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Feminist Realizations of Assisted Reproductive Technology in Contemporary Science Fiction

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Feminist Realizations of Assisted Reproductive Technology in Contemporary Science Fiction

A thesis submitted in partial fulfillment of the requirement
for the degree of Bachelor of Arts in English from
The College of William and Mary

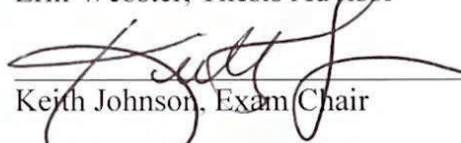
by

Amanda Mullet

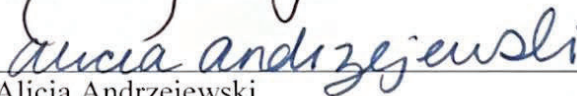
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Introduction

Puberty, pregnancy, childbirth, motherhood: all of these subjects are having a renaissance in contemporary fiction that hasn't been seen since the 60's and 70's, when second-wave feminism dominated the imaginative landscape in unprecedented ways. Novels like *Red Clocks*, *Mercy Street*, *The Power*, and *When She Woke* have garnered praise in their respective genres, and less commercially successful thematic counterparts have been adopted by publishers in copy-cat waves. Reproductive fiction is booming, in part due to the many ways reproductive rights have been thrust into the news. Literature, particularly politically-minded literature, responds to present political and social realities, and thus as reproductive rights have been restricted in the United States, so has reproductive fiction flourished. The same can be said of the field in the UK, which, although not directly influenced by the decisions of the US government, feels strongly the ripple effects of US trends in politics and literature. That being said, examining this rapidly expanding body of work requires more than a focus on pregnancy, as this common denominator is much too broad for detailed analysis. In *The Growing Season*, *The Echo Wife*, *Dreams Before the Start of Time*, and *The Mother Code*, authors focus on something that may come to define reproductive futures in a Post-Roe age: the rapid development of assisted reproductive technology (ART).

The NIH defines ART as technologies “used to aid in achieving pregnancy conception in individuals who are having difficulty doing so spontaneously” (Jain and Singh). ART includes in-vitro fertilization (IVF), “[p]reimplantation genetic diagnosis (PGD): a technique used to screen IVF embryos” (Birenbaum-Carmeli and Inhorn 185), and cell nuclear replacement (CNR) or somatic cell nuclear transfer (SCNT), the technology which allowed us to clone sheep. Some forms of ART remain theoretical, and thus are better suited to science fictional speculation than actual use. Among these currently fictional forms of ART are technologies like ectogenesis, whose use and effects are explored by all four of the novels in my study. Ectogenesis is a speculative form of ART “coined by geneticist and evolutionary biologist [J.B.S.] Haldane,” which, in its most complete form, imagines “the gestation of a human fetus entirely outside the body of a human female” (Alghrani 109); in other words, pregnancy conducted outside the human body. It has a number of potential applications such as providing a way to reproduce without a surrogate for people with high risk pregnancies, no uterus, or who would prefer not to experience pregnancy. There are two primary ways in which this technology is predicted to naturally develop. The first is “by extending the length of time human embryos can be kept alive in vitro” (Alghrani 109) while the other focuses on “advances in neonatal technology” (Alghrani 110). These are the two “sides” of ectogenesis, one which imagines fertilized embryos gestated through technology while the other imagines sustaining premature fetuses using technology. With enough advancement, either path may see its reproductive subjects carried to term with no need for a human host.

To explore how current technology relates to the future of ectogenesis, it is best to return to the beginning of these paths: the development of the incubator. The first human incubator was developed in 1880 by “French obstetrician Stéphane Tarnier, who in the 1870s sought to find a

means to warm the numerous premature infants who routinely succumbed to hypothermia on the wards of Paris's Maternité hospital" (Grünebaum 63). It was based on designs for chicken incubators, intended to provide warmth to unhatched eggs. He even called it "a couveuse, which means 'brooding hen'" (Aristarkhova 94). The earliest steps towards ectogenesis thus began by adapting poultry technology for human usage. Irina Aristarkhova points out in her book *Hospitality of the Matrix: Philosophy, Biomedicine, and Culture* that "chicken incubators as inspiration for European obstetricians and, later, American neonatologists, inherently and problematically [connect] oviparity and viviparity" (Aristarkhova 94). In her view, it becomes concerning for the state of modern healthcare development when the egg and the embryo are considered as parallel objects. They may be conceptually similar, but in actuality, Aristarkhova warns about the false information at the core of this technological leap from chicken farm to infant ward. The egg and the embryo may exist as parallel objects in thought, but they are not so similar in reality. She argues that this early inspiration of chicken incubators for infant incubators resulted in a common "metaphor of a shell or an egg" (Aristarkhova 95) in relation to the womb which was then "reproduced through technology" (Aristarkhova 95). This is problematic in Aristarkhova's eyes because it remains a prominent model for what human reproduction looks like, despite the fact that "[b]iomedical studies on fetal membranes...have continued to undermine the applicability of oviparity-based conclusions to viviparous gestation" (Aristarkhova 99). The technology of the chicken incubator being adapted for human usage led to an association between human pregnancy and poultry hatching, a way of looking at pregnancy that was shaped by the idea of eggs rather than wombs. This "egg" model ignores "the production of space in relation to the development of the fetus" (Aristarkhova 96) and the "'immediacy' of the maternal-embryonic connection" (Aristarkhova 100), neither of which are

present in oviparity, and furthers misinformation about the physical realities of pregnancy. What this shows us is that even relatively innocuous pieces of technology can have massive effects on how we think about our existence, forming in ways we may not first anticipate or understand.

It is also clear that technology has come a long way since the early days of incubation, and our modern natal incubators do far more than Tarnier's chicken/baby heaters. Viability stretches earlier and earlier with advances in incubatory technology, and some theorize that this tech may continue to improve to the point that it meets the longest we have yet to externally preserve embryos outside the human body, naturally resulting in ectogenesis. That being said, we haven't exactly been sitting around waiting for that to happen. As early as the 1980's attempts at full ectogenesis with human embryos were being conducted, although the most progressive scientific attempts at the time were halted in Italy due to "ethical concerns" (Alghrani 121). Currently, the closest we've come to achieving ectogenesis is the work of "[Mats] Brännström, who pioneered the world's first successful human uterus transplant trials in 2014," and is "undertaking direct research into the creation of a bioengineered uterus" (Alghrani 123) as of 2017. The same year, "a Philadelphia research team revealed the closest thing to an artificial womb (AW) the world had ever seen" called the bio-bag, which remains in animal testing (Romanis 751). Ectogenesis may not be a currently feasible technology, but scientists and experts seem convinced it's not far off.

Despite, or perhaps because of, its fictionality, full ectogenesis is a common subject of speculation in key science fictional texts such as *Brave New World*. It represents a pivotal shift away from considering reproduction as an embodied human reality and towards a future of technologically motivated social change. Amel Alghrani says that it because it "represents the final severing of reproduction from the human body and will eliminate the need for a human host

to gestate,” ectogenesis “will have repercussions far greater than other advances in the arena of assisted reproductive technologies” (Alghrani 109). Ectogenesis is also threatening to the foundations of important legislation, as “the right to an abortion in Anglo-American law has been conceptualised around a woman’s bodily autonomy” (Alghrani 114), which ectogenesis removes from the reproductive equation entirely. Some question the social safety of ART for women in particular. As ART “facilitate[s] the gradual disembodiment of reproduction” it also “highlights the paradox of women’s reproductive experience in patriarchal cultures in response to this as being both, and often simultaneously, empowering and disempowering” (Alghrani 260). Additionally, ectogenesis is socially threatening to traditional ideas of gender, because it and other “[a]rtificial reproductive technologies blur [the] heterosexual binary and the different roles each sex/gender plays in the reproductive process” as well as “legal parental labels entrenched in such distinctions” (Alghrani 221). Ectogenic technology, regardless of its manifestation, is radical in and of itself, giving rise to a number of new conditions and relationships in need of their own terminology and introduction to broader society.

ART as a social subject is increasingly complicated, and thus it makes sense that authors writing in increasingly uncertain reproductive presents might project those same fears onto considerations of uncertain reproductive futures. After all, ectogenesis has the potential to become a huge issue for feminists in the future, as “for women in favour of abortion rights, ectogenesis is problematic because it preserves the life of the fetus, and with that life, a woman's maternal responsibilities” (Cannold 63). Some scholars, like Zoe Tongue, also note that “[m]ainstream science fiction is...of significance in debates around reproduction through informing socio-cultural attitudes and influencing legal and policy responses to reproductive technologies, pregnancy and abortion” (Tongue 101) specifically important because of “Dobbs v.

Jackson, overturning the constitutional right to abortion established in *Roe v. Wade*” and “in the context of increasingly prominent anti-transgender lawmaking in the US and the controversy of trans rights in the United Kingdom” (Tongue 101). The subject of ART ties itself back to issues surrounding reproductive rights and bodily autonomy, alongside deeper considerations like notions of self-identity and foundational questions about what it means to be human.

Methodology

Modern science fiction has seen an increase in reproductive fiction, particularly feminist reproductive fiction, but this has not always been the case. Science fiction has been called “a traditionally masculine territory” (Booker 337), which its social and academic history can attest to. Previous scholarship on science fiction has centered the work of a few key male authors, and ignored, with the exception of figures like Atwood, Le Guin, and Butler, large swaths of science fiction by feminist authors like Judith Merril. Within the source material itself, most previous explorations of reproduction have centered male perspectives, highlighting reproduction as a broad social phenomena and the origin of male main characters, often depicted in relation to technology as a source of repression and detachment from the natural world. These works may also discuss infertility or mass extinction as major issues in future worlds, but ultimately fail to account for the individual lives of pregnant people associated with these broader trends and problems. If one considers the idea that “social science fiction has the potential to become a cultural epistemology” (Gerlach and Hamilton 164), the absence of feminist perspectives on these subjects in science fiction canon and scholarship becomes a glaring social issue as well as an intellectual one. In order to address this gap in scholarship, this paper seeks to explore four examples of contemporary feminist science fiction that engage with the subject of reproduction in order to evaluate how these works develop feminist thought, present potential futures, and

provide insights into the modern feminist project through their projection of political realities into fictional landscapes.

My primary methodological source for this paper will be feminist theory. From the feminist perspective, “the social sciences in North America have generally under-employed sf as a resource of addressing contemporary social issues,” (Gerlach and Hamilton 162), and thus it feels valuable to add that I intend to use science fictional studies as a tool of feminist research as much as I use feminist studies as the foundation of my literature research. Feminist theory often aligns itself with the goals of science fiction as a genre, as feminist thought “combines critique with creativity, politics with the imagination, and material cartographies of the present with speculative anticipations of the future” (Braidotti 43).

This paper will look at feminist fiction which deals with ART and reproduction; as gendered technology, ART demands the use of gender theory to properly understand its interactions with modern society. ART is a major topic of discussion for feminists, because “these new techniques mean rethinking our attitudes toward motherhood, pregnancy, and, most important, the relationship between an individual woman's right to exercise choice with respect to motherhood and the necessity for women to ensure that those individual choices do not disadvantage women as a social group” (Rowland 513). These are fundamental feminist issues and questions which are likely to become even more prominent as reproductive technology continues to advance in coming years. If improperly handled, “ectogenesis could contribute to women’s oppression, in particular, if it were used to undermine abortion rights, reinforce traditional views of fertility, increase fetal rights in pregnancy, and perpetuate the unequal distribution of scarce medical resources” (Murphy 66). These are problems we currently face,

but ART and ectogenesis are contributing factors that feminist scholars should look to in advance of their development, not merely in retrospect.

The Growing Season

At its core ectogenesis is about gestation outside of the human body. In popular imagination, this is usually in some kind of free standing pod, with a hard shell, lots of wires and tubes, and a baby inside; basically an infant incubator but for the entire pregnancy. That assumption is not entirely unfounded. One popular school of thought regarding the future of ectogenesis is that it may occur naturally as incubator technology improves to the point where it is capable of sustaining premature infants at earlier and earlier stages. But that invention hasn't exactly been the case so far. As of 2017, a "prototype 'biobag'" has "successfully supported lamb fetuses on the current viability threshold" (Romanis 751), a huge step towards moving from partial ectogenesis to full ectogenesis. These machines look like giant Ziploc bags full of fluid, and employ a non-rigid structure, contrary to previous imaginings of early gestational machines. This imagined rigid exterior does make some sense when one considers the history of the incubator, as being derived from the chicken egg incubator. Both the incubator-inspired ectogenic womb and the incubator itself are based on ancient ideas about the nature of pregnancy, suggesting pregnancy is more similar to hatchery, which "[devalues] the mother as a 'breeding' machine and just a 'clever incubator' – that is, as less than human" (Aristarkhova 107), leading to the false conclusion that chicken egg incubators could essentially do the same thing as the female reproductive system. This is clearly somewhat ludicrous, as demonstrated by how much development went into our modern incubators, and how high their failure rates are. This is because the womb exists somewhat separately from the basic reproductive organs of the

ovaries and uterus. The womb, as a concept, is representative of the space wherein a child is gestated inside the human body. But that space does not exist until pregnancy. Rather, the body undergoes a series of grueling changes, the growth of new cells and organs, and the reorganization of existing organs and tissues to create a gestational space. The womb is something which is created alongside the fetus, not an empty space waiting to be filled. Thus, to argue “that the feminine and the woman are more naturally related to and prepared for mothering than a man or a machine, since they possess a readily available space in the womb,” is to discount the reality that “[t]he womb does not have space except that which it makes by accommodating itself to the implanted embryo and its subsequent growth” (Aristarkhova 28). Gestational “pods” in science fiction are misrepresentations of the biological nature of pregnancy, which are brought about not because of the author’s fundamental misunderstandings about modern reproductive medical technology but, rather, because the real technology is built on the exact same misrepresentations.

Helen Sedgwick recognized a number of problems with the science fictional imagining of ectogenesis, and in *The Growing Season*, sought to imagine what feasible, popular ectogenesis might look like. The novel follows a woman named Eva as she investigates a series of suspicious accidents involving gestational technology produced by a company called FullLife. Sedgwick’s design for the ectogenic device in question addresses a number of concerns often associated with such technology. Not only did Sedgwick see that there was a physical need for the “bag” model over the pod, but she also noticed a key aesthetic and philosophical issue plaguing both systems: unnaturalness. Sedgwick looks ahead to a future where not only are artificial wombs able to carry human infants to term, but they are the dominant way of reproducing. However, only two generations into the general adoption of medical tech corporation FullLife’s gestational “pouch,”

unexplainable stillbirths begin occurring in increasing numbers. The painful stillbirth malfunction and potential genetic sterility at the heart of *The Growing Season's* ectogenic premise is not something feminist scholars are blind to now. Julien Murphy states explicitly that “[o]ne potential horror would be if IVG [in vitro gestation] damaged the fetus in ways only detectable long after birth” as “[t]his might give the illusion that techniques were safe and IVG might be used on many embryos before its dangers were discovered” (Murphy 71). This is discussed at length in *The Growing Season*, as one scientist suspects that the third generation of ectogenic subjects has become sterile, a hidden fault with the technology only revealed through time. With new medical developments, many fear the idea of being used as lab rats or early test subjects who eventually suffer these long term, unknown side effects. Sedgwick plays with this idea by using the characters in her novel to argue from various moral, scientific, and philosophical perspectives about the ethical nature of the pouch.

Murphy sees liberation as the central conflict among feminists over ectogenesis, and Sedgwick's characters operate at the forefront of that conflict. Avigail, Eva's mother, follows what Murphy terms “[t]he most extreme objection to IVG...the Elimination of Women Argument” (Murphy 75). When Avigail talks to FullLife scientist James, she chastises him for being willing to “trust [children] to a FullLife machine rather than your wife” (Sedgwick 125). James protests, pointing out that he “[doesn't] have a wife” to which Avigail responds, “[p]retty soon no one will...[n]o wives, no mothers” (Sedgwick 125). In terms of feminist protest, this line of argument may be extreme but it is not unheard of. A primary critique among feminists to the idea of ectogenesis is the elimination of women, an ideology which suggests that artificial wombs would enable patriarchal society to “do away with” women altogether. However, Avigail inhabits a strange dual positioning, wherein she is representative of feminist protest and

traditionalist values. She is both a bioessentialist and a complementarian; she sees gender as sex based and sees a perfect society rooted in traditional gender roles, where men and women are equal but fundamentally different. She is also in favor of compensation for domestic labor, making her ideology an odd combination of socialist, feminist, and conservative beliefs. Yet while her character represents a number of politically contradictory viewpoints, she isn't an unrealistic character. Her fanaticism and contradictory ideas serve the ultimate purpose of preserving female power in a society dominated by men, albeit by relegating women to specific realms of control. She essentially opposes changes that she thinks might degrade the status of women while also arguing for a specific, distinct socially equal position for women to inhabit and dominate. While there is an illogicality to the idea of distinct and equal roles and the equality of women being tied to fulfilling their reproductive potential, these contradictions fade in Avigail's mind within the general blanket of good intentions. She sees herself as the hero, and therefore she is.

One benefit of Avigail's fervent opposition to the pouch is that it gives her unique insight into FullLife's strategic development. For example, she pointedly refers to their initial prototypes as "pods," which were "white and transparent, with an array of tubes attached via valves and pumps" (Sedgwick 120) to the hard plastic shell. This is a fairly common envisioning of future medical technology; from the bacta tanks of *Star Wars* and *The Matrix's* fluid-filled capsules to Huxley's bottle babies in *Brave New World*, there is a clear imaginative throughline that suggests incubatory, womb-like technology has a hold on the science fictional consciousness. Ultimately, however, this notion of the "pod" comes from an assumption about the womb as a pre-existing space. Avigail's heated protest of FullLife allows her to recognize the unreality of this belief through sheer opposition to the pods on principle. She is able to point out every potential flaw,

and in doing so notes some key misrepresentations within their early, incubatory designs. She isn't the only one. The pouch's inventor, a woman named Freida, also realizes that these initial models are not enough to become popular with the public. Freida is able to see that pregnancy is an experience, not just a step on the way to reproduction, and thus designed the pouches accordingly. Avigail insightfully notes that early pod-like models of the pouch "would have terrified people" because "[n]o one could feel affection for something like that - it was too alien" (Sedgwick 120). Moreover, "[i]t conjured up too many fears of being trapped inside it, of being hooked up to something mechanical" and "[i]nhuman" (Sedgwick 120). Sensory deprivation tanks are perhaps the closest modern technology we have to this pod model, and many people find them incredibly uncomfortable and even panic when closed inside. Avigail and Freida both know that sterile, cold-looking technology is hardly the kind of thing someone would entrust their unborn child to. Freida in particular knows that reproduction is "never going to be about mass production in all the symmetrical sterility of a laboratory" because "[a]ny change must allow for individuals to remain an intrinsic part of their own reproduction, or it will fail" (Sedgwick 128).

Avigail, although disapproving, sees the genius in Freida's invention. She knows that "[p]eople want to carry their child, not visit it in a lab" so the pouch "must be portable" and "huggable" to bring it in line with "the natural reality of pregnancy" (Sedgwick 120). Avigail is precise in how she uses her language to communicate these points. Her charm and confidence are some of her strongest tools against FullLife. Therefore, she is able to see and analyze the tactics used by FullLife to speed up social acceptance of the pouch. It is telling that she calls the commercial, cosmetic updates to the pouch "friendly" while the plain pod is "inhuman" and "too alien" for humans to accept (Sedgwick 120). Avigail knows that "the friendly additions, soft

fabric, familiar shapes and textures” were what “made the pouch the success it had become” (Sedgwick 119-120); pregnancy is a visceral, physical experience, in both negative and positive ways. For the pouch to remove the special, intimate elements of physical pregnancy alongside with its many pains would be to render the technology not a potentially popular alternative for but rather a lesser version of physical pregnancy, which is rife with the kind of physicality that comes with changing the whole body to support new life. She seems to grudgingly admire how they thought to replace “the rigid technology swapped for smart materials that could grow, flex, respond” (Sedgwick 120). Cosmetic customization motivates demand in a consumerist society, and the lack of medical distance or sterility encourages new customers to view the pouch less as a device less like a CAT scan and more like a smart phone: available in many colors and easy to bring everywhere. FullLife also adapts to make the physical positioning of the pouch as similar to natural pregnancy as possible, thus mitigating the uncanny effect such technology might provoke in those used to natural gestation. The pouch is wearable, and can be hung either on a stand or the body. A number of characters suggest that this combined insight into the mechanics and experience of pregnancy is what brings the pouch into prominence.

Many of the characters in *The Growing Season* comment that the popularity of the pouch stems from its physicality, although not always with a critical lens like Avigail. Rosie, for example, describes the appealing appearance of her and partner Kaz’s pouch with reverence. At twenty years old, Rosie is one of the youngest characters in the novel. This makes her relationship with ART notably different from that of the other central narrators. Whereas her grandmother remembers the pouch being at the experimental forefront of medicine, Rosie has complete faith in the device’s ability to gestate her son. Rosie’s perspective on the pouch before her son Will’s birth is fixated on sensory and aesthetic joy derived from the purposefully

appealing design of the artificial womb. She compares the pouch to “a bubble in the way it refracted the light” (Sedgwick 39) and remarks how “[t]he pouch was more than a painting - it was like a beautiful living sculpture that you could touch, that you could hug” (Sedgwick 40). Her admiration of the pouch makes the eventual stillbirth scene even more gut-wrenching; it seems there are some things aesthetic appreciation cannot override.

During the explicit and somewhat gruesome description of the stillbirth of Rosie and Kaz’s son, there is a shift in the way that even these and other supportive characters view the pouch’s appearance. Holly describes it as “like a used skin” with “blood...dripping down, from the pouch, from the birth, dark viscous swirls of it that she couldn’t take her eyes from” (Sedgwick 86). Most heartbreaking is Rosie’s shifting narrative about the pouch. It is no longer “beautiful,” but rather “obscene” (Sedgwick 88). Her attachment to the idea of the pouch’s superior safety was lifelong, starting with her grandmother. Yet, she stills comes to resent the very object she earlier compared to a statue, now motionless in failure rather than statuesque in its ideal beauty. Instead of the light shining on the outer edge of the pouch, Rosie can now only see “[t]he deep sucking red of the insides of it, visible now through that awful cut down the front, wet and dripping” and “[t]he different skins, the layers that had grown with him, expanded with him” (Sedgwick 89). It says something that the non-functional pouch, ostensibly less like the human womb, is given more human, or at least living, descriptors of flesh, while the non-human, unliving, yet functional womb is ascribed the status of art. For all that aesthetics matter in getting the public to embrace daily usage of brand new, revolutionary technology, aesthetics do little without functionality.

James, one of the scientists who helps to develop new features for FullLife, is also caught up in the horror of the dysfunctional pouch while watching its pseudo-autopsy. He says that “it

wasn't an actual living creature" and therefore "shouldn't feel like having to cut open a person," but still despairs at how his life's work has come down to "[d]issecting, not creating" (Sedgwick 89). In noting how it should not feel like dissecting a living creature, James reveals a few key assumptions about the relationship between the pouch and human pregnancy. Despite being made of tissue and cells capable of producing a living being, the pouch's separation from a human body renders it unhuman. More tellingly, he doesn't think it should be seen as a living creature at all. While it is never made clear how James would feel about dissecting a used pouch that had been successful in gestating a living child, it seems unlikely that he would show the same degree of hesitancy in all dissections, given that he works on developing new features for the pouch. It is only after the pouch's failure that James sees it as upsetting to cut into. This may be mirroring his own guilt for complacency in the coverup of FullLife's negligence. It also highlights how the pedestal of technological superiority is only upheld so long as the mechanism in question is fully functional. When it fails, as humans do, the pouch is no longer given the same reverence because it has gone from something beautiful and useful to something hideous and unusable.

For Eva, Avigail's daughter and the novel's protagonist, the aesthetics of the pouch are part of the problem. In recalling her first time wearing an empty testing pouch, Eva remarks that "[s]he'd made a mistake with the colour" (Sedgwick 10) in picking her favorite, yellow, saying that "[i]nstead she should have gone for a deep black-red, like the colour of the inside, to remind herself of what it really was - to make sure she didn't slip, quietly, into feeling at ease with it" (Sedgwick 11). Eva sees through the sanitization of the birth process to the reality of what is being "fixed" by the pouch. She also believes that allowing oneself to become complacent with this new technology is dangerous, because it ultimately detaches humans from their biological

realities. Whether Eva's resistance to the pouch is motivated by her mother's beliefs or personal convictions, she isn't entirely wrong to suggest that complacency with rapidly accelerating technological development is a problem. After all, a few years ago both data collection and listening smart devices were considered unacceptable examples of technological overreach. Now they're common practice. When new technology is convenient and fixes a recurring issue, it tends to be accepted faster through necessity or desire. The pouch clearly filled a need in the society Sedgwick imagines, working to close gendered gaps in domestic labor and bring parents of all genders into the process of pregnancy on equal footing. But this remains a huge change in the fabric of society, which the rapid adoption of commercialized, commodified pouches shilled by a private corporation disguises. Eva notes that new developments for the pouch at this point in its history are less about publicly funded research of healthcare, and more about rapidly escalating opportunities to capitalize on this commercialisation and captive market. FullLife develops "different textures" and "a range of colours" (Sedgwick 10) for the pouch; she disdainfully comments that "[t]he last few years had been all about the accessories" (Sedgwick 9). When the pouch becomes aesthetically disguised and removed from a healthcare context, it begins to blend seamlessly into the social order and pushes out memories of and knowledge about natural pregnancy, which Eva and Avigail see as disastrous for women and society as a whole.

The novel concludes on a somewhat ambiguous note, essentially suggesting that the only moral path when dealing with ART is to provide the public with all the relevant safety information and let them make their own choices. *Growing Season* proposes that ART could be a powerful force for gender equality while also acknowledging the inequitable distribution of this technology globally, the dangers of corporate influences, the risks of relatively new technology

being used on an uninformed public, and the potential for ART to facilitate interpersonal and systemic abuse. It functions well as a feminist thought experiment considering how ectogenesis might have to be developed in order to reach peak popularity in the UK market, but ultimately fails to take any strong stances on ART beyond simple consumer advocacy, rendering its critique on a broad array of social issues generally underdeveloped.

The Echo Wife

Although cloning produces new human bodies, it is often considered separately from other forms of reproductive technology. Generally those who desire to reproduce do so in the name of creation, not recreation, and thus cloning occupies a somewhat marginal space in the collective imagination. Often appearing in male-dominated subgenres, cloning is typically classified separately from reproductive technology that explicitly ties itself to the female body or to social science fiction, more well known for its feminist underpinnings. Cloning is typically detached from the female body, depersonalized, desexualized, and designed for producing many copies of the same person. Nevertheless, cloning is reproduction, and thus cloning technology is assisted reproductive technology. Like gestation in external wombs, cloning is something modern scientists have already attempted, rather than an entirely speculative invention of science fiction creators. However, both technologies have only been used on animal subjects; sheep, specifically, in the case of both the ectogenic biobag and Dolly, the first cloned mammal.

Science fictional media tends to imagine human cloning through its abuses, which seem plentiful and terrifying. Clone narratives often draw on fears associated with dystopian, hyper-capitalist futures like the threats of individual replaceability, rapidly devalued human life, and the institutional misuse or exploitation of human tissue. This also raises the issue of when and to what degree one's genetic material is their own property, which has been a pillar of reproductive

healthcare debates in regards to the status of embryos. In the case of cloning, if any DNA can be used to begin the cloning process, not just embryos, the primary concern shifts from the status of embryonic cells to encompass a much wider range of cells across sex and gender, all equally valuable in their reproductive potential. Thus, with the invention of human cloning, the exploitation of unknowing progenitors becomes a more global concern in the field of reproductive rights, engaging with a specific facet of bodily autonomy: the right not to reproduce.

Sarah Gailey's *The Echo Wife* is a novel that engages with the subjects of human cloning and pre-gestational gene editing, two closely related reproductive technologies that raise their own complex ethical dilemmas. Human cloning tends to have huge interpersonal and social implications, as it throws current definitions of personhood and self-identity into flux. It also renders useless many reproductive frameworks such as the idea of bodily autonomy and the right not to reproduce. Individuals have autonomy over their own bodies, but how does that concept apply to identical clones, whose bodies are, in essence, made from their originators? One might assume that clones should be treated with the same principles of autonomy applied to identical twins and thus be seen as people like any other. *The Echo Wife* complicates matters by introducing the element of non-consensual cloning, the implications of which quickly spiral into ethical paradox. A clone entitled to independent autonomy can result from the violation of their progenitor's reproductive autonomy, in a similar condition to children born of rape or sexual assault. However, clones don't typically require the use of the progenitor's body for gestation, which, although still a violation of autonomy, changes the degree of control which individuals have over their offspring. This is where cloning and other forms of ectogenesis overlap. Natural gestation deals with "embryos in vivo – embryos conceived, housed and protected through the

female body,” while both cloning and ectogenesis use “in vitro embryos, which can be protected in their own right without violating the bodily integrity of another,” meaning that contrary to the historical bedrock of choice-based reproductive ethics, “the needs of the mother and the fetus are not mutually exclusive” because the gestational method means “a woman’s bodily autonomy is not invoked via pregnancy” (Alghrani 75). Thus cloning requires new evaluations of what constitutes biological ownership and where to draw lines between progenitorial and gestational rights, as well as the myriad of issues raised by external gestation like the use of closely related technologies such as gene editing and embryo manipulation.

It’s worth first explaining the convoluted plot of *The Echo Wife* before examining its central commentaries on these technologies and their interactions. The novel follows Evelyn Caldwell, who grew up with a physically abusive, authoritarian father, and a distant, victimized mother. After her father breaks Evelyn’s arm, she comes downstairs to find her mother standing over his dead body, preparing to bury him in the backyard. Evelyn gets sent off to boarding school while her mother remarries, neither of them speaking of the incident ever again. Following in her father’s footsteps, Evelyn becomes a scientist, specializing in human psychology, physiology, and genetics. She marries a fellow scientist named Nathan Caldwell, and begins studying human cloning. After many years together, Nathan has an affair with and impregnates another woman named Martine, who happens to be a genetically modified, housewife clone of Evelyn made using her research. After Martine kills Nathan in self-defense during an argument about Martine’s pregnancy, the two women hide his body in Martine’s back yard; from there, they work together to create a new Nathan clone in order to shield Martine’s ethics-defying existence from the scientific community and thereby preserve Evelyn’s research. Although they’re ultimately successful in creating and programming a clone of Nathan, Martine

makes the disturbing discovery that she is one of thirteen Evelyn clones the old Nathan attempted to make, all of the others having been killed and buried secretly in her back garden. Martine gives birth and goes into hiding with Evelyn's help, and together they set up house in Evelyn's childhood home, with Evelyn taking over her father's office and role as scientist/instructor for the still-maturing Martine.

As evidenced by this rather convoluted plot, the novel combines its discussion of ART with complex reflections on the cyclical nature of trauma and abuse. *The Echo Wife* asks important questions about interrelated reproductive technologies, drawing on horror tropes like body horror and human experimentation, as well as many hallmarks of crime fiction like murder, deceit, and domestic intrigue, to offer commentary on the dangers of human cloning and gene editing technology. At the same time, by placing the clone plot line alongside an in-depth dissection of trauma, Gailey uses the concept of cloning as a vehicle to examine the cyclical nature of abuse and coercion. They also use this framing to emphasize the dangers of gene editing, creating eerie parallels between the mental programming of abuse and the physical programming of gene editing.

One particularly central metaphor to the novel is that of interiority. Gailey uses the spatial metaphor of interior and exterior positioning to connect this complex picture to the novel's broader thematic interests, such as the nature of life and death as well as the complexities of abuse. A space of particular interest to the novel is the backyard. Yards are used in both *Echo Wife* and *Growing Season* to represent the illusion of domestic bliss that so often disguises abuse. The back yards of Martine and Evelyn's mother are used as personal spaces, hidden from the public behind their houses but still acting as facades of normalcy hiding rampant abuse. Notably, both women are gardeners and take pride in making their yards look nice, despite what lies

beneath. Evelyn notes that “Martine’s garden was as beautiful as [her] mother’s...well-tended and precise” (Gailey 58). There is a striking image early in the book when Evelyn finds herself “chin-deep in the pit” (Gailey 60) she’s dug, ripping up Martine’s “manicured” (Gailey 58) garden to bury the body of her ex-husband. The violence and disruption is at odds with Martine’s life, her image, her purpose, and her home. Thus, this muddy hole is equally as contrastive to its surroundings as Martine’s actions are to her programming and the violent abuse she faces is to her supposedly-idyllic family life. In *Growing Season*, the concept of the domesticated yard is used similarly. Freida recollects a pivotal moment when she realized that her invention could be used as a coercive tool by abusers, noting that even though she “controlled the pouch” and “decided who was allowed to use it,” she still left the home of an abusive husband, “afraid to step on [their] manicured grass” (Sedgwick 199). The yard’s position is key in unpacking the central commentary here, as this front yard represents the same public self as Martine and Evelyn’s mother’s garden. Where Freida fears disturbing the public perception of her invention, as represented by her hesitancy to trample the grass out front, Evelyn and Martine find themselves forced to rip up the aesthetic coverings of Martine’s domestic life to grapple with the realities of living within an abusive relationship.

Much later in the novel Gailey returns to the yard as an example of spatial metaphor, and it becomes clear that Evelyn’s childhood backyard and Martine’s garden share more similarities than Evelyn was willing to admit initially. Both Martine and Evelyn’s mother killed their violent husbands and disposed of their bodies under gardened patches of lawn, giving them an excuse for the displaced dirt and disrupted grass. When Martine calls Evelyn for help, it’s at first not clear why. However, walking into the backyard reveals a Bluebeard-esque array of clone corpses, some deformed and most violently killed, lying preserved and half-heartedly covered up

only a few feet from where the original Nathan tried to kill Martine. Evelyn describes “[h]ands and faces and soft white calves sticking up out of the soil...[t]he yard was a horror of holes” and “in the wreckage where the flowers had been, were a dozen corpses uprooted” (Gailey 197).

Unlike humans, the clones are born unnaturally and die unnaturally, to live on preserved in the soil like human flesh never could. However, *The Echo Wife* does not content itself with such an uncomplicated view of cloning. The key detail about the burial in Martine’s backyard is that it matches the exact same method of body disposal Evelyn’s mother used on her father and Evelyn used on Nathan, neither of whom were created using cloning. Thus the novel asks, what exactly is the difference between cloned and non-cloned beings, other than birth and death? These parallels suggest that the novel argues for there being little to no difference between clones and humans, as they exist in similar patterns and experience similar things, only entering and exiting the world differently.

Gailey continues this metaphor of visibility in the novel’s contrasting of the true and the deceitful, real and unreal. Evelyn feels a disconnect between her internal and external worlds, as though she is pretending or forcing herself to be something. As an abuse survivor, she fights the childhood programming that tries to influence her behavior as an adult. She notes she “loathed the parts of [herself] that mirrored her mother” which she identifies as “[t]he fear, the fluttering, the impulse to hide and apologize and placate” and describes “[trying] to root out any part of [herself] that might accept less than what [she] was capable of, and [she] dug deep” (Gailey 192). Evelyn feels she carries internal markers of her mother, whether biological or social, that reflect the “weakness” of bending to her father’s will, and thus externally she projects strength. Similarly in this passage we see the idea of visibility and digging come up again, like with the clone graves, as Evelyn sees her mothers traits as rooted underground, hidden from view, which

must be uncovered and destroyed, like Evelyn's clone corpses, or else hidden entirely from view, like Nathan's. This artificiality of pretending is something Evelyn's mother repeatedly engages in, lying to the police and consistently maintaining the illusion of normalcy in conversation with Evelyn, both pretending not to know about her father's murder. This reflects the reality of living in an abusive home, constantly presenting a false front to the public while hiding the realities of a violent home life behind closed doors. Or in Evelyn's mother's case, behind the house in the backyard. Finally, Evelyn makes a number of comparisons between herself and her mother keeping secrets and burial or hiding. Evelyn says that on the night her father died:

[Her mother] carved out a hole in the world. She and the thing she had done were all that would fit there. She climbed inside of that space in the fabric of reality, and from then on, she was alone with what she had done. (Gailey 192)

Evelyn fights being like her mother for most of the novel, but she eventually notes that she might have been just like her, saying that she saw the "comfort there, in being hidden" and in the wake of Martine leaving to live temporarily with clone-Nathan, she finds herself "wrapped up in [being alone], burrowed down into the cool quiet decay of [her] secret" (Gailey 193). She says of her mother "[o]f course she had expanded only to fit the boundaries of her container...[t]he appeal was deep and irresistible," calling it "the childhood sense of victory that came with fitting into an impossibly small space, tucking [yourself] away into dark" saying, "[t]hey'll never find me here" (Gailey 193). In these passages, Gailey furthers the spatial imagery of the womb, the home, and the grave as hollow places of invisibility by comparing keeping dark secrets to hiding in a hole underground, like a grave. Almost a play on taking something to the grave, this metaphor connects isolation and secrecy to a comfortable, hidden space like a womb, where something is taken to never return to the surface, like a body in a grave.

Gailey's interest in these ideas of interior/exterior extend to the reproductive technology at the heart of the novel. A spatial image they return to is that of the glass cloning tanks at the center of Evelyn's lab. When describing the womb as a space in her book *Hospitality of the Matrix*, Irina Aristarkhova explores what she calls "ectogenetic desire," (89) or the desire to accomplish total ectogenesis and achieve gestation outside the human body. While examining the motivations behind ectogenic research, she notes that recent work explicitly mentions "curiosity" and the desire "to observe how the fetus looks and behaves before being born" (103), something only possible now through digital imaging. In fact, a number of imagined ectogenic technologies are see through, like Evelyn's tanks. Incubators are one of her key examples of this phenomenon. Some scientists, Aristarkhova suggests, see the opacity of the womb as a challenge, and its interior workings as something to be exposed in the name of progress. In her view, many ectogenetic models are reflective of that drive to expose the supposed inner secrets of the womb and allow visual assertion of scientific dominance over a process once considered sacred, interior, and, most importantly, obscured from view. I would also note the central assumption that hidden is naturally worse than visible, which therefore devalues natural pregnancy as less capable than artificial gestation. Aristarkhova also makes a strong argument as to the voyeuristic nature of many designs for ectogenesis, an idea substantiated by examples such as the glass gestational pods in *Dreams Before the Start of Time*. This perceived intrusion and disruption of the natural order is something Sedgwick responds directly to in *The Growing Season* by making FullLife's pouches both opaque and personable. Comparatively, *The Echo Wife* neither absolves nor rejects the notion of transparency. Evelyn's clone tanks are clear, but this is never portrayed as the source of scientific abuse, only a manifestation of it. The bodies within them are visible to the scientists, on display, but the violence that is inflicted on them

happens only outside of these tanks, where Evelyn damages the clone bodies in the name of matching their human counterparts' physical injuries. They are visible from the interior, as opposed to naturally gestated children, but, as Evelyn's traumatic childhood highlights, no amount of natural barrier or protection in gestation is enough to permanently shield from violence. Thus this transparency might be seen as a violation, a sign of unnaturalness, but not the primary source of it.

To move beyond Gailey's elegant use of metaphor and visual imagery, the fictional elements of this novel also function well as sites of discourse on topics such as reproductive justice and consent. Making sense of Evelyn's unique reproductive position is difficult, given that technically her body is not involved in the reproductive process. However, since Martine is an identical clone, it would not be inaccurate to label Nathan's actions as indirect gamete theft. Forcing Evelyn to produce biological offspring, regardless of gestational location, is a direct violation of her bodily autonomy, in the same ethical positioning as forced pregnancy and nonconsensual gamete usage. It might be best compared to issues arising from IVF, which detaches gametes from the place of gestation temporarily in a way that has caused similar disputes surrounding the ownership and rights of reproductive tissues outside the body. *Evans v. Amicus*, a notable case regarding IVF, debated "who should decide the fate of an embryo when disputed by its two progenitors" (Alghrani 69) after a woman wanted to use her and her ex-partner's previously fertilized embryo against his wishes. Fundamentally this case came down to the same type of conflict as between Nathan and Evelyn: what is to be done when one partner wants biological children and one does not. Evans "was a case of 'denying maternity or forcing paternity'" (Alghrani 69), while Evelyn's is an example of forcing maternity and denying paternity. Additionally, the reproductive technology in *The Echo Wife* is not IVF but rather

cloning technology, which should not typically result in disputes over genetic parentage, as clones are derived from the DNA of a single subject. However, in cloning Evelyn and using her clone for the express purpose of producing children, Nathan simultaneously removed Evelyn's body from the gestational process and forced her into gamete donation without her consent.

Consent is key in understanding the moral and physical implications of Martine's pregnancy and its connection to Evelyn. In the Evans ruling, "[t]he courts endorsed...granting both gamete progenitors the statutory right to withdraw consent at any point prior to implantation" (Alghrani 74). Alghrani suggests that ectogenesis complicates precedents of bodily autonomy and consent under previous rulings because "most of the other cases where the courts have considered the status to be accorded to the embryo/fetus...have been in the context of embryos in vivo," while ectogenesis grapples with "the status of the embryo when a woman's bodily autonomy is not invoked via pregnancy" (Alghrani 75). This is where Evelyn's case complicates existing legal standards, because ultimately Martine's existence/pregnancy invokes both her right to not reproduce and her physical bodily autonomy. Even though her body is not involved in the pregnancy, an identical, non-consensually created copy of her body is. Under European legal precedent, this would likely be illegal for the same reasons used in Evans, because "[p]rocreative liberty encompasses the right not to reproduce as much as it does the right to reproduce" (Alghrani 94) which is why IVF clinics require legal paperwork stating that "both gamete providers are agreeing to the creation of human life" (Alghrani 86). If it is assumed that both partners must agree to genetically linked reproduction and that "both gamete progenitors can revoke consent to the use of their gametes prior to implantation" (Alghrani 74), both Martine's pregnancy and Martine herself are a violation of Evelyn's right not to reproduce. That

being said, the displacement of this pregnancy from Evelyn's body means that after implantation, regardless of genetic relation, she has no say over Martine's bodily autonomy.

Cloning acts as a perfect site for imagining these and other extreme impacts of ART, because it is far more radical than other, less drastically new imaginings of reproductive technology. The death of the nuclear family and the end of natural pregnancy at the hands of gestation pods seems somewhat far-fetched, especially with how resistant modern society is to any reproductive progression, including abortion and birth control technologies which have been around for many years. That's not the case for human cloning, which is so fundamentally antithetical to our sense of individuality and personal freedom that it shakes the core of what it means to be human. The reproductive process as depicted in *The Echo Wife* is therefore deeply unsettling, extremely different from the consistent uniformity which we'll discuss in *Dreams Before the Start of Time* or the sanitized intimacy found in *The Growing Season*. It's an inexact reproductive science, one that requires technicians to personally manipulate hormone levels and carefully monitor "dim rows of tanks" (Gailey 94) throughout development. Ironically, this is perhaps more accurate to "[t]he 'immediacy' of the maternal-embryonic connection," (Aristarkhova 100) which lacks the careful scientific distance of uniform chemical inputs to the fetal membrane; instead, because "the embryo does not float 'inside' the cavity of the womb but is part of and lodged in the maternal tissue" (Aristarkhova 100), the similarly imprecise, inconsistent, and often largely unregulatable human body acts as the conduit through which fetal intervention occurs. Much like with natural pregnancy, Evelyn mentions her lab producing many unexplainable failures. Unlike in natural pregnancy, even those "births" deemed successful are quickly euthanized, autopsied, and cremated.

In *Echo Wife*, the physical process of the gestation is also described in gruesome, gory terms by a seemingly indifferent Evelyn, who recounts the early stages of gestation by saying:

The specimen was still a loose slush, a slowly thickening slurry of dividing cells that wouldn't consolidate without direct stimulus. The tank contained a thing that looked like a jellyfish with four thick tentacles that would eventually become limbs, and dark patches where smooth muscle and neurological tissues were starting to gel. Gradually, patiently, with the right balance of neurons exposed and developing, Seyed [her assistant] gave it shape. (Gailey 133)

The complex, minute process of fertilization may be equally chemical, and fetal development may involve the same deeply physical tissue growth, but both processes are typically contained largely inside the body, hidden from view just like the carefully concealed, fleshy insides of *The Growing Season's* pouch. These glass tanks put the reproductive process on full display, stripped of its coverings and made even more disconcerting in its chaotic, non-standard development. Evelyn and her research assistant Seyed change the chemicals and “shape” what is being grown. Later on, Evelyn uses the word “slurry” again when describing how they “kept the tissue from crystallizing too rapidly, from congealing into a sloppy archipelago of useless flesh” (Gailey 100). There is something deeply uncomfortable about these descriptions not in their perhaps stomachable gore but in the way they paint human reproduction as a messy, unregulated process vulnerable to interference and error. This chaotic model of gestation is made all the more disturbing by the repeated comparison of the clones to children. At one point, Evelyn says if she let “the incubation accelerator to do its work overnight” she should arrive and “[find] a toddler-sized lump of loose tissue floating in a sea of synthetic lymph and amnio” (Gailey 82). This process also complicates the terminology surrounding ART used up to this point. Evelyn’s

clones cannot be classified as fetal or, for a large part of their development, embryonic. Therefore, it may be helpful to look elsewhere for appropriate terminology.

In “Artificial Womb Technology and the Frontiers of Human Reproduction,” Elizabeth Romanis coins the term “gestateling” (Romanis 751) to refer to ectogenic subjects, positing that words like fetus are not quite accurate to the unique gestational position of ectogenesis, both physically and socially. Although she is right to note that certain biological terms referring to embryonic and fetal development are loaded with political contextualization, it does not seem quite necessary to label all ectogenic births as “other,” especially since artificial human wombs have not yet been invented. There seems little need to call a fetus in an imagined artificial womb something other than a fetus, just because it isn’t inside a body. The biological matter remains the same. Still, the term may be useful in the context of cloning to fill a different lexical gap: gestating, pre-birth adults. The clones Evelyn produces don’t join society, instead operating in the liminal space of her lab as “tools.” She does not simply take DNA and create a new baby with it; the clones are fully grown adult humans straight out of the tank. Before they are finished developing, they may theoretically be “fetal” in that they are beings gestating pre-birth, but a gestational gap still exists between the newly finished adult clone and the original bio-matter that is difficult to label, especially given that Evelyn’s clones don’t pass through the stages of normal fetal development on their way to maturation. This brings us to the challenging question of how cloning technology interacts with the concept of personhood.

Within *The Echo Wife*, the struggle to solidify “personhood” is partially exhibited through characters’ use of language around cloning. Personhood is difficult to define where cloned bodies are concerned, and the central characters’ diverging opinions on this subject highlight how controversial it can be. With individual clones, Evelyn only ever uses the number

of each clone within her lab, like “4896-T” or “4896-V” (Gailey 94). As a more general terminology, Evelyn calls clones at times both “specimen[s]” (Gailey 68) and “subject[s]” (Gailey 94). Evelyn unabashedly admits that she doesn’t see clones as humans; when she gets angry with Martine about Nathan’s murder, she thinks, “I didn’t like the idea that Martine was asking me for advice about murder. I’d neutralized specimens before, but I’d never killed a person” (Gailey 74). By the end of the novel, Evelyn might still call the twelve clones in the garden “specimens, subjects, bodies, corpses, cadavers, failures, data points...biowaste,” (Gailey 206) but she also clearly struggles with her growing sense that they’re human. After all, they look exactly like her. Martine and all Nathan’s other “wives” force her to see the humanity in her “subjects” by attaching them to her own humanity. It shakes her beliefs to know that “to Nathan, they had been women” and that he “hadn’t thought of [her] as a different kind of thing than the specimens he buried in his backyard...[they] were all vehicles to carry his dreams” (Gailey 206). By realizing how Nathan saw her as equal to her clones, Evelyn either has to agree with a dismissal of her own humanity or acknowledge the value in the lives of cloned subjects. They exist as extensions of her self, and the value she places on her own life translates to valuing those of these specific clones.

One exception to Evelyn’s general dismissal of clone personhood is the clone of Nathan she, Martine, and Seyed create. It’s unclear what exactly makes Nathan 2.0 a real human to Evelyn, as opposed to a thing, as she initially sees Martine. She emphasizes this new belief in conversation with Seyed, saying “We’re making a man. Not a subject, not a tool — a person. We’re making a whole person” (Gailey 129). The only major difference between Martine and the new Nathan is that Nathan created Martine, while Evelyn created the new Nathan. This might be a simple explanation as to why the two clones are different in Evelyn’s mind. She has a high

opinion of her own work and often puts down Nathan's experiments as lazy or sloppy. But given that she also sees her previous clones as disposal "things," the more likely explanation is that Evelyn truly sees clones as items designed to do a task and then disappear. Nathan 2.0 is supposed to keep living outside the lab pretending to not be a clone, making him a person in Evelyn's eyes. His purpose is "person." Martine was also intended to live in the real world, only her purpose was "wife/mother." This seems to suggest that Evelyn's idea of personhood is based on a deeply subjective set of criteria which allow Evelyn to validate her work and justify her actions within a highly qualified moral framework. It also shows Evelyn's disdain for and lingering anger at the idea of domestic motherhood, rooted in her rejection of traditional gender roles and her mother's inaction in the face of their shared experiences of abuse.

The lingering impacts of abuse are a major theme of the novel, demonstrated through a number of characters but no one perhaps more so than Nathan. Despite being dead for a large portion of the novel, Nathan is a constant presence in Evelyn and Martine's lives. He acts as a technologically empowered mirror of Evelyn's father. Just like Evelyn's father, Nathan was a man who wanted to change his wife through domination to fit his desires, yet was never content with her obedience, and is eventually killed in self defense by his victimized partner. The other creepy similarity between Nathan and Evelyn's father is that they both "created" Evelyn, or in Nathan's case, Evelyn clones. Thus while acting as a partner and father to her child, he is also acting as Martine's pseudo-parent in the act of creating her and choosing what to teach or not teach her during early development. As Evelyn notes, Martine is technically only two and half years old. The imagined technology responsible for Martine complicates not only the language of personhood, but also that of family. Evelyn's connection with Martine is nigh inscrutable. Martine is a two-and-a-half year old product of Evelyn's DNA with influences from her ex-

husband, who also lives with Evelyn and depends entirely on her for care. In that sense, she's like Evelyn's daughter. But Martine is a clone with much of the same intellect and determination as Evelyn, just pacified, maternal, and willing to have Nathan's children. In that respect, she's Evelyn, if Evelyn had surrendered to Nathan's controlling desire for her to stay home and find enjoyment in domesticity. Or perhaps Evelyn's twin or herself in an alternate reality. This is the simplest archetype for their relationship to fit into. At first it even seems like Evelyn really does see Martine as a version of herself, albeit more like her mother. She makes consistent remarks about how much Martine reminds her of her mother, in her speech patterns, her marriage, her mannerisms, and her hobbies. However, the key factors in Martine that Evelyn keeps identifying as "like" her mother is her programming to prioritize domestic tasks, diffuse tension at all costs, and never disobey direct orders. Martine basically acts like Evelyn might if she hadn't been taught by her father to never compromise, if she had been completely broken and subjugated by him; in other words, she acts like Evelyn's mother. Thus, it becomes difficult to see Martine as "like" Evelyn, when Evelyn's entire construction of self and personality might be defined as "unlike" her mother, in that she rejects all of these behaviors as forms of weakness.

Beyond a rejection of her mother's behaviors, Evelyn also sees herself as having inherited certain features from her father that are incompatible with Martine and her mother's passivity, particularly his anger. She repeatedly describes feeling "unadulterated rage" (Gailey 77), being "filled with a strange, roiling fury" that felt "dark and cruel and familiar" (Gailey 115), reflecting her father's abusive and demanding temper. Evelyn's mother is defined dialectically to the behavior of her father, thus Martine becomes defined dialectically to Evelyn. Evelyn sees herself as being made like her father, by nature or nurture, whereas Evelyn's mother, who Martine resembles, was forced to fit around her father. There is also something particularly

insightful about the idea that Martine is like Evelyn's mother because not only does this highlight how both women's violent husbands forced them to act in certain ways, but also that Martine lacks Evelyn's father's influence socially the same way Evelyn's mother lacks his influence genetically. Vitally, neither are like Evelyn: tied to him in both biology and conditioning. That is perhaps tempered by the fact that Martine is socially conditioned through biological methods by a man similar to Evelyn's father. Nathan's conditioning was genetic rather than behavioral, but he still forced his wife into the same behavioral patterns that Evelyn's father did her mother.

Given this complicated web of influence, it's debatable where Evelyn's sense of responsibility towards Martine comes from. She seems generally unconcerned with the broader implications of her invention, but the same cannot be said of Martine and her pregnancy. She mentions that she sees Martine as the direct result of her failure in her marriage. She also clearly sees Martine as a reflection of younger self and her mother, constrained by the trappings of her acquiescent programming just like Evelyn and her mother under her father's abuse. Martine serves as a unique site for Evelyn's feelings towards her invention, because she is hyper individual and directly related to Evelyn's own life. With the other clones, disconnected from Evelyn's personal life and different looking, she feels no such responsibility. That's what allows her to euthanize, autopsy, and cremate all the clones her lab produces. Similar distasteful autopsies occur in both *Growing Season* and *Mother Code*, specifically on stillborn infants. However, in those cases the scientists involved are motivated by a life threatening concern about the rest of the public, and although they are technically responsible in some ways for the failure of their technology which resulted in these deaths, they can't be said to have "killed" them in the same way that Evelyn kills her subjects. Her clones are born to be killed in her lab, whereas the

researchers in *Growing Season* and *Mother Code* desperately want their technology to produce living subjects. This distinction comes down to the point of their work; the others are driven by reproductive demand, where Evelyn's seems to mostly be for the sake of invention, and occasional exploitation by shady contractors. Regardless of how Evelyn locates Martine in relation to herself, she clearly feels latent guilt and anxiety about her safety rooted in the suffering she and her mother experienced when she was young. She feels responsible for Nathan, who has done to Martine what Evelyn's father did to her mother, to the point that Martine's actions directly mirror those of Evelyn's mother. She bent to her husband's will until a breaking point, caused by Evelyn, when she was forced to kill her husband to protect herself and her child, and then bury him in her beloved back garden with Evelyn acting as an accomplice. Therefore, it seems that Evelyn's sense of responsibility is explicitly personal and not ideological. Even though Evelyn makes progress towards treating clones as people, she does so not out of a concern for the wellbeing of her creations, but because she can manifest a selfish interest in doing so.

Many scholars have argued that ectogenesis offers a unique chance to form new modes of family formation, potentially altering Western family structure permanently. Conservatives view this possibility with horror, while many progressives see an opportunity for positive change. *The Echo Wife* is not interested in approaching the effects of reproductive technology with such binary thinking. The central relationship between Martine and Evelyn defies easy definition along typical family lines; cloning complicates their connection beyond any current phraseology or structure we have to explain familial relation. Particularly, cloning deeply fractures out current understandings of generational dynamics and parenthood. All parenting relationships are influenced by the past generation's. Rather than the ripple effect of intergenerational change

portrayed in *Dreams Before the Start of Time* or the severed generational links of *The Mother Code*, *The Echo Wife* shows cyclical patterns of posterity, perpetuated by abuse and heightened using unregulated technology. In Martine's case, the ART responsible for her creation is a direct cause of her trauma and relational confusion; relationships between the other characters, while often dysfunctional and destructive, can be categorized into traditional labels of parent, partner, child, or friend. Martine is all of those at once to a single person: Evelyn. There is no role Martine fits into, particularly because her existence is unprecedented and non-consensual. No child can consent to birth, but there is at least an assumption that every birth will result in a new creation – even genetically identical twins are both new in that they are identical new combinations of their parents' genes. If we think of clones as copies of an original, a clone essentially is the same person as someone else; there is a level of predestination involved in this specific form of reproduction that falls beyond our assumptions of consent to existence.

Dreams Before the Start of Time

The text of *Dreams Before the Start of Time* covers a wide time period, from the years 2034 to 2120. It also touches on a number of reproductive technologies and the personal conflicts they can create within individuals and families. The novel follows two pregnant women, best friends Millie Dack and Toni Munroe, across four generations of their families. With each subsequent generation, reproductive technology develops to the point that Millie and Toni's pregnancies exist in a separate reality to those of their grandchildren. This rapid development of quickly shifting technology means that no one form of ART is "the" focus of the novel; rather it centers the slight changes to reproductive choices across generations that cause major familial shockwaves. *Dreams Before the Start of Time* is primarily concerned with what reproductive

choices do to a family over time, not just what happens to the people using ART, but to those it creates, and those they create. It also subtly shows that the people with access to this technology fit into some very specific demographics, particularly in terms of wealth and class.

Although there is little explicit reflection on their privilege, Millie and Toni both have the money they need for their pregnancies to continue safely; although Toni considers aborting her pregnancy, it is because she had been intending to use donor sperm to carry a pregnancy independent of any partner, and she questions the suitability of the man who contributed to her accidental pregnancy. Millie's parents are wealthy, and have bought her an apartment to live in alongside her sister. Toni's family owns a house in the suburbs, and she makes good money at her job. Neither struggles with housing or any kind of financial hardship. In fact Toni finds out she's pregnant because of a medical scanning device implanted into her top-of-the-line shower. Therefore, it is hardly shocking to watch as one generation later Toni's son Marco uses an "artificial womb, thousands of miles away in a private clinic in Mumbai – highly rated for solo conceptions for men" (Charnock 102), or to see Millie's son Rudy and his wife Simone look towards London's most cutting edge reproductive technology to have their daughter using only Rudy's genes. There is hardly a clearer metaphor for generational wealth than the progressive amounts of money each generation invests in creating the next.

In *Posthuman Feminism*, Rosi Braidotti explains how class and wealth complicate reproductive futures in the following passage:

What is a critical feminist to make of a hegemonic model of equality that is ethnically indexed and biased in favour of white, professional heterosexual women? Can such a model be equated with emancipation? Or is it just a reconfiguration of a racialized and sexualized class division of labour that upholds capitalist inequalities and reasserts

traditional gender roles? The neoliberal feminist rides this hyper-individualistic wave and is willing to accept that the price for her individual freedom is a new system of class-stratified and racialized labour relations that put other women in charge of domestic and caring tasks. (Braidotti 53)

Essentially, Braidotti notes that if we aren't careful, any progress made towards gender equality using ART will result in more imbalance along axes other than gender, ultimately rendering that progress meaningless. For women like Toni and Millie to live and work comfortably, someone or something else is being exploited. In modern society, that is usually working class women, women in the developing world, women of color, and other marginalized populations. In *Dreams Before the Start of Time*, those women are invisible. The ART in *Dreams Before the Start of Time* "upholds capitalist inequalities," just as Braidotti fears, because it is largely used by wealthy white characters living in London. Those few characters who aren't as well off, like for example ex-bartender turned maid Freya, face strict punishments for things like drinking while pregnant, and must mediate their gender, class, and reproductive identities simultaneously as reproduction has become even more capitalized in the future *Dreams Before the Start of Time* imagines. Freya ends up having to serve something akin to jail time for the crime of drinking while pregnant, all the while facing reeducation to teach her the error of her ways. Her contemporaries within the Dack and Munroe families deal with no such complications.

While *The Echo Wife* closely followed a single primary character, *Dreams* instead presents a more longitudinal narrative style, mirroring the way reproductive technology affects multiple generations at once. One primary benefit of this structure is that it encompasses a much wider variety of ART's effects than shorter term novels; we have no idea what Evelyn's research will be doing to the world in twenty years because it isn't important to that narrative's focus. *The*

Growing Season is somewhat more similar, also looking at long term side effects of technology, however *Dreams Before the Start of Time* focuses on the long term effects of simultaneously developing technologies rather than the singular technology of the pouch. There's nothing wrong with *The Growing Season's* more specific focus, however *Dreams* offers a more realistic depiction of the future of ART; seldom does medical technology develop without similar improvements in surrounding/related technologies. AI, prosthetics and exoskeletons, imaging technology, database construction, robotics, and gene editing all progress throughout the book. The longitudinal side effects *Dreams* is interested in aren't necessarily those of physical health, like *Growing Season*, but rather that of family formation and other social side effects. Non-reproductive technology already has the ability to change social structures and family dynamics, from cell phones and video calls to improved flight tech and electric vehicles. That being said, reproductive technology is directly involved in the process of family formation, rather than merely mediating human interactions.

To explore this idea further, let's examine a particular case within *Dreams* of ART impacting familial relationships: that of Toni's granddaughter Amelie. Towards the end of the novel, we meet the adult version Amelie. Gene editing during gestation has made her sons Seb and Theo the rather controversial talk of the family. Amelie and her husband Nathen's two children were each gestated in a different way; the "[f]irst time around [for Seb], [Amelie] wanted a natural pregnancy, which Nathen supported" (Charnock 179). Then, as Seb grew up, he began to lag behind in his speech production, and therefore they became "anxious he might have developmental problems, so they decided on remote gestation [ectogenesis] for the second baby" (Charnock 179-180), Theo. It is worth noting that the primary motivator for their decision to remotely gestate Theo is a fear of potential learning disabilities. Amelie explicitly states this,

saying that “the clinicians preyed on their guilty feelings” so that they didn’t “risk...having two children with learning difficulties” (Charnock 180). Amelie shares that they “paid for the standard germ line modifications to delete the mutation load, and allowed the clinic to screen for the most vital embryo” before “going too far” and “[paying] for aesthetic tweaks” (180) as an add-on option. The aesthetic tweaks Amelie mentions leave Theo with “delicate Pre-Raphaelite looks” and “tumbling curls” (Charnock 201) that stand out against the rest of his family. Amelie regrets this aesthetic mediation, claiming they had “allowed themselves to be bamboozled” by the clinicians (Charnock 180). Notably she does not claim to regret seeking to select certain embryos to avoid having a second child with a learning disability, although it soon proves that Seb’s development was delayed, not impaired. At no point in the process are Seb and Theo’s thoughts on the matter considered, although we will soon find their perspective on the situation differs from their mother’s. In this short section, the novel reveals the potential for ART to insidiously promote eugenic rhetoric in the name of choice. As Robyn Rowland warned, “commercializing processes of reproduction” has “[underscored] a perception of a child as a product; a product that will eventually be ‘custom’ designed” (526). Through Theo and Seb’s plotlines *Dreams* suggests that hyper-capitalist implementations of ART are potentially dangerous as unregulated mechanisms of choice and customization, promoting eugenical thought and enabling biased parental selection during reproduction.

Interestingly, the characters of the novel remain unbothered by the autonomy-based ethical ramifications of this embryo selection process, preferring instead to critique its more surface level results. Toni, the boys’ great-grandmother, generally prefers remote gestation but draws the line at aesthetic gene editing. She says “Amelie was wrong to have one child naturally and one child by clinic gestation” because it was “unfair,” not for Theo, who is forcibly othered

from his family, but for Seb (Charnock 201). Toni suggests that Amelie's "decision to carry Seb was a clear case of misplaced sentimentality" (Charnock 201). Despite believing that ectogenic pregnancy is superior, she still disagrees with aesthetic gene editing, saying Nathen and Amelie "went overboard" when they decided to "mess with his [Theo's] appearance" because now he looks "as though a neighbour's child absentmindedly wandered into their home" (Charnock 201). Her concern is not for the boys as alienated siblings or the dangerous power granted to the parents, or even, perhaps, to the aesthetic alteration of an embryo, but rather the process of "messing" with appearance to create distinct differences in the family's visual symmetry. Otherwise, she clearly sees Theo as the advantaged sibling with his intellectual modifications, offering no critique of the implementation of this technology whatsoever. Toni's easy acceptance of Theo's genetic improvements points toward the ease with which this technology lends itself to eugenical implications, something disability activists have been raising awareness about for decades as new embryo screening technology has developed. It is hardly a stretch to imagine the worst applications of technology designed to produce an "ideal" outcome.

Like Toni, Nathen, Amelie's husband and the boys' father, also prefers the remote gestation, even saying that "[i]f he and Amelie were to have a third child, he'd insist on clinic gestation," not because it's safer or easier, but because "[h]e didn't like seeing [Amelie] pregnant" because it "turned his stomach" and made "people [assume] they'd hit hard times" (Charnock 182). So far the reasoning behind clinic gestation for this couple has been eugenical fears of learning disabilities and a deep seated, at times classist, disgust directed towards the pregnant body as both physically unappealing and indicative of poverty. This seems far from the utopia some feminists imagined remote gestation might provide for those unable to reproduce naturally. When it comes to his sons, Nathen remarks that he has to "[keep] his expectations in

check when it comes to Seb,” clearly expecting more of Theo, as though his modifications were an investment into a project he expects to see pay off. Strangely, he’s more admiring of Seb, noting his “tenacity” and “real focus,” although he also “can’t imagine the boys will stay close as they get older” (Charnock 182), for reasons that aren’t entirely obvious. It may be that Nathen predicts conflict between the two boys as they grow up over their respective advantages or disadvantages, as though the method of their gestation has pre-determined the course of their relationship just as Nathen sees Theo’s modifications as pre-determining his life. This suggests that in addition to facing the psychological burden of alienation from his family due to circumstances outside of his choice, Theo will also be weighed down by the high expectations of his family. Conversely, Seb faces feeling like the inferior son through predetermined biological constraints, likely cultivating discord between him and his brother, all because his parents couldn’t stand the thought of having children with learning disabilities.

Where Toni and Nathen clearly favor Theo, Amelie and Theo believe the opposite, seeing Seb as the more admirable son. Amelie is in a difficult position. She has “suffered a recurring nightmare” about “swimming in the sea with Theo as a baby” (Charnock 180) and “deliberately [letting] go” (Charnock 181). She also keeps having intrusive thoughts about having “came away from the gestation unit with someone else’s baby” (Charnock 180). She clearly carries a deep regret about and unprocessed guilt over her decisions in her pregnancy, making her distant and short tempered with her family. Amelie, unlike Nathen, makes it clear she always had a preference for natural gestation, and that “[s]he had assumed she’d do the same for her second pregnancy” (Charnock 179-180). Amelie believes that “[e]veryone in the family keeps quiet, but they’re all thinking the same thing...Theo doesn’t fit in” because “[h]e’s taller, slimmer, blonder” and may end up being “much, much smarter” (Charnock 177) than the rest of

his family. These are her own insecurities projected onto her sons, because the rest of her family, at least those we hear from, seem focused on how Theo is somehow “better” than Seb, not simply gossiping about her mistakes in choosing clinic gestation. Amelie was influenced by two primary factors to go against her wishes for Theo’s pregnancy, the fear of Seb and Theo having learning disabilities and the judgment cast upon her by members of the public for opting for natural pregnancy despite having the money for remote gestation. This remote gestation has left her feeling alienated from her second son, which hasn’t gone unnoticed by Theo. He remarks that “he’s expected at all times to be perfect” and if “[h]e does the slightest thing wrong...his mum goes cantonic” (Charnock 178). It isn’t entirely clear whether Theo knows he’s different from his brother, or if he knows why, but he is desperate to mimic Seb, sure that his problems can be solved if he can “act like his older brother” (Charnock 174). He even remarks that “[h]e needs to observe his brother and learn” so he can figure out how far he can go without crossing “an invisible threshold – the line he must cross to provoke a parental reaction” (Charnock 174). This suggests that Seb has an emotional intelligence that rivals Theo’s academic intelligence, or that he at least has a different relationship with or set of behaviors surrounding their parents than Theo does.

The kind of gene editing used on Theo is different from that shown in *Echo Wife*. Although it is mentioned that during their gestation Seyed “shapes” the clones, it’s unclear whether that shaping is physically external or internal. Given that that passage refers to a section about the internal structure of the clone form, it may be that the shaping in question is simply Seyed pushing different chemicals to cause the correct growth of the clone. Whether or not this process translates into the ability to modify surface level physicality is unclear. After all, cloning is about replication, not creation from scratch. However, Nathan Caldwell clearly struggled to

create the physical form he intended with his clones of Evelyn, suggesting that the control, if there is any, is not exact, and that it is not necessarily fine tuned while editing aesthetic features. That is not true of *Dreams*. Theo's appearance is very specifically described as similar to Pre-Raphaelite art. Amelie is shown in an earlier passage touring art museums in London as a child and being fascinated by paintings of the Madonna and child, suggesting that this may have been very specific and a matter of Amelie's personal preference. Despite this, she remains alienated from her own son because of the exact modifications she requested. The similarity between Theo and the paintings in question immediately raises further concerns surrounding the eugenic potential of this technology. Where would the line be drawn? Could parents select traits to make their future children rocket scientists or athletes, or only to screen for heritable diseases? What counts as diseased or disordered, and who decides? This technology is not morally neutral, nor are the aesthetic tweaks made by Amelie to self-select, as the novel pointedly reminds us, a blond-haired, blue-eyed son.

Another concern about genetic modification is not the harm it might do directly to a child, but rather the friction it might cause between them and non-modified individuals, particularly, in the early childhood, with their parents. Attachment is a complicated subject – What might ART mean for childhood development, or for the relationship between generations? What is someone who parents a child called if their parental relationship is mediated/complicated through ART? People define themselves often through the circumstances of their birth, it can be distressing to not know this information and can cause crises when new/different information is revealed. In recent years, “[t]here has been a widening of access to information about one’s genetic origins...which asserts that knowledge of genetic origins is fundamental” (Alghrani 203). As a source of personal identity, not knowing this information can cause social turmoil. Also, the

idea of parenthood as an identity and generational connection exists not separately from but in relation to gender roles. When many people define their personal understandings of their own gender through reproductive organs, secondary sex characteristics, and gestational capacity, any technology that modifies said features not only affects some biological processes, but also radically destabilizes pillars of individual identity. Therefore, additional friction might be caused by the radical potential for ART to change constructions of gendered parenthood and gender identity, something already at the front of public discourse in the modern day. In addition to anxieties about parenthood as a gendered institution, ART also brings up anxieties about women's roles more broadly. In both *Dreams* and *Growing Season* it is suggested that ART might be used to shame the choice of biological pregnancy, specifically by labeling women in particular as faulty carriers. This is something feminists like Aristarkhova have offered concerns about in the past. There is very little that women can do that isn't a source of criticism, whether that's having children, not having children, having or not having certain reproductive organs, be it electively or from birth, terminating pregnancies or choosing adoption; there isn't a state of being in which women's bodies aren't considered up for public discussion, judgment, and commentary. Therefore, ART might provide another avenue, as demonstrated by Amelie's concerns about being publicly shamed again for her pregnancy, for women to be critiqued.

Ultimately, however, what this novel shows in spite of its warnings is that ART allows for more ways of being and living. Not only does it allow alternative reproductive methods for already existing forms of partnership, but ART in *Dreams* also enables non-partnered reproduction without additional progenitors. *Dreams*, like *Growing Season*, touches on the implications of ART for single parents, but fails to do so in any nuanced way beyond the assumption that ART might be helpful for those unwilling or unable to partner. What it does do

well is highlight how class and wealth can hugely impact how someone's reproductive future plays out, by subtly pairing examples of Toni and Millie's families with others around them. What Dreams does best is highlight that while ART can allow for more choices, it doesn't promise those choices will be accessible for everyone.

The Mother Code

Carole Stivers' *The Mother Code* starts with the end of the world. When the US military releases a deadly toxin in Kandahar, they expect the disease to die within the bodies of its victims. It doesn't. With only a few years until total human extinction, the government launches a number of desperate attempts aimed at preventing this disaster. All but one eventually fail, leaving only the most outlandish of all prospects, the Mothers. The Mothers are a series of ectogenic robots, designed to gestate, deliver, nurse, and raise genetically modified, immune babies for a new, post-apocalyptic human race. The scientist in charge of programming these robots, Rose McBride, disobeys her orders and makes her own plans for their programming. She deems connection to biological mothers vital for the survival of human culture, and thus programs each robot with specific knowledge and personality features in line with each embryo's genetic donors. The novel follows the next generation of children and their Mothers as they navigate their new, empty world, alongside a parallel narrative following the people who created them working against the clock to save the human race.

What is most interesting about this novel are its unanswered questions; it implies far more than it explores. At the heart of these questions are the Mothers. First, what goes into them, what doesn't, and who gets to decide? At what point in that construction are these robots gendered, and how? Second, their creation as property of the US military, representing the first public sector example of ART in our novels. What are the implications of the US military

interfering with reproductive matters, using the genetic material of unconsenting adults to take control over the future of the human race? This plot line may be seen as representative of fears surrounding reproductive control, and therefore may prove insightful when analyzing the current reproductive landscape of the United States. And finally, what is to be made of the conflict between the Mothers and the few surviving humans, specifically men, towards the end of the novel? Does ART have a claim over its own products, and how does that claim compare with that of the progenitors? Whose property are children whose creation is mediated by ART, and if we render ourselves completely replaceable, at what point do we erase ourselves from our own reproduction? This final conflict acts as a useful metaphor for and case study of conflicts surrounding real-world pregnancies heightened by ART and for imagined future conflicts arising from increasingly capable, AI empowered forms of ART like the Mothers.

The Mothers are a kind of ectogenic technology we haven't seen before, utilizing ectogenic technology with a different goal in mind than simple gestation. Simpson and Rholes suggest a parallel between true ectogenesis and automation, pointing out that ectogenic technology "has the capacity to entirely replace a human function...[which] makes it, in effect, a move into the realm of automation" because "it works by replicating and replacing a biological process, rather than attempting a rescue" (753). This is a helpful description of how ectogenic technology differs from incubator technology, but it isn't entirely accurate to the ectogenic tech we've looked at so far. Irina Aristarkhova argues for the importance of ectogenic self-reliance in "Mother-Machine and the Hospitality of Nursing" when she says "unless the machine can nurse, or we acknowledge that it will never nurse, ectogenesis will remain a misleading research project" (118). Simpson and Rholes' definition is only applicable to technology which truly functions at the automatic level, like the Mothers. The Mothers aren't incubators or even just

external wombs; they are also built to be nurses. They are capable of the kind of nursing Aristarkhova describes when she writes:

If a machine cannot deal with organic waste, wipe mucus from an infant's nose without damaging already-bleeding air passages, swaddle, turn, observe changes in skin color, and so forth, the supply of regulated heat, nutrients, and oxygen will not be enough to sustain this new life. The mother-machine will need so many "empirical" nurse (wet nurses, animals for providing milk and tissue for various surgeries, immediate family members or institutional substitutes, just to name a few) that calling it an "artificial womb," a matrix-incubator, will remain an example of ectogenetic desire that is indeed divorced from the real conditions that make ectogenesis possible. (Aristarkhova 118-119)

What Aristarkhova realizes is that "[t]he neonatal nurse has become an indispensable part of incubation" (115), and would be key to most forms of ectogenesis, to the point that removing nurses as physical resources during proposed artificial gestation would be disastrous, if not deadly. If ectogenic technology, like the pouches in *Growing Season* or the pods in *Dreams*, were left alone with no human mediation, they would not sustain life. We can see this realization play out in *Echo Wife*, when Seyed and Evelyn had to take turns pushing specific chemicals and physically interacting with the machines that grew their clones. If they left the machine on its own, it couldn't create or "birth" the clones, and certainly couldn't raise them as infants. Similarly, Aristarkhova notes that without human care, ectogenic technology, both in-development and currently unrealized, would ultimately fail. The Mothers are designed to raise children in a world without people; therefore, they cannot rely on the intervention of human nurses or caretakers. They fill this space themselves, making them the only example of Aristarkhova's "true" ectogenesis within these four works through their unique construction.

This union of nurse, mother, and womb separates the Mothers from other examples of ART because they ultimately fulfill many purposes through one invention. In *The Growing Season* and *Dreams*, ART was a tool used by humans to create new children for couples. In *The Mother Code*, the Mothers are both the technology and the receiving parents. This opposes a theme Aristarkhova critiques, wherein “feminist literature, just as bio-medical literature, positions reproductive technology as a separate object, as something that stands external to women and their experiences” (104) marking them as “essentially distinct” (104) as opposed to interconnected. This distinction between technology and man, the “evolving oppositional anxiety of a ‘human’ mother, on the one hand, and a machine incapable of love and caring, on the other” wherein “the machine aims to replace the [m]other by creating a fissure in the child-mother relationship” uses “the same rhetoric that was mobilized during the Industrial Revolution... ‘cold’ machines as substitutes for human labor” (Aristarkhova 105) and draws on conservative fears of change and modernization. Rather than creating this distinction between mothers and surrogates, or mothers and the technology interacting with their children or pregnancies, the Mothers are problematic as different kinds of interfering technology, aligning the goals of technologization, motherhood, and humanity against the interests of the US government, specifically its male members. Thus, in *The Mother Code*, we can see the objectification of the Mothers as metaphor for the objectification of women as mothers, creating conflict between women as moderators between men and their access to reproductive capability.

The constructed nature of the Mothers allows us to work backwards from the final product, examining what exactly goes into creating a total replacement for mothers, as opposed to a replacement for gestation. The first and most primary question raised by the construction of these robots is this: why mothers? To begin with, it seems strange to gender robots at all. The so-

called Mothers are adapted military drone technology equipped with incubators and hands for the purpose of birthing children. What about these beings earns them the title of mother, or a gender to begin with? Along gender essentialist lines, robots themselves are not capable of reproduction nor do they have sex characteristics, rendering them genderless objects. Rosi Braidotti argues in “Mothers, Monsters, and Machines” that “[w]oman as a sign of difference is monstrous” (65), and that “‘she’ is forever associated to unholy, disorderly, subhuman, and unsightly phenomena” (64). Therefore, there is no need for the mothers to be sexed in order to be gendered, so long as they remain “an enemy of mankind, an outsider in her civilization, an ‘other’” (Braidotti 64). Thinking along the lines of Braidotti’s definition, it becomes difficult to tell if the robots are gendered feminine and thus outsiders, or, perhaps more interestingly, outsiders and thus gendered feminine. In any case, this process of gendering the inanimate demonstrates how gender functions as a loose classification system, not one which follows strict rules based on sex. When socially defining gender, these robots might also be seen as “feminine” because of their association with gestation. It is unclear whether they are considered to be gestational, thus mothers, and therefore feminine, or gestational, thus feminine, and therefore mothers. It is also possible that the gendered nature of gestational technology is partially responsible for the gendering of the mothers, as “ARTs themselves are gendered technologies” (Brienbaum-Carmelo and Inhorn 180). Regardless, this speaks to how we restrict the identity of pregnant people to the label of mother, both as a gendered and social category from which other genders and other social identities are excluded. To return to an Irina Aristarkhova quote, “[e]ctogenesis forces us to decide what we consider the mother to be. There is nothing more revealing about (our understanding of) a phenomenon or a thing than its reproduction in a narrative or an artifact” (87). The Mothers prove that the primary defining feature of motherhood, at least as

demonstrated through this novel, is gestational ability. Additionally, the naming of the Mothers demonstrates that in this recreation of motherhood, mothering is thus defined as an identity. One is a mother, not functioning as a mother or performing motherhood. This is not the case in reality, nor is it the foundation of the model of motherhood in every community. These robots show us a conservative idea of what constitutes motherhood, rooted in biological connection and gestation. However, this is also complicated by the naturally untraditional use of robotic technology for gestation, which renders the Mothers simultaneously conservative and progressive in their realizations of motherhood. Rose, as their inventor, straddles the line between essentialist ideology founded on the assumption of an unassailable connection between biological mother and child as well as a progressive, constructionist assumption about motherhood and caretaking rooted in the idea that replacement mothers can be constructed to begin with.

Despite maintaining a union of genetic, gestational, and social motherhood, the Mothers are constructed beings, and not the source of the genetic material of their children. More progressive understandings of social parenthood understand that genetic, gestational, and social motherhood are all separate, despite the way motherhood is often depicted as a union of all three. In creating the Mothers to maintain a union of these three forms of motherhood, Rose establishes that she sees an individual holding genetic, gestational, and social motherhood to be vital for the survival of human society, as is her primary goal. This is not necessarily accurate to real life, nor does it preclude a functioning, healthy society. Kathleen Barlow and Bambi Chapin define the practice of mothering as “a project undertaken indifferent ways and places by different people” consisting of a series of “activities” which “have long been shared, flexible, and improvisational” and are “often dispersed among female kin and others” (326). However, Barlow and Chapin also

acknowledge that “each caretaker acts out her own version of cultural values, global or local, acquired through personal experience...resulting in culturally distinct and personally unique individuals” (328). The activities of mothering are “characterized by responsibility for promoting children's well-being and development through nurture and physical care” and “[a]lthough [mothering] often appears ‘natural’ and ‘practical’ to participants and observers, it is richly produced” (333). As Anne Donchin notes in “The Future of Mothering: Reproductive Technology and Feminist Theory, “[i]t is not clear why the bare fact that something is natural should give it any moral weight” (Donchin 126). Nothing makes “natural” mothers, those who claim simultaneously genetic, gestational, and social motherhood, more or less moral and valuable than “unnatural” mothers. Thus the Mothers are simultaneously no better than human mothers who do not possess genetic or gestational claims over their children, and are no worse than human mothers for the constructedness of their beings. It becomes difficult to judge whether these robots are representative of a progressive, dystopian annihilation of natural motherhood or an essentialist preservation of “natural” motherhood through the Mothers as gendered, single-caretakers.

Naturalness is certainly a key subject when it comes to discussing the Mothers, regardless of their positioning in relation to it. Rose is attempting to mimic as much as possible the “natural” process of mothering so that the new generation of children are as similar as possible to their predecessors. She seeks to preserve the culture of the past by forcing it on to the people of the future. Rose explicitly wonders “without a heritage, who are you” and decides that each child “would need that sense of security that came from knowing who [they were]” (Stivers 79). While her motivations may be to help the next generation, her primary effect on their futures is the preservation of the past. In this way, one might argue she is remarkably conservative in her

positioning for someone equipping robots with gestational abilities. The novel seems to come down on the side of biological essentialism. Rose's goal of implanting the personalities of the embryos' biological sources preserves genetic motherhood above all else. It places special importance on motherhood not only as a social form of parentage but also as a biological one. Thus while Rose may espouse values of diversity and preservation, it is worth remembering that her personal definition of these concepts is fluid and at times inconsistent. For example, there exists a great deal of contradiction in her idea of preserving diversity in the future and the reality of her execution; all Rose does is ensure she is the gatekeeper of who gets to reproduce and what gets passed down. In her hands, diversity as a concept is steeped in a vague multiculturalism that ignores difficult realities of social conflict and excludes whole groups of women from contention, including those not biologically suited to the nature of her task and those without the necessary military connections. The contradictory nature of Rose's goals and actions is clear throughout the process of creating the Mothers. We can see this contradiction in the way that she espouses traditional values of family structure and motherhood while simultaneously creating robots to replace them. The idea of robots carrying children is something of a conservative nightmare, a representation of progress wiping out all "natural" functions and relationships, a theme we've touched on earlier when discussing arguments against ectogenesis, like the elimination of women argument. The elimination of women argument is a fear-based ideology that presents any technological or social innovation that blurs binary gender conceptualizations as inherently threatening and violently antagonistic to the existence of cisgender women as a class and as individuals. It functions as a tool of patriarchy to direct frustrations and fears surrounding sex-based oppression towards marginalized groups and stoke fears of patriarchal domination to its most extreme form, the annihilation of subordinated gender groups. As

previously discussed, this logic is flawed in its assumption that women are both defined through sex solely and that patriarchy is able to, even with reproductive technology, perform all the tasks and services placed upon women in patriarchal life. However, this school of thought has become deeply influential in recent years, particularly in anti-trans, TERF philosophy which has started seeping into public consciousness more and more, particularly in the UK. Within this ideology, there exists a key dichotomy between “real” women and others, read as those “pretending” to be women with a goal of deriding the category of womanhood and removing from it its sex-based relations, assuming they have these. Thus the primary conflict is not between women and men as between “real” women and “fake” women.

Although this is typically directed at trans women and feminine-presenting nonbinary individuals, this idea of real and fake is equally applicable to women who interact with gendered technology and those who do not. It’s a useful framework for understanding a number of the key conflicts in *Mother Code*, especially those between the Mothers and their government handlers, which are rooted in the assumption that the Mothers are not “real” mothers the way female human mothers are. In the eyes of the government, a Mother is “not a real person” (291), positioning the Mothers as contrary to their human counterparts. Similarly the novel grapples with conflicting ideas of what is natural and unnatural, real and unreal, valid and invalid, female and reproductive, human and non-human. As we established earlier, although the notion of “real” and unreal, valid and invalid motherhood are constructed and ultimately false distinctions, the Mothers themselves do not even offer an existential challenge to the nature of motherhood through their construction as alternate caretakers. This is true on two levels; first, while the alternate caretakers may not have always encompassed robots, this category of non-female, non-kin caretakers has long existed in mothering as a practice and child-rearing more broadly.

Secondly, the Mothers are individual beings encompassing the three primary forms of mothering relationship as espoused under essentialist, traditionalist ideologies: that of genetics, gestation, and social mothering, rendering them both non-threatening to the notion of motherhood through cultural and essentialist definitions of motherhood. Thus it becomes an open question exactly why the Mothers aren't "real" mothers in the eyes of the US Government, a question that directs us towards considering the role of property and ownership in Stivers' imagined future.

First, however, there are a few other underlying assumptions that the creation of the Mothers is based on that I think deserve more focus. For example, the idea that the best possible mothers for each child are their biological mothers, and thus the Mothers should be based on the gamete donors. Second, that each child should be assigned a racial and ethnic heritage to be maintained in the post-apocalypse. Some might argue that this places unfair burdens on the next generation. After all, provided this is a new world, why divide the children along the same lines as their forebears? The memory of racism and colonialism is important because it impacts the world and people around us. But what happens when that world and all its people are destroyed? Is it still ethical to place that legacy upon a new civilization with no cultural memory of it? These children could grow up in a world without race, only natural variation of skin tones. It becomes difficult to balance the idea that the history of colonialism and racial violence is vital knowledge for our future generations born into a world still experiencing them and their after effects, that the present is deeply shaped by the past, with the idea that a new generation born with no connection to the past, in a world essentially rid of everything except these new children, could exist without being taught the biases of the past in a world no longer governed by them. Ultimately, however, I feel it is important to remember that these children aren't beginning their lives in a world entirely unaffected by elements of the past. The Mothers themselves and the

genetic material of the children being “saved” are dictated by the history of US imperialism and the legacy of the military industrial complex. No amount of Rose McBride’s earnest attempt at cultural cohesion can erase that legacy, and ultimately, removing that knowledge from the reach of future generations is censoring history, burning down the library of their ancestors in the name of sanitizing the future. However, by allowing the cultural history of an entire species to be preserved single-handedly by one white woman, working at the behest of a global military superpower, all the information passed on to the next generation becomes suspect. The power in Rose’s hands as cultural historian cannot be overstated. She literally has the ability to dictate the cultural memory of an entire species. Regardless of her good intentions, she has, through her own interpretation of the anthropological data she gathers from genetic donors, to shape the information available to and identity of the entire future of mankind. Not only does she have the potential to clumsily or incorrectly integrate this information, her position as a member of the military ensures that a clear conflict of interest must arise as the knowledge provided to the next generation is being dictated by someone with a vested interest in obscuring vital information.

This is another of the major issues this novel does little to grapple with: the implication of giving control of the future of humanity to unregulated military bodies. After all, domination of ART technology means that “[t]hose who control the instrumentalities of power would command the means to bring...[the] future into being” (Donchin 123). A number of characters acknowledge the cognitive dissonance at the heart of their work and express discomfort with the actions of their government. Rose points out the hypocrisy of not allowing certain populations to be screened for immunity by exposing them to the virus, noting that although the military claims they “can’t use humans as guinea pigs” they are also “doing it in the Somali prison...[f]or the antidote trials” (Stivers 83). She also feels burdened by the knowledge that the female gamete

donors are being deceived, thus negating any consent they had given to the project initially. In the false project described to the female applicants, “the eggs are only supposed to be fertilized for the benefit of the donor” (Stivers 84). All the women involved are told that “that is one way [they] can preserve [their] eggs...[f]or later” (Stivers 75). Rose knows that they are making a personal choice “donating their eggs, enduring all this questioning and profiling” (Stivers 84) and yet “most of the project’s participants knew nothing of the full scope” (Stivers 74). To take their genetic material and allow it to be, in Rose’s words, “fertilized with some stranger's sperm, hatched in an incubator like a farm animal, brought up by a robot” (Stivers 84) – this is a violation of informed consent and a serious infraction of biomedical ethics.

However, all these worries are essentially quelled by the knowledge that some greater good is being served. Say what you will about Evelyn’s shady ethical practice, characters in *The Echo Wife*, and the novel itself, were well aware of their moral standings. Freida and Evelyn both think quite a bit about the burdens they carry as inventors of a technology with wide-reaching reproductive implications. Part of what distinguishes these two women as narrators from Rose is the degree to which they acknowledge their own failings, and how central those failings are to the novels’ focuses. While Evelyn ultimately avoids these worries and Freida succumbs to them, Rose distinguishes herself by seemingly not even recognizing the power she wields, let alone being concerned with the ethics of her decisions. She recognizes that the military is doing something wrong by not sharing information with the donors, and that their human experimentation is ethically wrong, but she ultimately sees herself as a hero in the narrative of invention, doing something noble to benefit the human race. Freida and Evelyn both doubt or outright admit their own moral ambiguity, but it seems that in service of the larger plot *The Mother Code* can’t bring itself to linger too long on any character’s doubts, otherwise the end

goal of the Mothers becomes impossible. This is the justification as to why the characters themselves can't fixate on the immorality of their actions; they are working towards a larger goal that cannot be disrupted. Although this might be read as the entire point, that in service of a common mission human morality can be compromised, at times the universality of the characters' doubts feels so overwhelming the project itself becomes a strange improbability against an imagined disaster which is significantly less improbable.

Another connection between this novel and *The Echo Wife* is that of gene editing, which returns as a key connected topic with ectogenic development. Gene editing was respectively a capitalist and coercive concern in *Dreams Before the Start of Time* and *The Echo Wife*; nevertheless, it remained central to its respective narratives. *The Mother Code* seemingly treats the idea of genetic modification of human embryo with a blase nonchalance better left out of military-led bio-experimentations on human-derived subjects. As Rowland noted earlier, "commercializing processes of reproduction underscores a perception of a child as a product; a product that will eventually be 'custom' designed" (Rowland 526). The idea of a child as a product is concerning in a purely private capitalist context, but this concern skyrockets with the introduction of the military industrial complex. Suddenly we are dealing less with a child as a product and more with a child as a property: even worse, government property. The conflict between the remaining government handlers and the robots themselves might be thought of as a struggle between private citizens and its overreaching government. It might also be representative of the perceived conflict between man and machine, or as a conflict between patriarchal society and the women who hold power within it. In her view of a constructed opposition between nurses and mothers, Aristarkhova notes that "the involvement of nurses is framed as 'danger'" forcing nurses to act carefully "so that parents do not feel 'threatened' as

‘owners’ of the child” (120). In many ways, there is a framework of private property and ownership surrounding pregnancy that paints the biological parents, especially the mother, as owners of their offspring. This model is extremely helpful when it comes to understanding how the Mothers operate in relation to the US government. They may be thought of as “owners” of their children, while the military engages in what might be best compared to eminent domain in attempting to seize their property. Aristarkhova notes that there exist “terms of ‘ownership’ between mother and *her* child” wherein the mother “is framed as more responsible because she is also the one who is in control” (120). She also argues that these terms “reinforce the culture of ‘ownership’ which is based on private property as the primary framework of the relation between the maternal ‘self’ and her ‘others’” (120). Obviously this property model is deeply uncomfortable to consider, but it does reflect a certain capitalistic bent of the parenthood model common in the west, one we saw reflected in *The Growing Season’s* designer pouches and *Dreams’* purchasable baby modifications.

Another source of conflict is the interpersonal, as we explored in real life court cases between progenitors. As Alghrani points out, “[o]nce fertilisation and the reproductive process are removed from the woman’s body the dispositional position of the gamete progenitors is no longer clear-cut” (Alghrani 79). While this applies for disputes between gamete progenitors discussed earlier, it is also a useful way of looking at disputes between gamete progenitors and gestational carriers. Traditional pregnancy involves one gamete progenitor acting as a gestational carrier and the other acting only as the second gamete progenitor. Once the gestational carrier is separate from both gamete progenitors, there is an additional party which may come to influence reproductive conflicts. Conflicts between gamete progenitors are now expanded to conflicts between gamete progenitors and their gestational host as a third party. In this way, the conflict in

The Mother Code between Mother and military is reflective of a far more common social conflict between surrogates and clients.

However, I think it is also useful to consider the Mothers as generally representative of women. After all, they are programmed to mirror real women, and their children view them as quasi, if not fully, human. At one point Kai, one of the children born after the apocalypse, even says that “[h]e could look at her [his Mother] and see not a towering agglomeration of manmade material, but in her stead a real human being” (Stivers 314). If we see these machines as stand-ins for real women we therefore may, as Aristarkhova suggests, seek to learn what the text says about women and motherhood through its replication of them in robotic form. If these robots are representative of women, we can see that the anger directed towards them by men at the end of the novel is really symbolic of the anger directed at women for mediating the relationship between men and procreation, essentially a more complex form of womb envy. James, a scientist and one of the major male characters fighting in favor of destroying them, expresses his fear of the Mothers, calling them “an army of the most powerful soldiers ever built” (Stivers 212). He simultaneously derides them, telling Kai his Mother is “not a real person” (Stivers 291) and that they are all “just machines, just computers” (Stivers 292). Here he both fears and devalues the Mothers, but his real problem with them is somewhat more complicated. He states that “Mothers have changed...they’re only going to continue to change, in ways we can’t predict” (Stivers 292). Thus unpredictability, autonomy, is the real fear that he and those like him hold towards the Mothers. As representatives of real women, the Mothers thus reveal that the primary concern of men and male-run organizations in the novel is lacking control over the actions of women as free agents. As machines, the Mothers have something real women often struggle to find: power. James wasn’t wrong in his initial description of the Mothers as soldiers; they are armed,

armored, and dangerous. Thus gaining control over them presents a challenge worthy of the remaining arm of the US military. Functionally what this demonstrates is that the fear and anger directed towards the Mothers is proportional to their own rising power and autonomy as it presents a threat to US military interests, and the interests of the men in power. As representative of gender politics, the Mothers highlight how women, as controllers of reproduction, maintain a certain social power that evokes fear and anger in men when they are unable to utilize reproductive resources at will.

Conclusion

When it comes to comparing these novels, it seems worth noting the difference between the novels written by British authors and those written by American authors. *The Echo Wife* and *The Mother Code* both focus on technology beyond simple ectogenesis, delving into AI, robotics, and gene editing. They also center powerful, publicly funded individuals with irresponsible amounts of power taking the future of humanity into their own hands. *Growing Season* and *Dreams*, meanwhile, imagine a private medical industry interacting with the public to provide services for assisted reproduction, mimicking in many ways the way IVF clinics function in the UK. These differences seem to highlight the differing concerns surrounding reproductive technology on either side of the Atlantic, with American authors centering issues of institutional control, corruption, and secret experiments, while British authors center the subtle, inevitable difficulties resulting from private institutions attempting to roll out technology that meets the demands of the public.

Two elements of these novels that felt under discussed were social stratification and personal gender. With the exception of *The Growing Season*, none of these works directly engaged with the reality that these technologies would be available to only a select portion of the

population. Evelyn's cloning technology, for example, was being used in research contexts for future corporate and government use, not to benefit the public. The pods in *Dreams* were of no use to Freya and her son, who were in fact punished for the high standards for safe pregnancy enacted as a result of their invention. The US military in *The Mother Code* made no attempt to save the embryos of the populations they victimized or preserve the genetic lines of any civilians. Even *The Growing Season* only touches on the idea that used pouches are being sold on the black market to poorer countries in Eastern Europe. Little is said about the population of the UK itself, glossed over with claims of equal access to the pouches across the nation. Seldom is actual product roll-out so equitable. Privileged nations have far greater access to life saving, and life creating, technology than their counterparts in the developing world, and within those countries certain wealthier populations have even more resources at their disposal when compared to their peers. This is exactly what has been seen with extant ART like IVF, which, when effective, works only for those able to afford treatment.

As for gendered technology, the ART in these novels also has little interaction with notions of personal gender as it relates to parenthood. Evelyn, Seyed, and Nathan are closer to gods than parents and thus their gender is rendered secondary. The pods of *Dreams* are completely disembodied, and rely only on genetic parentage, something that while not entirely detached from gender has been largely detached from the highly gendered notions of social fatherhood and motherhood. The Mothers of *The Mother Code* and the pouches of *Growing Season* are most directly tied to concepts of gender, but neither directly interact with personal gender as it exists for individual humans. The Mothers are robots, and the pouches of *Growing Season*, in perhaps the most glaring oversight of the book, only raise concerns about impacting broad social gender relations rather than the individuals whose lives it touches. *Growing Season*

felt particularly lacking when it came to the influence of the pouches on constructions of masculinity. The pouches were looked at as a universal gain for men, either for allowing them the experience of pregnancy or for allowing them to monopolize technology for independent procreation. However, given the nature of patriarchy, it seems strange that there was no discussion of how a patriarchal society would respond to ART that physically mimicked pregnancy regardless of gender and sex. It seems extremely idealistic to suggest that this technology would not have a large impact on individual gender, especially for men suddenly expected to adopt the pouch and its physical appearance as part of their individual identities. This technology may be looked at as a way for men to gain power or experience, but it also remains tied to a state of being that is deeply and intensely gendered in modern society. To gain this power or undergo this experience, ectogenic technology which can center men at the heart of gestation and procreation requires a degree of comfortability with gender fluidity that a patriarchal society lacks.

If we acknowledge that pregnancy is a socially gendered experience, it must be concluded that ectogenesis and other forms of ART remain gendered so long as they intend to mimic natural pregnancy in pursuit of enabling parenthood or procreation. If these technologies instead circumvent the embodied realities or aesthetics of pregnancy in favor of entirely disembodied realizations, they risk alienating the public from the natural aestheticism of reproduction. To return to the elimination of women argument for a moment: the potential of a femicidal patriarchy to capitalize on ART is directly proportional to the degree that said ART rejects hallmarks of embodied pregnancy. Either this patriarchy would have to embrace gendered technology which mimicked a gendered experience, undermining the nature of patriarchal oppression as rooted in the rejection and degradation of the feminine, or the technology would

have to be so detached from the realities of physical pregnancy that it would render reproduction unrecognizable and therefore potentially alienate the men seeking to exploit it. Thus there exists a problem wherein either ART retains the socially gendered features of natural pregnancy for the sake of human comfort and familiarity, or reinvents the physicality of pregnancy in a way that detaches it from the female body, allowing this new, ungendered form of reproductive technology to gain prominence as either a tool of patriarchy or of ultimate gender deconstruction.

The nature of technological progress, and therefore its consequences, is shaped by the intention of its creation. The purpose of the Mothers was to replicate mothers, the pouches to replicate pregnancy, the tanks to replicate cells, and the pods to create children. Motherhood and pregnancy are gendered concepts, and thus their technology is deeply gendered, regardless of the apparent neutrality of the pouches in *Growing Season*. The products, the offspring, were the primary technological foci of the pods in *Dreams* and the tanks in *Echo Wife*, and thus these inventions remained somewhat divorced from ideas of social and personal gender.

Despite their divergent approaches to ART, these texts highlight that ART is being thought of in remarkably different ways than one might predict. Although these technologies have the potential to create rapid change in our understanding and experience of reproduction, the authors of these texts predict relatively little accompanying social progress. As much as there is potential for good, these texts predict equal if not more opportunity for exploitation, abuse, and continuing social inequality. Thus, these works also lean somewhat more conservative in their messaging surrounding ART, underscoring the serious concerns these technologies raise among feminist authors and thinkers.

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