
The Duelling Fictions of Parthenogenesis

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Abstract

Despite scientists' current attempts to claim human parthenogenesis as an ethical alternative for therapeutic cloning purposes and the fact that parthenogenesis does not produce viable human embryos, public discourse continues to decry this technology as a dangerous option for human reproduction. By considering a range of discursive constructions of human parthenogenesis, including those from women authors of avant-garde fiction, we can more aptly understand the source of such fears. I use the social construction of technology model (Pinch & Bijker 1984) to analyze the technologies of parthenogenesis as an artefact, specifically one in which scientists are trying to renegotiate its meaning.

Introduction

Only in the last decade has the science of human parthenogenesis begun to catch up with the science fiction. Parthenogenesis, a type of asexual reproduction, also known as 'virgin birth', occurs when an ovum, or female gamete, becomes an embryo without having undergone fertilization by a sperm cell, or male gamete. Though scientists have observed parthenogenesis in insects since the 1700's, have induced parthenogenesis in some species of insects, reptiles, and amphibians since the early 1900's, and have induced parthenogenesis in mammals since the 1980s (Schatten, Simerly & Schatten 1991), in the last ten years, parthenogenesis has gained momentum in public discourse as an option for human reproduction. This increase in scrutiny on human parthenogenesis has also occurred within a larger trend of emergent discourse about new reproductive technologies (i.e. in vitro fertilization, embryo adoption, egg, sperm, and embryo cryogenics, etc.) and genetic technologies (i.e. germ line engineering, stem cell research, therapeutic cloning, etc.), more generally. Interestingly, there is no scientific evidence that human parthenogenesis has successfully occurred. By this I specifically mean that there is no concrete

proof that a human embryo created via parthenogenesis has survived long enough to be born from a woman's uterus. To the contrary, scientists studying the process of genomic imprinting have shown that in order for human embryos to develop normally, both the male and female gametes are necessary.

Despite the fact that, at this point, techniques of human parthenogenesis have only successfully yielded embryo-like multi-cellular bodies that are unable to develop into viable embryos, the discourse around human parthenogenesis has very much reflected its potential as a reproductive technology.¹ This is also in light of the determination on the part of some scientists to claim parthenogenesis as an ethical technique for therapeutic cloning and stem cell research and specifically not for purposes of human cloning and/or reproduction (Ingram 2004). It is on this *potential for human reproduction* that I focus my current research. I am particularly interested in how human parthenogenesis has been discursively constructed as a reproductive technology, given its apparent limitations as such.

Knowledge production in science

Before delving into the discursive constructions of human parthenogenesis, it is important to take a look at how scientific knowledge production happens, generally. Social scientists have long been curious about how people, from experts to lay persons, come to understand science. Though there are numerous windows through which to look at the process of scientific knowledge production, in this paper, I will primarily be interested in a cultural approach.² Thus, I frame my inquiry in the paradigm that already suggests that the production of scientific knowledge is a culturally mediated activity. As such, we can look to cultural representations of scientific products and processes, often manifesting in a huge range of discursive media, to elucidate how science is socially constructed (Pinch & Bijker 1984; Latour & Woolgar 1986; Owen-Smith 2001).

Research about public understanding of science has generally shown two things: one, that the general public is not ignorant about scientific innovation; and two, that the general public is not a passive consumer of

science (Beamish 2002; Edwards 2002; Loe 2004; Penley 1997). Rather, people may read different accounts, often from a variety of sources, including news organizations, works of fiction, and gossip, combine issues, and engage in discussions with others before settling on an opinion.

Numerous other scholars have documented a similar kind of process among scientists themselves. Generally, scientists draw on a variety of sources of knowledge, including non-obvious ones such as social interactions with other scientists, current events, local politics, and works of fiction (Kuhn 1996; Haraway 1989; Latour & Woolgar 1986; Owen-Smith 2001; Steinmuller 2003). Steinmuller argues that science fiction historically has been a site of not only scientific knowledge production but also inspiration for the advancement of science, writing 'perhaps it is science fiction that has the strongest impact on the public conception of (...) future scientific achievements and potential hazards' (2003, 177). Indeed, he says that science fiction has long offered a diverse population of readers, including aspiring scientists, a realm to explore the 'what if?' question.

In this paper, I will first give a brief synopsis of current discourse on human parthenogenesis, using the language of feminist critiques of new reproductive and genetic technologies (NRGTs), for the purpose of illuminating the discursive focus on the potential of parthenogenesis for human reproduction. Then I will shift my attention to another site for scientific knowledge production, a genre of avant-garde fiction, specifically lesbian science fiction written from 1970s-present, in an effort to make sense of why current discourse on parthenogenesis continues to focus on human reproduction.

The historical stakes of parthenogenesis

In 1740, Charles Bonnett discovered that female aphids could reproduce without male aphids (Luck 1999). By 1900, Joseph Loeb induced parthenogenesis in sea urchin eggs (1900a, 1900b). Parthenogenesis has enjoyed a much longer history in mythologies and religions than in science. The term parthenogenesis is derived from the ancient Greek myth of Zeus giving birth to his daughter Athena, after swallowing her

mother, Hera. Parthenogenesis has explained many a virginal birth of/by religious leaders and other mythic icons, including the Judeo-Christian god Christ, the Eastern European witch Baba Yaga (Dumars & Nyx 2003), and the Hindu god Rudra (Mayer 1991). Science fiction authors also invoke parthenogenesis to explain virgin births, such as Lucas' (1999) *Star Wars*' Anakin Skywalker and Crichton's (1990) *Jurassic Park*'s asexually reproducing female dinosaurs, as well as all-female human/humanoid populations, including Gilman's women of *Herland* ([1915] 1979) and Slonczewski's Sharers from *A Door into Ocean* (1986).

In 2001, scientists at Advanced Cell Technologies (ACT) claimed to have cloned a human embryo using parthenogenesis (Cibelli et al. 2002a).³ In the February 1, 2002, issue of *Science*, one of the two top-tiered journals in science, Cibelli and his team of researchers presented their successful efforts at developing primate stem cells via parthenogenesis (Cibelli et al. 2002b, 819). Cibelli's team induced parthenogenesis by catalyzing a primate oocyte, or pre-ova, into developing into an embryo, without any fertilization by a sperm cell. This is possible because an oocyte still retains the full set of chromosomes, half of which are 'dumped' prior to fertilization, to make room for the half set from the sperm. Thus, the oocyte retains the full genetic code of the female donor. Though these parthenotes are not complete clones due to some amount of unpredictable shuffling of genes, Cibelli states that the differences between the parthenote and female donor are not large enough to inhibit therapeutic cloning applications.⁴

Thus far, the stated purpose of creating parthenogenetic embryos is to harvest human embryonic stem cells, the 'holy grail' of therapeutic cloning research. Stem cells are master cells that can be prompted to differentiate into any other human cell. Stem cells can also be harvested from embryos created via somatic nucleic cell transfer (SNCT). SNCT is the more widely known and controversial means of embryo cloning and has been linked to the abortion debate.⁵ Both parthenogenesis and SNCT are processes to create cloned human embryos. The distinction is that parthenogenetic embryos are derived from unfertilized eggs while SNCT embryos are created from fertilized embryos.

Prior to the late 1980's and 1990's, invested actors might have agreed that parthenogenesis was a mechanism of species survival, invoked in

nature or under duress, to allow species reproduction to occur in a population of females. Arguably, it was only after Dolly the Cloned Sheep made headlines in 1996 that we begin to see parthenogenesis invoked as a different sort of mechanism. In the case of Dolly, scientists used an unfertilized egg to host the cell nucleus of the animal to be cloned (Wilmut, Campbell & Trudge 2000). Thus, parthenogenesis was reclaimed as a mechanism for cloning. Within a few years, parthenogenesis has been further reclaimed as a technology for therapeutic cloning with the specific intent of harvesting embryonic stem cells. In 2003, scientists at the Roslin Institute received a license from the British Human Embryo and Fertilization Agency to clone a human embryo through parthenogenesis for the purpose of stem cell research (Clennell 2002).

Despite scientists' efforts to claim parthenogenesis as an ethical alternative to SNCT for stem cell research, current discourse still reflects parthenogenesis as a potential human reproductive technology. Cibelli and his team even spell out their intentions in their scientific journal article on primate parthenogenesis: 'Differentiated cell types derived in vitro by parthenogenesis eliminate the requirement to produce or disaggregate a normal, competent embryo and may circumvent the ethical concerns voiced by some, positively impacting the debate in stem cell research' (Cibelli et. al 2002b, 819).

Newspaper headlines reporting on human parthenogenesis definitively place the technology into the realm of reproduction. One headline in the *The Washington Post* reads: 'Are fathers really necessary? In certain species and circumstances, the answer is no' (Rensberger 1986). After Kaguya, the parthenogenetic mouse, was born in 2004, Martha Munro, a science and technology reporter for Canadian newspapers, wrote seven similar articles with headlines like 'Two Minnies and no Mickey make babies: Don't worry guys, you're still needed: one mom was a mutant made to act like male' (Munro 2004). One anonymous British commentary, reflecting a perceived threat to mankind, emerged shortly before the Roslin Institute filed for a license to clone human embryos via parthenogenesis: 'At the same time, girls study more, pass more exams and look set to rule the world as soon as parthenogenesis is available at drop-in high street clinics' (*The Guardian* 2002).

Earlier conceptualizations of parthenogenesis as an evolutionary mechanism have lingered such that discursive representations continue to promote it as a human reproductive technology. Theoretically, the continued competition over defining technology is easily understood. In the theoretical model of the social construction of technology, this process is called *gaining closure* (Pinch & Bijker 1984). Numerous social scientists have studied the evolving social constructions of technological artefacts as relevant claim-makers have negotiated their meanings over time (Boczkowski 2004; Loe 2004; Pinch & Bijker 1984). Perhaps the stakes of *parthenogenesis as a human reproductive technology* artefacts can be seen by looking at the how the creators of Dolly characterized the technology. They wrote that the method of parthenogenesis 'could, if applied to humans, realize the ultrafeminist goal of the self-replicating female (although "self" would have to be aided by attendant scientists and clinicians)' (Wilmut, Campbell & Trudge 2000, 61). Thus, for scientists to re-appropriate human parthenogenesis for therapeutic cloning purposes, they will need to challenge the closure of parthenogenesis as a mechanism for not only human reproduction but for something far more threatening: the means to a women-only society.

The past hundred years of parthenogenesis scientific research have often been met with fear, disdain, and misogyny, as I have argued elsewhere (Ingram 2004). Though feminist social scientists have yet to specifically address parthenogenesis, we can look to their critiques of NRGTs to gain some perspective.

Situating human parthenogenesis in the critiques of NRGTs

Though the current science of human parthenogenesis has yet to be studied in depth by social scientists, there are many sociological studies of animal and human cloning processes and human reproductive technologies that are relevant to this inquiry. Collectively, social scientists have argued that cloning research and reproductive technologies illuminate gendered and racialized inequalities as well as heteronormative assumptions in science. For instance, Duster (2003) argues that the ideologies behind

therapeutic cloning reproduce racist eugenicist tendencies. Similar to Duster's claim, others have argued that therapeutic cloning and genetic engineering will lead to the 'fixing' of those already on the margins of society, including the deaf, the mentally retarded, and gays and lesbians, and thus the eradication of their respective subcultures. Further, Fukuyama (2002) argues that new biomedical technologies, such as genetic engineering and cloning, mark an end of humanity, as humans learn to literally shape their species, starting at the genome. Haraway (1991; 1997), and many other feminists, have long argued that the interface of humans and biotechnology yields a fragmented humanity, or a world populated by 'cyborgs' where people, as well as animals and other organisms, are subject to 'branding'. Franklin (1997) sees therapeutic cloning research as a means to make and then patent new transgenic life forms, preserving patriarchal hierarchies where paternity manifests through scientists' innovations and corporate patents (Franklin 2002). Researchers have highlighted the raced and classed bifurcation of egg donors (Holland 2001), the legacy of sexist understandings of reproductive processes (Martin 1991), and the ways that new reproductive technologies, such as in vitro fertilization (IVF) and egg- and womb-surrogacy, construct motherhood as normative for all women (Layne 2003) and perpetuate racist notions of white women as mothers and women of colour as 'breeders' (Davis 1997). Mamo (1998; 2001) explains that lesbians seeking motherhood, when they find doctors willing to help them, are increasingly encouraged to seek expensive technological means to get pregnant rather than low-tech means of insemination while Layne (2003) extends this expectation to middle- and upper-class women, especially women who have already experienced pregnancy loss.

Exploitation of women's bodies and NRGTs

As Holland argues, therapeutic cloning research, which includes human parthenogenesis, begins with the exploitation of women of colour and poor women (2001). She compares the bifurcated experiences of egg donors, separated by means of eggs for research and eggs for fertility clinics.

She concludes that the line for stem cell research and fertility eggs is drawn along racial and class distinctions. Thus, women of colour and poor women are more likely to donate their eggs for stem cell research, at a much lower compensation rate, than are educated white women, who are in demand by fertility clinics. She then goes on to describe the ordeals that egg donors must endure, which include long-term risks such as infertility and severe scarring. Thus, she makes a case for a potential eugenics outcome for women who donate primarily for money, who are generally women of colour and/or poor.

Other feminist critics of NRGTs, such as Sherwin (2001), argue that all scientific innovations must be placed in the larger oppressive sexist and racist social structures in which they are derived. Therapeutic cloning research is a product of a field that has long excluded the interests of those from the margins, including women, persons of colour, and the poor. Thus, research on NRGTs has been criticized as continuing a tradition of further removing reproduction from women's bodies to largely male dominated hospitals and laboratories (Franklin 2002). Angela Davis (1997) argues that women of colour have shouldered the heaviest burden from advances in reproductive technologies. One, they are more likely to be surrogate mothers than any other group of women; two, they are less likely to benefit from technologies derived from their own bodies; and three, they more likely to suffer long term physical consequences from these research processes.

Naturalizing the divide between women and their reproductive potential

Feminist critics of NRGTs also offer a more complex assessment of the dangers of pitting women against their bodies that will be useful for an analysis of current human parthenogenesis discourse. New reproductive and genetic technologies stand to revolutionize the way we understand women's bodies in relation to not only the foetus, but also to processes of reproduction, more generally. NRGTs create an artificial divide between women's physical bodies and the developing foetus (Franklin 1995). One set of mechanisms facilitating the illusion between the physical space of

the women and the foetus are the technologies that render representations of the foetus, such as ultrasounds (Petchesky 1990). As these kinds of representations become standardized procedures, the artificial divide becomes naturalized (Franklin 1995).

In Franklin's analysis of Dolly, we begin to see some of the dangers in normalizing a separation between women's bodies and their reproductive processes. She argues the routinization of NRGTs will lead to women's bodies being reduced to merely vessels for reproductive purposes while embryos are reduced to DNA (Franklin 2002). Both women's bodies and embryos will thus be able to be controlled by scientists (Franklin 1995; 2002). It will be doctors and scientists, who are largely male, who will direct the processes and constructions of meanings of conception and fertilization. Thus, even within the parthenogenetic conditions of Dolly's birth, paternity is merely 'dispersed' rather than 'displaced' (Franklin 2002, 128). Dolly's paternity, which Franklin defines through the scientists and biotechnology firms who hold patents detailing her birth, is manifested through a technology that '*bypasses* her own reproductive capacity, which is too inexact' (Franklin 2002, 125, italics in original).

Fiction: a site of critical knowledge production

Several feminist critics of NRGTs have looked to fiction as a site for critical knowledge production about current and projected scientific innovations, especially those involving reproductive and genetic technologies (Kaplan & Squier 1999; Haraway 1989; Penley 1997; Schwab 1999; Squier 1994). Together these critics argue that fiction, specifically avant-garde fiction, is an important site of discursive knowledge because it threatens taken for granted norms and values, it challenges the agency of decision-makers (Schwab 1999), it breaks up the 'monopoly of experts', and it forms 'new subjectivities, relationships, and practices' around the technologies (Kaplan & Squier 1999, 241). Indeed, Kaplan and Squier call these processes of disciplinary transgression 'playing Dolly' (1999, 241). In an earlier work, Squier refers to the women-authored fiction that critiques turn-of-the-century reproductive technologies as 'feminist parables' (1994, 169).

Methodological considerations

Many researchers in the field of science studies use scientists' work as well as media accounts to illuminate how scientific processes and technologies are socially constructed. However, fewer researchers use science fiction, as well. I use science fiction as a site for knowledge production precisely because I think this body of work not only reflects the ideologies of parthenogenesis as an evolutionary survival mechanism, but also because it extends these ideologies further into the realm of possible, if improbable, outcomes. As Squier (1994; 1999) and Kaplan and Squier (1999) have argued, studying both literature and science illuminates the rich traffic between the two in the construction of meanings. Further, looking at both science, usually men's domain, and literature, generally women's domain, as sources of knowledge production deconstructs the privileged status that science often enjoys. Thus, Squier critiques the problematic dichotomy between science as masculine and rational and defining the natural objective world and literature as feminine and emotional and defining the subjective self (1999).

In this section, I want to examine a set of claimsmakers whose voices have not been privileged as legitimate sources of knowledge production. These actors' analyses of parthenogenesis are expressed in their science fiction and fantasy stories. Though many of their concerns echo those of feminist critics of NRGTs, they also express other kinds of issues. Moving within the realm of fiction allows them to answer that important 'What if?' question that is the hallmark of science fiction (Steinmuller 2003). They ask, 'what if women could reproduce without men?' Their answers, though varied in the details, plot, and characterizations, do share important commonalities. They also give voice to the fear of *parthenogenesis for human reproduction* that is so striking in the above-discussed quotes by scientists and journalists. They provide an interesting new set of themes: fear. They all explore women's fear of men and other women who fear their parthenogenetic reproductive technologies.

This article is based on a larger study wherein I draw on three different sets of historical and disciplinary constructions of parthenogenesis: scientific research, science fiction, and media accounts. By using search terms related to parthenogenesis, including 'human parthenogenesis', 'parthenote', and 'virgin birth', I created a list of possible sources of data for each of the three

categories. I then used the search terms in subject word indices of the University of California library system as well as in general Internet searches to identify a list of seven accessible science fiction novels. These books all clearly featured parthenogenetic individuals and/or populations as key characters. They are: Suzy McKee Charnas' epic trilogy, *A Walk to the End of the World* (1974), *Motherlines* (1978), and *The Furies* (1994), Sally Miller Gearhart's *The Wanderground: Stories of Hill Women* (1980), Katherine Forrester's *Daughters of a Coral Dawn* (2002 [1984]) and its sequel *Daughters of an Amber Noon* (2002), and Joan Slonczewski's *A Door into Ocean* (1986).

Analysis of feminist and anti-heteronormative parables

To examine the seven novels' construction of human parthenogenesis, I have borrowed Squier's concept of analyzing avant-garde fiction as 'feminist parables' (1995, 169). Parables are allegorical stories in which the author is deliberately trying to teach a moral lesson. Thus, the characters, setting, and plot are metaphors with meanings that extend far beyond the story itself. Though there are many parables within this sample of books, I will focus on the ones that concern human parthenogenesis and also give us insight into the overall discursive constructions of parthenogenesis as a dangerous option for reproduction. There are five primary allegorical stories that are applicable to this research: male-female reproduction is oppressive to women while parthenogenetic reproduction is not; women know that their parthenogenetic reproductive abilities are threatening to men and non-parthenogenetic women; parthenogenetic women are protective of their societies but not necessarily to the point of exclusion of men or non-parthenogenetic women; parthenotes may be physical clones but they are not truly clones due to socialization; parthenogenetic women deliberately protect their control of the science, technology, and/or magic of parthenogenesis.

Male / female reproduction vs. parthenogenesis

One of the most obvious themes in these seven novels is that parthenogenetic reproduction frees women from the oppressiveness of childbirth

and child rearing that is otherwise associated with male-female reproduction. On the surface, this seems rather straightforward. Indeed, it is echoed in some of the earlier discussed quotes by scientists and journalists, especially that parthenogenesis would facilitate 'ultrafeminism'. A closer look, however, complicates the simplicity of this assertion because parthenogenetic women carry their children as do non-parthenogenetic women. They are also the primary caregivers for their children. How does the technology of parthenogenesis itself change pregnancy and child rearing into something that is not oppressive?

For the authors, the answer lies in the parable that without males, a society of females tends towards some kind of egalitarianism (not to be confused with utopianism). In each of the seven books, the parthenogenetic women live varying degrees of communal lifestyles. Birthing a child does not necessarily translate into mothering a child. An entire community will take on that responsibility. Furthermore, pregnancy itself is a choice. None of the parthenogenetic women can become pregnant unless they take appropriate steps. They cannot be raped and forced into pregnancy.

For Gearhart's *Hill Women*, pregnancy is a serious endeavour. A birth mother must find six other mothers with whom she will not only share genetic material, but also child care responsibilities. There is a sense of a contractual nature to the relationships between the 'sevensisters'. For Forrest's and Slonczewski's characters, parthenogenetic women will, for the most part, pair off into parenting units. However, there are still numerous instances of single mothers and extended families. Even among these women who mirror tradition dyadic parenting models, community support for child rearing is an important responsibility for all.

The threat of parthenogenesis

In each of the novels, the parthenogenetic women are viscerally aware that males and non-parthenogenetic women perceive them as frightening. They are reflexive about this to the point of understanding that their entire communities are endangered. The parable here is that women who are different (i.e. lesbians, feminists, etc.) are at risk because their difference threatens the moral status quo. Thus, the women have to take measures

to both mitigate how they are perceived by others and to minimize the danger from the non-parthenogenetic populations.

The authors have different strategies for addressing both of these tasks. Slonczewski's Sharer Women try to educate the humans of the neighbouring planet of Valedon. They bring a male Valon, Spinal, to their planet to show him first hand about their culture because they know that the governing bodies of the universe threaten their way of life. Though Spinal does become an ally of the Sharers, it is not enough to stop a war from breaking out between Valedon and Shora, the Sharers' home planet. The other authors have their characters maintain separate geographic spaces from males and non-parthenogenetic females.

Protection or exclusion?

Each population of parthenogenetic women is faced with the decision of what to do to protect themselves. This lesson of this parable is that parthenogenetic women will not exclude men from their society unless they are sorely provoked. As discussed above, Slonczewski's Sharers choose not to fight invading armies of men and instead try to teach them about their culture. This leads to the deaths of more than half of the population of Sharers before the invaders call a cease-fire. Gearhart's Hill Women live in the rural areas and use psychic powers to create a force field to keep males out of their zones. Through out the story, whenever a male manages to cross over, he inevitably rapes and/or hurts one of the women. However, the Hill Women do sometimes meet with males who identify as gay. They are not their allies, though. Rather, these men are neutral, neither supporting the Hill Women nor the males of the cities.

Like the Hill Women, Charnas' Riding Women patrol the borders between their civilization and those of the men's. But the Riding Women also want to keep out the Free Fems, non-parthenogenetic women who were formerly enslaved to men. The Riding Women joke among themselves about how they are monsters to the men and the Free Fems. By the end of the *Motherlines* trilogy, after the Riding Women and the Free Fems have struggled to work together, the few remaining men of their world are slowly reintroduced to society. These men are held suspect

by Riding Women, who for generations have not been around men, and by the Free Fems, who suffered as slaves at their hands. Yet, by the end of the story, both groups of women begin to trust those men who demonstrate a willingness to be peaceful and to accept women's new roles as equals.

What is a clone?

Of the four authors, only Charnas uses parthenogenesis as a means to reproduce through cloning. The other authors use parthenogenesis as a technology that enables the joining together of two or more women's genetic material. Thus, the Riding Women are all descended as clones from an initial stock of women, what Charnas calls the 'Motherlines'. I include this parable because it specifically addresses a concern that arises throughout the discourse: what is a clone, especially in relation to the person to be cloned? For Charnas, clones are alike primarily in physical aspects and some behavioural ones. In one example, Sheel Torrinator is spying on another encampment of Riding Women. She has only to remove a few identifying pieces of clothing and be careful of her speech in order to pass as that camp's Torrinator. Sheel knows that her gait and her mannerisms are similar enough that no one will notice anything amiss. Charnas' answer is that clones are individuals with unique personalities and life experiences, despite their appearances. This is even clearer at another point in the story when Sheel sings her 'self-song'. This is an oral history mechanism that first introduces the tales of her motherline before ending in her own personal experiences. Each of the Riding Women has a self-song.

Agency of parthenogenesis

In each of the novels, the women have either reclaimed the technologies of parthenogenetic reproduction from scientists or guard their secrets very closely. This parable teaches that women should have control over their own reproductive lives, a theme common in feminist critiques of

NRGTs. Charnas' Riding Women were once experimental populations who lived in labs like animals. After a global war, these women escaped from the labs into rural areas. There, they figured out how their bodies worked until they could stimulate parthenogenetic reproduction on their own. When they rescue Alldera, a pregnant Free Fem, they make a decision to try to convert her foetus into one of them. They experiment on Alldera by feeding her special medicines and their own breast milk while she is pregnant. Then they raise her child as one of their own. This is the only time throughout the trilogy when the Riding Women share their technology.

For Gearhart's, Slonczewski's and Forrest's characters, specific health care practitioners oversee the science of the conception, implantation, and subsequent pregnancies. The medicine, science, or magic involved is as rationalized as any modern day health care experience. However, for Forrest's characters, the required catalyst, 'Estrova' is outlawed as a means to prevent parthenogenetic births. These women are able to work around this by making their own Estrova, though. Slonczewski's Sharers protect their reproductive technologies by avoiding interbreeding with the male Valens. For a group of women who are so clearly advanced in the fields of science and medicine, it seems that allowing Sharers and Valens to breed would be easily managed, especially when we discover that the two are descended from the same race. Yet this is heartily discouraged and seen as impossible by the Sharer women.

Concluding thoughts

These fictional feminist parables offer insight into why scientists struggle against the current discursive constructions of human parthenogenesis. For Kaplan and Squier (1999), avant-garde fiction is a site of resistance, where dominant cultural values are turned on their heads as authors explore new meanings about the functions and implications of NRGTs for human society. For Haraway, 'Science fiction is a territory of contested cultural reproduction in high-technology worlds' (1989, 5). Schwab argues that science fiction 'brackets the natural' and explores what happens

when women, in particular, challenge norms and values regarding NRGTs and allow themselves to become ‘monstrous’ (1999, 234). Considering avant-garde fiction is necessary for naming the risks, implications, possibilities that would otherwise go unnamed due to disciplinary bias in science and science reporting.

In this study, by looking at a selection of lesbian science fiction, we can privilege alternative sources of knowledge production. Not only do the authors offer us feminist parables for NRGTs, specifically parthenogenesis, but they also use parthenogenetic technologies to challenge sexist, misogynistic, and heteronormative assumptions about reproduction, child rearing, and women-only communities—themes we also see echoed in feminist critiques of NRGTs. If we consider that both literature and science co-constitute the social knowledge of technologies (Squier 1999), we can now see how the current discourse of human parthenogenesis reflects fear and trepidation of parthenogenesis as a mechanism of human reproduction.

Notes

- 1 By discourse, I mean a range of media, including scientific journal articles, journalistic and editorial accounts, press releases, religious views, discussions among lay persons, and fiction.
- 2 Other research veins suggest that scientific knowledge production may be attributed to government policies, the interactions between government, universities, and private industry and certain population demographics.
- 3 ACT’s first attempt at human cloning was considered a bust by scientists in the field of biotechnology and genetics. The cloned embryo cells all ceased to replicate at the 6-cell level and not at the 8-cell level when stem cells begin to form. ACT published this in an online journal, *e-Biomed: the Journal of Regenerative Medicine*.
- 4 Therapeutic cloning is the cloning of cells or tissues for replacement of older cells and tissues and not for the cloning of human beings (Lanza et al. 1999).
- 5 SNCT is the technique by which a fertilized embryo is enucleated and then re-nucleated with a nucleus from that organism to be cloned. Enucleating the donor egg has been connected with the abortion controversy.

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