impact ecosystems, public health, and the commons" (175).[7] Multiple epistemological approaches and a focus on situated knowledges encourage the participation of the public in research directions and policy decisions. The lack of women with influence in decision-making roles and as subjects in research projects needs to be amended.

Furthermore, the extrapolation of results from studies with men and animals as research subject to women is entirely inappropriate. As discussed previously throughout this thesis, the effects of endocrine disruptors manifest differently in women's bodies, and thus, women must be the subjects in forthcoming research projects. While reducing women solely to their reproductive bodies is problematic in that it is essentialist, scientists and researchers must value women's health and future generations enough to study the specific impacts of endocrine disruption on women's bodies. Colborn, Dumanoski, and Myers explain the importance of this task:

> Protecting the next generation from hormone disruption will require a much longer vigilance [than short-term prudence such as healthy consumption habits during pregnancy] – over years and decades – because the dose reaching the womb depends not only on what the mother takes in during pregnancy but also on the persistent contaminants accumulated in body fat *up to that point in her lifetime.* As discussed earlier, women transfer this chemical store built up over decades to their children during gestation and during breast-feeding (211-12).[8]

A strategic essentialism is useful then in propelling women-centered health research in an effort to redesign policy to protect women's health as a fundamental human right.

Women's bodies must be contextualized in a way that demands that policymakers account for biological differences between women and men, as well as different reproductive experiences among women, but without dismissing the variety of sociocultural, political, and economic factors that expose women to environmental toxins.

The "right to know" is also a critical component of democratic decision-making. Historically, the United States government is based on democratic principles that, in theory, encourage citizen participation in governmental decisions, although this participation is often only granted after a struggle. The Environmental Protection Agency (EPA) was created in 1970 to protect human health and promote environmental sustainability. Partly in response to the tragic chemical leak in Bhopal, India in 1984, the Emergency Planning and Community Right-to-Know Act (EPCRA) was established in 1986 to assure appropriate reporting of hazardous chemicals to the general public (Schettler, et al. 262-63, 248-50). The Toxics Release Inventory (TRI) also enacted in 1986 requires companies to disclose information regarding the toxicity released through their operations (Colborn, Dumanoski, and Myers 221). While information provided by the TRI has proved useful in several citizens campaigns urging industry and governmental leaders to improve environmental and human health protection, TRI coverage is limited (Schettler, et al. 195-96). The TRI currently covers approximately 650 out of over 75,000 chemicals currently produced in the United States. The polluter is responsible for reporting estimated chemical releases, which are often incomplete, inaccurate, and most likely biased to protect the self-interest of the company. Many industries and small businesses are exempt from disclosing chemical releases and TRI does not actually require reporting of chemicals released through the *use* of such products

(only the manufacturing of them) (Colborn, Dumanoski, and Myers 221-22; Schettler, et al. 195-96; Schroeder and Steinzor 147-48). True democratic decision-making requires full and open disclosure by corporate polluters so that consumers can make informed decisions and citizens can be active participants in advocating for their health and the health of the environment.

Proposition 65, the Safe Drinking Water and Toxic Enforcement Act passed by California voters in 1986, requires companies to inform consumers of potential health risks from using their products, specifically chemicals that known to cause reproductive disorders and/or cancer (State of California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA), Proposition 65).[9] Warning signs in grocery stores and restaurants disclose mercury levels in fish which assists consumers (especially pregnant and nursing women) to reduce the risks of exposure (Schroeder and Steinzor 149-50; Schettler, et al. 258-59). When women are afforded information about avoiding potential health risks, we can assume that they will be more likely to embrace a sense of agency to protect their health and the health of their children.

Alternatives Assessment

Legislation such as Proposition 65 encourages companies to look for alternatives to the use of toxic chemicals in their products, especially since consumers generally value companies that appear to hold ethical integrity in high esteem. In 1989, Massachusetts passed the Toxics Use Reduction Act (TURA) requiring manufacturing companies that use large amounts of chemicals to complete a bi-yearly assessment of potential alternatives to reduce the use of these chemicals (Tickner 177-78). TURA is an excellent example of how the precautionary principle can be used to decrease (or cease) the

production of endocrine disrupting chemicals. The act requires companies to analyze potential reduction and alternative strategies to reduce levels of pollution that includes "a comprehensive financial, technical, environmental, and occupational health and safety analysis of viable alternatives" (178). Although not required, the information gained through the alternatives assessments is often enough justification to implement the alternative (Tickner 178; McGinn 68-69). In 1998, Massachusetts achieved its goal of reducing the creation of toxic byproducts by 50 percent. From 1990 to 2000, a core group of 340 facilities reduced "[t]oxic byproducts by 58 percent, [t]oxic chemical use by 40 percent, [q]uantities shipped in product by 47 percent, [t]oxic releases to the environment by 90 percent, and [t]ransfers off-site for further waste management by 36 percent" (Massachusetts Department of Environmental Protection). If all states implemented such legislation, the environmental and health benefits for United States citizens could be impressive, and the positive impact would extend globally as well. Furthermore, a feminist alternatives assessment would include risk analyses based on gender, race, and class differences and alternatives that would specifically better the lives of marginalized populations.

Alternatives assessment necessitates new research methods that include alternate forms of knowledge production (other than traditional "sound science" methods). Moreover, it demands respect for the limits of our knowledge. Employing situated knowledges within alternatives assessment research could provide a wider range of information from which to evaluate the multivarious nature of endocrine disruptors. Alternatives assessment leads to democratic decision-making when the public informs research directions: "The alternatives assessment process is necessarily enriched by

broadly based public participation, because a full range of alternatives is more likely to be considered when diverse publics determine the range of alternatives examined and suggest specific reasonable alternatives, as well as their short- and long-term benefits and drawbacks" (O'Brien 210). The inclusion of women as both researchers and subjects in research studies is imperative to comprehensively consider multiple biological and gendered experiences that will guide the development and implementation of new alternatives committed to protecting women's reproductive health from environmental toxins.

The precautionary principle also encourages researchers and policy makers respect the limits of our knowledge.

> Acknowledging indeterminacy has profound repercussions for the methods and the role of science. It entails an appreciation for the naturally and socially constructed boundaries of our knowledge, and for our situation in, and our influence on, scientific research. Precautionary science invites us to make explicit the boundaries of our knowledge by unearthing complexity, ignorance, and values and thereby revealing how our concepts of certainty are defined (Barrett and Raffensperger 119-20).

A feminist objectivity similarly recognizes and respects partial knowledge. The precautionary principle is a befitting model for a feminist perspective on the problem of endocrine disruptors. In working with the precautionary principle, we must remember to reinforce fluidity rather than thinking linearly. In promoting the concept of ethical protectionism and risk management policy, it is important for researchers, theorists, and policy makers not to become immobile within patriarchal and hierarchical notions of "nature" and "woman." These categories must be renegotiated and deconstructed as we acknowledge the intersections of many categories of oppression. A feminist perspective

is needed when creating new policies so as to not recreate gendered and racist systems of oppression within contexts designed to bring justice and protection to all of humanity.

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[1] See Michele L. DiDiego, Julia A. Eggert, Rosanne H. Pruitt, and Lyndon L. Larcom, "Unmasking the Truth Behind Endocrine Disruptors," The Nurse Practitioner 30 (October 2005): 54-59; Theo Colborn, Diane Dumanoski, and John Peterson Myers, Our Stolen Future: Are We Threatening Our Fertility, Intelligence, and Survival? – A Scientific Detective Story (New York: Plume, 1997); and Stephen Safe, "Endocrine Disruptors and Human Health: Is There a Problem," Toxicology 205 (2004): 3-10.

[2] Even in the event of an environmental disaster, it can take years for policy change to occur. Take the recent hurricane Katrina for an example. Although the Environmental Protection Agency and other organizations are working to identify environmental hazards and clean up the environment (such as the water supply, pest management, extensive debris and hazardous materials, and air quality), residents are currently exposed to many unknown potential environmental threats. In addition, there hasn't yet been any (as far as I know) new policies that will affect the industries responsible for the hazardous materials and chemicals.

[3] For a more thorough discussion of the problems with ecological linearity and the need for circular alternatives to create sustainable modes of production, see R. Michael M'Gonigle, "The Political Economy of Precaution," Protecting Public Health and the Environment: Implementing the Precautionary Principle, ed. Carolyn Raffensperger and Joel Tickner (Washington, D.C.: Island Press, 1999) 123-47.

[4] The phrase "primum non nocere," or "first, do no harm" is often quotes as part of the Hippocratic Oath; however, this exact phrase does not appear anywhere in the Hippocratic Oath. The phrase may have stemmed from Hippocrates's Epidemics, in which he wrote, "Declare the past, diagnose the present, foretell the future; practice these acts. As to diseases, make a habit of two things—to help, or at least to do no harm." See "Hippocratic Oath," Wikipedia: The Free Encyclopedia, 5 March 2006, Wikimedia Foundation Inc., 10 March 2006, <http://en.wikipedia.org/wiki/Hippocratic_Oath>. See also Susan Records, "'First, Do No Harm': *Not* in the Hippocratic Oath," Everwild, 8 Feb. 2006, 10 March 2006 <http://www.geocities.com/everwild7/noharm.html>.

[5] One of the difficulties in proving safety is defining a measurement of what is "safe" and what is "harmful." See Andrew Jordan and Timothy O'Riordan, "The Precautionary Principle in Contemporary Environmental Policy and Politics," Protecting Public Health and the Environment: Implementing the Precautionary Principle, ed. Carolyn Raffensperger and Joel Tickner (Washington, D.C.: Island Press, 1999) 15-35. These definitions would need to be fluid and inclusive of gender, racial, and class differences.

[6] For a detailed discussion of environmental bonds, see Laura Cornwell and Robert Costanza, "Environmental Bonds: Implementing the Precautionary Principle in Environmental Policy," Protecting Public Health and the Environment: Implementing the Precautionary Principle, ed. Carolyn Raffensperger and Joel Tickner (Washington, D.C.: Island Press, 1999) 220-40.

[7] The "commons" are aspects of life that are generally considered to be public property to be shared and not exploited. For more information, see John Cavanagh and Jerry Manders, eds., Alternatives to Economic Globalization (San Francisco: Berrett-Koehler Publishers, Inc., 2004) 105-46. Cavanagh and Manders contend that "Any global trading system needs to recognize and yield to the primary notion that not every aspect of experience should be subject to its centralized rules, and many aspects should never be included in global trade or investment of any kind or in the rules that govern trade and investment" (109).

[8] The comment in the brackets is my addition for clarification purposes.

[9] The list of chemicals is updated annually. For the most recent list of approximately 800 chemicals, see State of California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA), Proposition 65 List of Chemicals: Chemicals Known to the State to Cause Cancer or Reproductive Toxicity, Feb. 3, 2006. 10 March 2006 <http://www.oehha.ca.gov/prop65/prop65_list/files/P65single20306.pdf>.

Epilogue

My daughter is about to turn nine months old as I defend this thesis. When I was pregnant with her, I actively attempted to make healthy lifestyle choices to ensure her the best health possible. I chose a natural, drug-free childbirth at a birthing center so that I could bring her into this harsh world in the most peaceful, caring, and respectful manner I could provide. Brennan Jada Anstey graced the world at noon on July 2, 2005 surrounded by loving family and gentle midwives. Although we have maneuvered through several breastfeeding challenges since the day she was born, I have continued to breastfeed her because I believe it is the healthiest choice and a wonderful experience for both of us.

There are many benefits to breastfeeding for both the mother and the baby.[1] Breast milk provides the mother's immunities and antibodies to the baby, which help to prevent the baby from getting sick and supports the development of the baby's own immune system. Breast milk is more easily digested than formula and protects the intestines from allergens while maintaining a healthy level of bacteria in the digestive system. Plus, babies who consume breast milk don't have smelly poop. Breast milk is naturally sweet, it tastes pleasant, and this sweetness is what makes a baby's breath smell so wonderful. Breast milk is also good for healthy eyes, ears, hearts, teeth, and breathing. A few drops of breast milk can cure an eye infection. The disease-protection for breastfed babies is also extensive; breastfed infants suffer less from life-threatening and life-shortening diseases such as diabetes, obesity, some cancers, allergies, asthma, SIDS,

ear infections, and Crohn's disease, among others. Studies also show that breastfed children have higher IQs and fewer developmental, emotional, and behavioral problems and learning disabilities (Steingraber, Having Faith; Sears and Sears).

Breastfeeding helps the mother's body recover more quickly from childbirth by shrinking the uterus back to its original size and providing faster weight loss. The hormone oxytocin is released in the mother's body during breastfeeding, which provides a sense of relaxation and peacefulness for the mother, a useful benefit when caring for a newborn. Breastfeeding protects the mother from many diseases as well, including osteoporosis and breast, uterine, and ovarian cancers. Breastfeeding provides important emotional bonding time and physical contact between a mother and her child (Steingraber, Having Faith; Sears and Sears). Other benefits include the economic savings (breast milk is free), the environmental savings (fewer bottles, cans, and boxes, unless pumping the milk), and time savings (nothing to clean and sterilize, unless pumping the milk).

The benefits of breastfeeding are so great that the American Academy of Pediatrics recommends breastfeeding "for at least the first year of life and beyond for as long as mutually desired by mother and child" (AAP). And yet, with regard to persistent organic pollutants (POPs), the most contaminated human food is breast milk (Steingraber, Having Faith 251). As discussed earlier in this thesis, environmental toxins can bioaccumulate as they move up the "food chain," meaning that they increase in toxicity. Many synthetic chemicals are stored in body fat; the breast is an extremely friendly location for the concentration of these toxins. Breast milk is the highest step on the "food chain," above the foods that humans eat; the toxins stored in a woman's body become more concentrated as they are transmitted into milk produced by the breasts (Steingraber,

"Why the Precautionary Principle" 363). Within the first six months of life, breastfed babies will exceed their lifetime limit of dioxin and "may receive five times the allowable daily intake of PCBs for a full-grown adult. Cow's milk with levels of PCBs this high would be too contaminated for sale in the United States" (Schettler, et al. 205).

Most of the fat content in breast milk (about 60 percent) derives from the mother's bodily fat stores from years of accumulation, which includes years of accumulated toxins (Steingraber, Having Faith 262).[2] "What this means is that a lifetime burden of long-lived, fat-soluble contaminants becomes mobilized when adipose tissue is called upon to supply fat for breast-milk production" (Steingraber, Having Faith 262). The toxins are released into the bloodstream, transferred into the breast milk, and consumed by my daughter, who only knows breastfeeding to be her source of food and comfort.

This transfer of toxins from myself to my daughter is actually protective for me. The longer the mother nurses her child, the more chemicals she releases from the stores of toxins in her body and, over time, her milk becomes more pure. This means that each subsequent nursing baby receives fewer toxins than his or her older sibling. The older the mother when she has her first child, the more toxins she has accumulated and the more contaminated her milk becomes (Steingraber, Having Faith 263-64; Schettler, et al. 205). "According to various studies of breast milk contamination, nursing babies take in the highest doses of contaminants they will experience in their entire lives – levels ten to forty times greater than the daily exposure of an adult. It is indeed tragic that breast-feeding is the only efficient way to remove these persistent chemicals from the human body" (Colborn, Dumanoski, and Myers 215). The protective factors of breastfeeding

may be due to the release of these stored toxins from the mother's body, thus reducing the concentration of endocrine disrupting toxins and decreasing her potential for developing cancers of the reproductive system.

While researchers are able to study the levels of toxins in breast milk, they have difficulty studying the harmful effects of these toxins on children, especially since a control group of women with pure breast milk does not exist; there are only women with contaminated and less-contaminated breast milk. In addition, children who receive more contaminated breast milk also likely received more toxins in their prenatal environment (Steingraber, Having Faith 268-69). Studies have shown that children's exposure to environmental toxins lead to neurological disorders such as hyperactivity, attention problems, and learning disabilities, as well as several forms of childhood cancer such as leukemia and Hodgkin's disease (Steingraber, Having Faith 271; Wargo 180-99; Colborn, Dumanoski, and Myers 188-94).

A typical "sound science" approach to examining potential risks from toxins in breast milk (to both mother and child), would evaluate the cost-benefit or risk-benefit of breast feeding to formula feeding.[3] This approach is problematic in that it encourages women to choose the less harmful option, without considering the socio-cultural and economic differences among women that may not permit such a choice. I have had the fortune to make certain choices that protect my and my daughter's health to some extent, but my opportunities are not typical for the majority of women across the globe. The level of toxins in breast milk is of particular concern for women living in indigenous communities that rely on fish and wildlife as part of their diet. Wind and water carry endocrine disrupting toxins to even the most remote locations of the globe and as they

bioaccumulate, they become more toxic (Schettler, et al.; Steingraber, Having Faith; Colborn, Dumanoski, and Myers; LaDuke). While making healthy choices is beneficial, the answer really lies in the reduction of all toxins in our environment. Furthermore, this approach does not attempt to solve the actual problem: the contamination of women's breast milk from environmental toxins (Steingraber, Having Faith 274-75). The four main components (scientific proof/knowledge, burden of proof, democratic decision-making, and alternatives assessment) to the precautionary principle, as discussed in chapter 4, provide a useful framework for guiding research and developing policy that will attend to the problem of endocrine disruptors for breastfeeding mothers.

To have to make a decision about whether or not breastfeeding is safe is an absurd and inconceivable choice for a mother to make. Breastfeeding, every child's birthright, must be protected; this can only be done when we respect the interconnectedness of all life to the environment. Many Native American tribes teach a powerful method for understanding the cyclic nature of our actions and the need for sustainability by suggesting that in making every decision we are responsible for considering the impact on the seventh generation from now (LaDuke 198). The precautionary principle does just this by demanding that chemical companies be held responsible and toxins be phased out of our environment. This is a feminist issue in the largest sense: it is an issue for all the Earth's inhabitants and the entire ecosystem.

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[1] Although breastfeeding provides many benefits, it is not a practical or even possible choice for every woman. Working mothers are faced with many breastfeeding challenges, including making time and finding a location to nurse or pump at work, securing employer acceptance to either nurse on site or pump, and having access to necessary accessories such as a pump and refrigeration or ice packs. In addition, many women have trouble breastfeeding due to low milk supply, inverted nipples, nipple confusion, multiple babies, a tongue-tied baby, an adopted baby, and a disabled or ill baby. Mother's who have a chronic illness, disease, or disability that requires regular medication may also find breastfeeding to be impractical. For information on a variety of breastfeeding challenges, including challenges for working

women, see Martha Sears and William Sears, The Breastfeeding Book: Everything You Need to Know About Nursing Your Child from Birth Through Weaning (New York: Little, Brown and Company, 2000).

[2] Thirty percent of the fat in breast milk derives from the mother's daily nutritional intake and 10 percent is produced directly by the mammary gland. See Sandra Steingraber, Having Faith: An Ecologist's Journey to Motherhood (NewYork: Berkley Books, 2003) 262.

[3] Formula is not toxic-free either. Formula must be mixed with water, which is often contaminated, and bottles contain endocrine-disrupting plasticizers that can leach into the milk. See Steingraber, Having Faith 278.

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