

Ectogenesis and Representations of Future Motherings in Helen Sedgwick's *The Growing Season*

JESSICA ALIAGA-LAVRIJSEN

Universidad de Zaragoza

jeskeal@unizar.es

After the boom of feminist science fiction in the 1970s, many such novels have tackled the different sociocultural understandings of gender and sexual reproduction. Conventionally, patriarchal thinking tends to posit a biological explanation for gender inequality: women are supposed to be child bearers and the primary caregivers, whereas men should provide for the family through their work. However, if men could share procreation, would these views change? A recent work of fiction exploring this question from multiple perspectives is Helen Sedgwick's *The Growing Season* (2017), a novel that presents a near future in which babies can be grown in artificial wombs that can be carried around. As an analysis of the novel will show, *The Growing Season* creatively explores the existing tensions among contemporary understandings of motherhood and feminism(s), as well as developments in reproductive biotechnology, through the different perspectives offered by the heterodiegetic third-person narration and multiple focalisation. Ultimately, the voices of the different characters in the novel convey a polyhedral vision of possible future feminist motherhood(s) where ideas of personal freedom and codependency are radically reconceptualised—a rethinking that becomes especially important nowadays, for the biotechnological elements of this fictional dystopia are already a reality.

Keywords: ectogenesis; gestation; motherhoods; motherings; reproductive technology; feminist science fiction

...

Ectogénesis y representaciones de maternajes futuros en *The Growing Season*, de Helen Sedgwick

Después del auge de la ciencia ficción feminista en la década de 1970, muchas novelas de este tipo han abordado las diferentes interpretaciones socioculturales del género y la reproducción sexual. Convencionalmente, el pensamiento patriarcal tiende a proponer una explicación biológica de la desigualdad de género: las mujeres son las que tienen hijos e hijas y son las cuidadoras principales, mientras que los hombres deben mantener a la familia con su trabajo. Pero si los hombres pudieran compartir la procreación, ¿cambiarían estas visiones? Una de las obras que explora esta pregunta desde perspectivas múltiples es *The Growing Season* (2017), de Helen Sedgwick, novela que presenta un futuro cercano en el que los bebés pueden crecer en úteros artificiales transportables. Como demostrará el análisis de la novela, *The Growing Season* explora creativamente las tensiones existentes entre las interpretaciones contemporáneas de la maternidad, el feminismo y los desarrollos en biotecnología reproductiva a través de las diferentes perspectivas que ofrece la narración heterodiegética en tercera persona y la focalización múltiple. En último término, las voces de los diferentes personajes de la novela transmiten una visión poliédrica de la(s) posible(s) futura(s) maternidad(es) feminista(s), donde las ideas de libertad personal y de codependencia se reconceptualizan radicalmente—un replanteamiento que se vuelve especialmente importante hoy en día, ya que los elementos biotecnológicos de esta ficción distópica ya son una realidad.

Palabras clave: ectogénesis; gestación; maternidades; maternajes; tecnología reproductiva; ciencia ficción feminista

Women can attain freedom only by concrete,
definite knowledge of themselves.
(Sanger 1922, 402)

The right to choose is fast becoming the right to consume.
(Raymond 1993, xii)

I. INTRODUCTION: FEMINIST SCIENCE FICTION AND GENDER INEQUALITY

After the boom of feminist science fiction (SF) in the 1970s, many such novels have tackled the different sociocultural understandings of gender and the diverse approaches to sexual reproduction. Conventionally, patriarchal thinking tends to posit a biological explanation for gender inequality: women are supposed to be child bearers and the primary caregivers, while men should provide for the family through their work. Certain strands within feminist thinking also hold this notion, affirming that women are, in a sense, subjected to their own biological role as life conceivers and that this physical fact is one of the main reasons for gender inequalities (Firestone 1970). However, one might wonder, if those biological roles were altered, if women were not the only procreators and men could share procreation in its most literal, biological sense, would women become obsolete as child bearers? Would the basis of patriarchal capitalism also be eroded? It is undeniable that if human gestation were to take place outside the female body, “the paradigm shift would be immense” (Ferreira 2015, 15).

A recent work of fiction exploring this issue from multiple and plural perspectives is Helen Sedgwick’s *The Growing Season* (2017), a novel that depicts a near-future London where babies can be grown in artificial wombs called *pouches* that can be carried around as backpacks. In this society, women are said to have been finally liberated from childbearing and this radical development in reproductive technology is merchandised as the definitive tool to democratise procreation, finally bringing about gender equality—both men and women can share the responsibility of growing a healthy embryo. However, as some characters in the novel argue, this is actually a capitalist appropriation of human reproduction that commodifies it and ignores the biological importance of gestating mothers, the mother-child pair and the symbiotic nature of pregnancy and life in general. Starting from the representation of gender inequality and human reproduction in SF, it is the aim of this article to analyse how developments in reproductive biotechnology such as unembodied extrauterine gestation, or ectogenesis, are explored through the different perspectives of the diverse focalisers in *The Growing Season*.¹ Further, we shall see how the voices of the

¹ Many scientists believe that “the creation of laboratory-grown, full-term infants is no longer fantasy” (Wallace 2017, 6). In the 1980s a growing desire to experiment with external gestation led to the successful Extrauterine Fetal Incubation (EUFI) of a 17-week-old goat foetus for three weeks, headed by Yoshinori Kuwabara of Juntendo University (Rosen 2003, 68). In April 2017 a group of researchers at the Children’s Hospital of

different characters in the novel ultimately portray a polyhedral vision of possible future feminist motherhood(s) that radically reconceptualises contemporary ideas of personal freedom and codependency—or, rather, interdependence.

2. *THE GROWING SEASON*

Sedgwick (b. 1978) is a British writer and physicist with special interests in science, biotechnology and feminism (Sedgwick 2020). She holds an MLitt in Creative Writing from Glasgow University and a PhD in Physics from Edinburgh University. Not surprisingly, her scientific knowledge and experience were crucial in her writing of *The Growing Season*, her second novel, set in an alternate reality where, at some point in the 1970s, an artificial womb had been created. In a proleptic leap of fifty years, ectogenesis has become the norm and has made natural birth obsolete. The initial pioneer Holly Bhattacharya—the first woman to be mother to a child born via the artificial pouch—is now seventy-six years old and is awaiting the birth of her first great-grandchild, also gestated externally. Across town, forty-six-year-old Eva Goldsmith starts a campaign against the pouch, a protest she inherited from her mother Avigail Goldsmith—respectively granddaughter and daughter of Freida, the original creator of the pouch who later “regretted giving away her patent” to the ironically named company FullLife (Sedgwick 2017, 269). Together with James, a journalist investigating some stillbirths due to the possible malfunctioning of the pouch, Eva will try to find out what the consequences of external gestation might be for the pouch-gestated babies.

The novel is told mostly by a heterodiegetic third-person narrator and adopts multiple focalisations. Through the different characters and focalisations, which present opposing perspectives and outlooks, readers are offered a variety of views on reproduction and feminism as well as on the controversial topic of motherhood—which the various feminisms have often had divergent perspectives on. As the analysis will show, their multiple points of view, as well as how the different characters feel and are impacted by ectogenesis and the pouch, challenge each other. By means of the different voices, the novel ultimately portrays a polyhedral, diverse vision of possible future feminist motherhoods—or, rather, *motherings*, following Adrienne Rich’s distinction (1976).

2.1. Ectogenesis and Feminism(s)

At the beginning and in the middle of the novel (Sedgwick 2017, 1-4, 127-33), we find “Audio log” entries that provide a homodiegetic first-person narration of Freida’s analeptic account of the choice she made as a scientist, a decision that made “the world change” (4). In her second log, recorded on January 5, 2016, she recounts how when

Philadelphia created the *biobag*, an extrauterine device where foetal lambs, which are “developmentally equivalent to the extreme premature human infant can be physiologically supported [...] for up to 4 weeks” (Partridge et al. 2017, 1). The ultimate aim of these experiments was to extend this process to human embryos.

she was young and “still one of the only women in the faculty” (127)—along with her friend Rosalind—she heard “Haldane speak at the Royal Society” (128).² The knowing reader will immediately think of the figure of J. B. S. Haldane (1892-1964), who coined the term *ectogenesis* in a 1923 paper—published a year later as *Daedalus or Science and the Future*—and who imagined the instauration of artificial wombs that would free mankind “in an altogether new sense” (Haldane 1924, 50). In the decade of the 1920s, issues about eugenics, maternalism, motherhood and sex reform were at the forefront of public debate (Squier 1994, 67) and many works discussed the topic of ectogenesis.³

As the character/narrator Freida explains, she was deeply shocked by Haldane’s speech and held a totally different outlook on the issue: “I hadn’t read *Brave New World* [...]. So as he talked about external wombs and selective breeding and child production rates I thought to myself, no, no, that’s all wrong—that’s such a man’s way of seeing a woman’s world” (Sedgwick 2017, 128). Indeed, at that time teaching and research were very patriarchal, so that in Princeton, for example, “women weren’t even allowed to step foot in the physics department” (127). As Freida further reflects, procreation “is never going to be about mass production in all the symmetrical sterility of a laboratory. Human beings [...] need to feel like individuals. [...] Any change must allow for individuals to remain an intrinsic part of their own reproduction, or it will fail” (128). As a woman and, more specifically, as a female scientist, she “wanted to create a liberating form of pregnancy. A genuine equality. A more reliable bond between parent and child” (128). No doubt, the fact that Freida experiences the limitations in the world of work due to gender bias motivates this desire. Her statement on the liberating form of (external) pregnancy resonates with Shulamith Firestone’s classic feminist manifesto *The Dialectics of Sex* (1970), which views technological maternity as a symbol of female rebellion based on the idea that gender inequality has a purely biological cause. In this line of thought, ectogenesis appears as a technological instrument of liberation that would free “women from the tyranny of their reproductive biology” (Firestone 1970, 206) and allow them to finally reach equality with men (235).

² The narrator only mentions that “Rosalind died the same week my daughter was born. I was grieving for my friend, while my colleagues were still taking credit for her work” (126). However, it would not be far-fetched to infer that Freida might be referring to Rosalind Franklin (1920-1958), who worked on X-ray diffraction images of DNA. Though she was not credited for it at the time, it was Franklin’s images that would allow James Watson and Francis Crick—who had together written a purely theoretical article (Cobb 2015)—to create their famous double-helix model, for which they and Maurice Wilkins jointly received the Nobel Prize in Physiology or Medicine in 1962.

³ In *Lysistrata: Woman’s Future and Future Woman*, Anthony Mario Ludovici voiced his concern about “fertilization [being] consummated in the surgery” (1927, 88). *Hymen*, by sexologist Norman Haire, dramatised how embryos could be transferred to the viable bodies of “women who volunteer for the service, or perhaps in the uterus of other animals” (1927, 87). Vera Brittain’s *Halcyon, or the Future of Monogamy* (1929) made a plea for a feminist perspective on the reproductive life of modern women, while John Desmond Bernal’s *The World, the Flesh and the Devil* (1929) aimed at the construction of the perfect man (Squier 1994, 81, 86). Eden Paul’s *Chronos, or the Future of the Family* stated that women should “be freed from the slavery of child-bearing” (1930, 35).

On the other hand, we also find in the novel the contrasting view put forward by feminist authors such as Rich, for whom pregnancy and motherhood can be seen as empowering female experiences, as characters such as Avigail—who had “been fighting to preserve [natural birth] her entire professional life” (Sedgwick 2017, 14)—seem to contend. Rich makes a crucial distinction between *motherhood*—a patriarchal institution, with a history and an ideology—and *mothering*—a female practice (1976). Although patriarchal ideology is deeply embedded in the understanding and control of the female body (Rich 1986, 34), the mother caring for her child “is involved in a continually changing dialogue” (36). Both mother and baby are deeply connected “by the most mundane and the most invisible strands” (36), while pregnancy and childbirth can lead to “the experiencing of one’s own body and emotions” (37) in a way that turns them into an empowering female experience.

2.2. Reproductive Technology and Female Liberation

As seen above, the thought behind the desire for ectogenesis in *The Growing Season* echoes Firestone’s perspective on reproductive technology as a tool for female liberation. As Holly, the first pouch-mother in the novel, recalls, “it still seemed miraculous to her, even after all these years, that humanity had found a way to share creation of life. When she was young it had seemed impossible, as if the inequality so blatantly visible all around was an innate part of what we are, as a species” (Sedgwick 2017, 18). In this, Holly is voicing Firestone’s argument that “the natural reproductive difference between the sexes led directly to the first division of labor at the origins of class, as well as furnishing the paradigm of caste (discrimination based on biological characteristics)” (1970, 9). As a child, Holly had wondered “what was it that made [men and women] fall into these roles?” (Sedgwick 2017, 19), and her father offered her an explanation from biology as the very basis of patriarchy: “Someone has to earn money, and someone has to stay at home with the children” (19). “The physiology, the *biology*,” is at the heart of inequality (21; italics in the original).

However, other characters in the novel point out that the assumption that the basis of patriarchy is distinctively biological is fallacious, since it leaves “learned behaviour, the impact of society” (20) out of the equation. In fact, radical feminists such as Mary O’Brian (1981) and Mary Daly (1978) “were outraged at Firestone’s claim that women’s biology is to blame for women’s oppression” (Condit 2010, 182). Talking of the reproducing material female body as if it were an extant thing, untouched by culture, implies a (re)essentialising of womanhood, as Deirdre M. Condit argues (182).⁴ As Condit further contends, while Firestone aimed to provide a Marxist reading of reproduction, her reasoning was insufficiently materialist in method since it seemed to overlook the fact that the material world and the social world are mutually porous (184-85).

⁴ For many years, feminism has struggled to deconstruct essentialising discourses. For more on this, see Judith Butler (1993).

As becomes evident in the novel, both embodied reproduction and external gestation show the reciprocal influence exercised by the social environment on biology. Science does not exist independently or as pure objectivity. Even the natural sciences are deeply embedded in what feminist scholar Donna Haraway refers to as “the union of the political and physiological” (1991, 7). As will be obvious to readers who are familiar with Marxist humanism and poststructuralism, Haraway points out that “neither our personal bodies nor our social bodies may be seen as natural [...]. What we experience and theorize as nature and as culture are transformed by our work” (10), concluding that “the political principle of domination has been transformed [...] into the legitimating scientific principle of dominance as a natural property with a physical-chemical base” (19). That is, all science is based on dominance and power relationships and, thus, the social context must always be taken into account when analysing scientific discourses.

In the case of *The Growing Season*, the pouch is created and marketed in a neoliberal, patriarchal context where gender equality has not yet been achieved. “There is no greater patriarchy than London,” says Freida in the novel—echoing Jean Rhys, as Eva points out (Sedgwick 2017, 165). So perhaps, in line with Janice G. Raymond’s argument that new reproductive techniques replicate the patriarchal system and empower fatherhood over motherhood, the pouch signals a commodification of conception. As Raymond contends, the institution of “father-right” underpinning what she calls “ejaculatory fatherhood” “increasingly reduces women to ‘alternative reproductive vehicles,’ ‘incubators,’ and ‘rented wombs’” (1993, 30-31). It reduplicates the inequalities women endure while, as Rich warned in her introduction to the second edition ten years after the initial publication of her *Of Woman Born* (1976), women should not “be used merely as an instrument, a role, a womb” (1986, xviii). The commodification of gestation can be clearly seen in the novel’s first chapter, which offers, through the focalisation of Freida’s granddaughter Eva, an overview of the establishment of the use of artificial wombs, marketed by the company FullLife.⁵ The pouch can be carried around like a trendy backpack; in fact, many celebrities “in their matching outfits, courting paparazzi” go for “designer pouches” in “pretty colours” (Sedgwick 2017, 19). You can also hang it “on the pouch stand” at night, and “turn on the incubator and attach [...] the nutrient bag to the feed on the pouch’s surface” (11). It promises an independence that is equated to individual freedom.

Moreover, this development in reproductive technology is being marketed as the definitive tool to democratise procreation, bring about gender equality and change “the world for the better” (13): both men and women can share the responsibility of growing a healthy embryo. In this society, women are said to have been finally liberated from childbearing (18). Consequently, women no longer have to “take more time off work”

⁵ The name Eva makes reference to the Biblical figure, as suggested by several allusions made to the story of genesis and women’s creative power: “Her mum [Avigail] had told the tale of how she started the group so many times it had become a sort of genesis story, to their family at least, to their supporters. Women, it always began. We are women” (Sedgwick 2017, 5).

because “fathers play [...] an equal role to mothers” (21). They have been freed from their physiology. But again, because science does not exist in isolation from the wider social and historical context, this in itself might not be sufficient to achieve equality. As Sedgwick has stated, “technology has the power to revolutionise society in a very short time and I think that some of the world’s largest problems will only be solved through science. But science exists within society, not apart from it, so legislation and infrastructure should be there to make sure technological advances are used for the right reasons” (2019b).

Nevertheless, it cannot be ignored that the pouch does seem to offer solutions in certain specific cases, such as premature births or infertility, among other difficulties of procreation. As advocates of the pouch claim, the process of ectogenesis is allegedly safer than natural pregnancy and childbirth because everything can be medically and technologically controlled. Rosie, a woman gestating her baby in a pouch, is convinced that natural birth was tremendously risky for “those other women before the pouch” (Sedgwick 2017, 200) and that biotechnology has made procreation safer. In addition, as the author herself points out, premature babies who might otherwise die could survive in this “revolutionary type of incubator” (2019a). Also, undesired pregnancies can be easily dealt with—if a woman desires to stop pregnancy, her baby can simply be transferred into a biobag. In the novel, early-stage transfer allows FullLife to “offer a new choice” to women considering an abortion (Sedgwick 2017, 98). However, the “discourse of choice” or “choice mystique,” as Judith Stadtman Tucker puts it (2010, 298), can be understood as a passive discussion rather than as a more progressive narrative that would “try to situate mothers and their problems in a broader social context” (297). The reduction of feminism to “the right to make the right choices” is based on the strategic decision to replace the language of abortion rights with the language of privacy (Solinger 2001, 5) and fairness. Nevertheless, the suggestion that choice contains the possibility of several positive outcomes is not true, and “having choices [should] also [be] recognized as a product of privilege” (Tucker 2010, 299). That is, power structures are always in operation.

2.3. Female Choice or Marketing Strategy?

Despite Firestone’s aspiration and Michelle Stanworth’s strong belief that “the object and effect of the emergent technologies is to deconstruct motherhood and to destroy the claim to reproduction that is the foundation of women’s identity” (1987, 16), many people, Sedgwick among them, believe that “we are not prepared for what this technology might bring” (2019a). The social consequences are vast and, in a sense, unforeseeable. As Avigail—who is “certain there was evil intent behind the baby pouch” (Sedgwick 2017, 141)—theorises in *The Growing Season*, everything is connected and even “the environment of the foetus could alter genetic code expression” (141). Scientists and the general public just do not know to what extent changing certain elements would alter the whole.

Moreover, as Virginia Woolf noted long ago, “science [...] is not sexless; she is a man, and a father” ([1938] 2015, 212). We can equally argue that modern technoscience is neither neutral nor feminist. Indeed, the new reproductive technologies (NRTs) could bring about new ways to dominate and exploit maternity and the female body (Klein 1985, 67). Following this line of thought, feminist bioethicists such as Rosemarie Tong believe that artificial wombs could lead to the commodification of the whole process of pregnancy (2006), as is seen in the novel, where neoliberal capitalism is clearly the driving force of the economy and every facet of reproduction and breeding is subjected to commodification. Thus, once the babies are born, the whole process of nurturing becomes standardised and marketed by FullLife. Milk, for example, is genetically engineered and marketed as “specifically tailored, the healthiest option” (Sedgwick 2017, 48).⁶ In fact, the novel addresses the complex politics around breastfeeding in interesting ways. For many women, breastfeeding can be a traumatic experience, as it was for Freida, who felt forced to do it despite not wanting to, since she chose “to work rather than stay at home with her new baby” (96), which was shocking at the time: “the doctors told me I had to keep trying—we were made to feel hauntingly inadequate if we didn’t breastfeed back then” (96). Freida actually conceived the idea of the pouch when “struggling to breastfeed at four in the morning” (95) and for her, being a scientist, progress “comes from invention. Technology. Medicine” (96). In fact, she refuses the label “mother” and always calls herself “a scientist” (96), her work defining her over her mothering. In this context, “[milk] formula was my lifeline,” she states (96).

Freida thus represents the type of mothering that came after the patriarchal, sacrificial, full-time motherhood, where women were the primary caregivers of their children. She is in line with the “neoliberal model of self-sufficiency, which denies the centrality of care” (O’Reilly 2016, xiii) and currently coexists with the model of intensive mothering that has emerged from the 1990s onwards (46). Neoliberal ideology like that behind the marketing of the pouch in *The Growing Season* “allows space for women who are willing [...] to be like men [...], and who are able to compete as men do” (Braedley and Luxton 2010a, 15). In contrast, intensive mothering demands that women who are both busy professionals and biological mothers establish a 24/7 “intensive engagement with children” (Nelson 2010, 7) and promote “the intellectual, behavioural, emotional, and social development of the child” (O’Reilly 2016, 52-53). Nevertheless, despite the obviously different approaches of the two models, both serve “the interests of men [...] and capitalism, the state, the middle class and Whites,” as Sharon Hays argues (1996, xiii), and leave women with a feeling of inadequacy, conflict and incompatibility (O’Reilly 2016, 57).

To return to the representation of the debate about breastfeeding in *The Growing Season*, and as Olivia Ballard and Ardythe L. Morrow point out, contemporary science

⁶ That is, as if breastmilk was not specifically tailored and the healthiest option for a baby. I state this while being very much aware of the difficulties breastfeeding entails for the mother, especially when she has to “return [to work] from maternity leave” (Sedgwick 2017, 95).

views human milk, “unlike infant formula, which is standardized within a very narrow range of composition” (2013, 49), as “a dynamic, multi-faceted fluid containing nutrients and bioactive factors needed for infant health and development” (59). In addition, it adapts to the environment and the needs of the nursing infant and is thus a fluid connection between mother and child, establishing a chemical symbiotic communication between them: “human milk cytokines can cross the intestinal barrier, where they ‘communicate’ with cells to influence immune activity” (56). So, regardless of Freida’s choice of how to feed her baby, we could argue that the interests of FullLife are not the improved health of babies but in fact, and exclusively, their own profit.

2.4. A New Means of Patriarchal Control?

As commented above, the neoliberal model of mothering serves patriarchal and capitalist interests. In fact, as some characters note, the pouch might be a new means to exert power over women. Freida’s desire had always been “to help women” (Sedgwick 2017, 196), so when the pouch starts being used by the general public, she feels the duty “to make sure that it wasn’t misused” (197) and decides to personally interview the couples who apply for it. During one of her visits, which changes everything for her (198), she realises that the man in a heterosexual couple “was forcing [his partner] into this, so that he would have control of their unborn child” (199). Freida then understands that her invention has “provided the world with the means for such manipulation” (199). Horrified, she tells Sylvia, who works at FullLife: “we have invented a whole new form of abuse. We have given men the ultimate power over women” (200). She adds that she now realises she has given up her own power: “I did not control the technology I had invented” (201). She subsequently finds out about many more cases of abuse where the pouch is used by men “to threaten, to manipulate” women (236) while the media and the company ignore these “individual cases” (237).

As Freida reflects in her 2016 audio log, society has reached a point where many believe “that women are redundant. The pouch gave [men] the last of our power” (236). She has come to the conclusion that reproduction is not necessarily a burdensome load and that reproducing in the human body is necessary, and even desirable, for human life. This new perspective she has acquired over time echoes the position taken by feminists such as Andrea O’Reilly, whose work is deeply rooted in Rich’s thought. O’Reilly calls for the necessity of a “matricentric feminism” and for the fostering of “*empowered mothering practices and politics*” (2016, xiii; italics in the original). It is true that in *The Growing Season* the pouch has eradicated the “dangers” of natural pregnancy, as FullLife puts it, as well as “the pain of childbirth” (Sedgwick 2017, 214). However, as Eva remarks, “instead of fearing the pain of childbirth [...], perhaps we should be celebrating the strength of women” (214). Childbirth, if conducted respectfully, can be a tremendously empowering experience for women, as US midwife Ina May Gaskin has been showing by means of her woman-centred childbirth methods since the 1970s (2011).

Mothering can be empowering as well. As characters such as Eva argue, the capitalist products manufactured and sold by FullLife undervalue the role of the biological mother, ignoring women's emotional and spiritual life, and they assume that pregnant women are mere neutral vessels that carry an embryo, thus commodifying human social reproduction. Indeed, extrauterine gestation might save some lives but it also "removes the psychological bond" between mother and child (Sedgwick 2019a). Consequently, the ideology behind FullLife ignores the relationship of the mother and child, the symbiotic nature of pregnancy and life in general, as well as the power of women. Like the coral reefs Freida tries to cultivate only to discover they cannot live in tanks, developing embryos "need so much care they will never be truly independent" (Sedgwick 2017, 329). Women are definitely not passive vessels, despite current developments in ectogenesis claiming that artificial wombs will empower women to procreate without sacrificing their careers.⁷ As shown by the fruitful polyphony presented in the novel through the various female voices, gender equality cannot be achieved if the system creating alternative means of gestation is not based on the premise of gender equality from the outset.

3. TOWARDS A SYMBIOTIC APPROACH TO MOTHERING

As noted above, the biological link between mother and baby is crucial for foetal development. Recent studies have shown that during pregnancy, foetomaternal microchimerism takes place, which involves bidirectional crossplacental trafficking of cells, allowing foetal cells to manipulate maternal physiology (Boddy et al. 2015, 1106). In this way, mother and child form a symbiotic unity which is positive for both. As Lynn Margulis's approach to biology emphasises (1970; 1993), as well as Margulis and Dorion Sagan's (1986), life on earth itself is based on symbiotic processes. Contemporary non-Darwinian approaches to biology have shown that all animals establish symbiotic relationships with others.⁸ Furthermore, in the case of mammals, pregnancy and breastfeeding are especially fruitful cooperative processes in which highly dynamic relations take place. Not only does the foetus or baby feed from its mother, but the mother also undergoes a series of transformations from the very moment of conception. Both beings respond to different stimuli and establish a continuous mutual negotiation.

Moreover, as Felipe Vilella et al. point out, pregnant women modify the genomes of their future child even when the ovum is not theirs but donated: "the EF [Endometrial Fluid], a viscous fluid secreted by the endometrial glands into the uterine cavity, nurtures the embryo and constitutes the microenvironment in which the first bidirectional dialogue between the maternal endometrium and the embryo occurs during the WOI [Window of Implantation]" (2015, 3210). The maternal intrauterine environment can

⁷ So-called surrogacy, which is an illegal practice in many parts, is also a way to achieve motherhood without the biological costs of pregnancy, at least for the legal mother, some might argue. The novel, however, does not tackle this kind of ectogenesis.

⁸ Elsewhere I examine a symbiotic approach to biology in feminist SF (2020).

reprogram the embryo's microRNA, which regulates all aspects of human physiology. Under this scenario, procreation cannot be undertaken by machines or pouches without bringing serious consequences for humankind, as Freida eventually finds out.

Apart from the biological cooperation between the two beings during pregnancy, it has been demonstrated that the mother's thoughts and feelings leave an imprint on the foetus; they shape the baby-to-be's own thoughts and feelings and teach them about the external world through their vital experiences and their chemistry (Kelly and Verny 1982). Feminist thinkers focusing on the issue of mothering and mother-child interaction have also shown a growing awareness of mothering as relational, as constituting a complicated, ever-changing relationship (Ruddick 1989).⁹ For these thinkers, the child's development is intersubjective (Benjamin 1994); that is to say, the child develops within and through interaction with the mother (Jeremiah 2006, 24). In sum, the relationship between mother and child is symbiotic at many levels—chemical, biological, emotional and spiritual, among others.

If we focus on the complex reality of biology and reproduction, the mere implantation of a blastocyst requires a synchronised dialogue between maternal and embryonic tissues, between the gestating mother and the embryo.¹⁰ By removing the gestating mother and her interactions with the embryo, we are changing more elements than we might think, just as Eva and James suspect in the novel when they hypothesise that there might be “a change in human biology, in DNA, brought on by gestation in the pouch, then passed down to the children of parents who had been pouch-born” (Sedgwick 2017, 92). As Haraway stated, in the late twentieth century a revolution began when developmental biology combined with three disciplines: evolutionary developmental biology, ecological developmental biology and medical developmental biology (1976, xiii-xiv). All these disciplines made evident the fact that “one genotype can produce different phenotypes in different environmental circumstances” (xiv). And the body, as well as the mind, of the gestating mother should be understood as one of the fundamental factors influencing the foetus and later, of course, the new-born baby. That is, mothers do matter, as matricentric feminism contends, and cannot be replaced with biobags or pouches without altering human reproduction and, therefore, humanity at large.

The social interdependence between mother and child is also addressed in *The Growing Season*, without a firm conclusion being reached. Instead, readers are offered a representation of different ways of understanding possible present and future forms of motherhood. For some female characters “natural” by no means implies “better,” as is the case for Freida when she opts for formula rather than breastfeeding (Sedgwick 2017, 96). Nevertheless, Freida never intended to make a political

⁹ As the very concept of mothering suggests, the relationship between mother and child goes beyond the biological realm and also includes adoptive mothering, for example. Therefore, it could be argued that all kinds of mothering—including the mothering of children not born from one's womb, as well as mothering by nonfemale mothers—imply a symbiotic relationship.

¹⁰ A blastocyst is a cluster of cells in early embryonic development.

statement—“it was the physical reality of the situation I was thinking about” (96), she tells her granddaughter Eva. She is proud of being a scientist and believes that “progress doesn’t come about through protest groups and the slow, grinding change of democratic legislation. [...] Invention is how you change things” (96). Freida dreams of gender equality and thinks that the only way is through biology. She is fascinated by indigo hamlet fish: “the synchronous nature of their hermaphroditism. [...] They each take on a role, male and female, and release gametes into the vortex where they are fertilised. And then they swap. [...] They are both mother and father, and in being a mother or father neither loses the ability to become instead father, or mother” (94). However, as becomes clear at the end of the novel, human beings are not indigo hamlets and women and men are physically different (103). As such, biotechnology by itself does not bring about gender equality: “Equality comes from respecting differences, not eliminating them,” Freida tells her granddaughter Eva when she is a child (214). And Eva later declares her belief as an adult woman that “women should never have had to change anything about themselves” (102-103) and inequality should have been tackled before the invention of the external womb through improving and enforcing the legislation (103). As she continues, “when a child was born, men and women should [...] take the same responsibility for raising [it], and so be treated with the same respect” (103). The problem, she believes, is that “their society was still based on capitalism, whatever else had changed” (103). As Sedgwick has acknowledged, “gender equality cannot be achieved technologically without the previous achievement of social equality” (2019a).

Perhaps one of the most interesting aspects of *The Growing Season* is that it succeeds in offering a polyhedral vision of possible future feminist motherings by raising many questions about the uses of reproductive technologies as well as about our ideas of personal freedom and biological and social interdependence. But no monolithic or univocal answers are put forward by the novel; no definitive statement is made about the adequacy or inadequacy of reproductive technology. It is entirely left to readers to continue reflecting on those issues from a personal perspective after having been given the chance to contemplate them from different angles.

4. CONCLUSION: A FUTURE OF MANY FEMINISMS

In sum, we could argue that *The Growing Season* portrays the existing tensions among contemporary understandings of motherings, the diverse and sometimes conflicting feminisms and the most recent developments in reproductive biotechnology. Sedgwick wanted specifically to explore the different attitudes and perspectives of women towards this technology, since “we are all feminists,” but there are many versions of it (2019a). The novel indeed shows a polyhedral vision of the different standpoints of feminism regarding reproductive technology; nevertheless, in the end it perhaps becomes clear that the pouch, when in the hands of a megacorporation such as FullLife, commodifies

human reproduction, overlooking the biological importance of pregnancy, and that science is never neutral or objective, as it is a product of a given society.

The author herself has admitted having written the book as a scientist, since at the time she was not as yet a mother, and has commented that now, after becoming a mother, she is “less convinced that the pouch is a good thing,” mostly because she has thought more about how it could be misused (2019a).¹¹ In any case, the polyphony of voices in the novel gives readers the opportunity to enhance their knowledge with respect to those opinions they like the best, or to construct a new view on the basis of the diverse thoughts, attitudes and feelings presented by the various characters.

My own reading of the novel leads me to the conclusion that it is of paramount importance that women should be present in all spheres of social activity—medical, technological, legal, educational and so on—in order to be truly free to choose, without “reducing choice to consumption,” as Raymond puts it (1993, xii). Neither should women be reduced to the status of vehicle for a foetus nor be treated as empty vessels that could be replaced technologically. In *The Growing Season*, Holly feels that “she needed to show the world [her pregnancy] was her choice” (Sedgwick 2017, 56). The idea of property and commodity relations underlie current biotechnology, especially genetic engineering and the profusion of genome projects, and this entails serious risks (Aliaga-Lavrijsen 2021, 249). Barbara Katz Rothman has suggested that “the ideologies of patriarchy, technology and capitalism give us our vision of motherhood while they block our view, give us a language for some things while they silence us for others” (1994, 139). That is the main reason why *The Growing Season* is an outstanding example of SF feminism, as it contributes to unblocking our view by giving voice to the many feminisms present in current society without privileging one perspective over the others. The novel manages to represent existing tensions and, most importantly, fosters further dialogue about gender equality, pregnancy and motherhood in the past and present and into the future.

WORKS CITED

- ALIAGA-LAVRIJSEN, Jessica. 2020. “A Transmodern Approach to Biology in Naomi Mitchison’s *Memoirs of a Spacewoman*.” In Onega and Ganteau 2020, 213-30.
- . 2021. “Naomi Mitchison’s *Solution Three* or the Need for Biological and Cultural Difference.” In Fiasson, Fournier and Garzon 2021, 233-52.
- BALLARD, Olivia and Ardythe L. Morrow. 2013. “Human Milk Composition: Nutrients and Bioactive Factors.” *Pediatric Clinics of North America* 60 (1): 49-74.
- BASSIN, Donna, Margaret Honey and Meryle Mahrer Kaplan, eds. 1994. *Representations of Motherhood*. New Haven, CT: Yale UP.

¹¹ Coincidentally, my writing of this article took place during a period of pregnancy, puerperium, nursing and my next pregnancy. My perspectives on childbearing and motherhood have also changed during this time.

- BENJAMIN, Jessica. 1994. "The Omnipotent Mother: A Psychoanalytic Study of Fantasy and Reality." In Bassin, Kaplan and Honey 1994, 129-47.
- BERNAL, John Desmond. 1929. *The World, the Flesh and the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul*. [Accessed October 14, 2019].
- BODDY, Amy M. et al. 2015. "Fetal Microchimerism and Maternal Health: A Review and Evolutionary Analysis of Cooperation and Conflict beyond the Womb." *Bioessays* 37 (10): 1106-18.
- BRAEDLEY, Susan and Meg Luxton. 2010a. "Competing Philosophies: Neoliberalism and Challenges of Everyday Life." In Braedley and Luxton 2010b, 3-21.
- , eds. 2010b. *Neoliberalism and Everyday Life*. Kingston: McGill-Queen's UP.
- BRITTAİN, Vera. 1929. *Halcyon, or the Future of Monogamy*. London: Kegan Paul, Trench, Trubner.
- BUTLER, Judith. 1993. *Bodies that Matter: On the Discursive Limits of Sex*. London and New York: Routledge.
- COBB, Matthew. 2015. "Sexism in Science: Did Watson and Crick Really Steal Rosalind Franklin's Data?" *Guardian*, June 23. [Accessed July 17, 2015].
- CONDIT, Deirdre M. 2010. "Androgenesis and Mothering Human Identity." In O'Reilly 2010, 181-95.
- COREA, Gena et al. eds. 1985. *Man-Made Women: How Reproductive Technologies Affect Women*. London and New York: Routledge.
- DALY, Mary. 1978. *Gyn/ecology: The Metaethics of Radical Feminism*. Boston, MA: Beacon.
- FERREIRA, Aline. 2015. "Beyond the Womb? Posthuman Parturitions in Joanna Kavenna's *The Birth of Love*." *La Camera Blu. Rivista di Studi di Genere* 11 (12): 11-28.
- FIASSON, Arnaud, Pierre Fournier and Sabrina Juillet Garzon, eds. 2021. *L'Ecosse: la différence / Scotland: The Difference*. Besançon: Presses Universitaires de Franche-Comté.
- FIRESTONE, Shulamith. 1970. *The Dialectics of Sex: The Case for Feminist Revolution*. New York: Morrow.
- GASKIN, Ina May. 2011. *Birth Matters: A Midwife's Manifesta*. New York: Seven Stories.
- GELFAND, Scott and John R. Shook, eds. 2006. *Ectogenesis: Artificial Womb Technology and the Future of Human Reproduction*. Amsterdam and New York: Rodopi.
- GLENN, Evelyn Nakano, Grace Chang and Linda Forcey, eds. 1994. *Mothering: Experience, Ideology and Agency*. London and New York: Routledge.
- HAIRE, Norman. 1927. *Hymen, or the Future of Marriage*. London: Kegan Paul, Trench, Trubner.
- HALDANE, J. B. S. 1924. *Daedalus or Science and the Future*. New York: E. P. Dutton.
- HARAWAY, Donna. 1976. *Crystals, Fabrics, and Fields: Metaphors That Shape Embryos*. Berkeley, CA: North Atlantic.
- . 1991. *Simians, Cyborgs, and Women: The Reinvention of Nature*. London: Free Association.

- HAYS, Sharon. 1996. *The Cultural Contradictions of Motherhood*. New Haven, CT: Yale UP.
- JEREMIAH, Emily. 2006. "Motherhood to Mothering and Beyond: Maternity in Recent Feminist Thought." *Journal of the Association for Research on Mothering* 8 (1): 21-33.
- KELLY, John and Thomas Verny. 1982. *The Secret Life of the Unborn Child: A Remarkable and Controversial Look at Life before Birth*. London: Sphere.
- KLEIN, Renate Duelli. 1985. "What's 'New' about the 'New' Reproductive Technologies?" In Corea et al. 1985, 38-51.
- LUDOVICI, Anthony Mario. 1927. *Lysistrata: Woman's Future and Future Woman*. London: Kegan Paul, Trench, Trubner.
- MARGULIS, Lynn. 1970. *Origin of Eukaryotic Cells: Evidence and Research Implications for a Theory of the Origin and Evolution of Microbial, Plant and Animal Cells on the Precambrian Earth*. New Haven, CT: Yale UP.
- . 1993. *Symbiosis in Cell Evolution: Microbial Communities in the Archean and Proterozoic Eons*. New York: W. H. Freeman.
- MARGULIS, Lynn and Dorion Sagan. 1986. *Origins of Sex: Three Billion Years of Genetic Recombination*. New Haven, CT: Yale UP.
- NELSON, Margaret K. 2010. *Parenting out of Control: Anxious Parents in Uncertain Time*. New York: New York UP.
- ONEGA, Susana and Jean-Michel Ganteau, eds. 2020. *The Singular Response of Literature to the Transmodern Paradigm*. London and New York: Routledge.
- O'REILLY, Andrea, ed. 2010. *Twenty-First Century Motherhood: Experience, Identity, Policy, Agency*. New York: Columbia UP.
- . 2016. *Matricentric Feminism: Theory, Activism and Practice*. Bradford: Demeter.
- PARTRIDGE, Emily A. et al. 2017. "An Extra-uterine System to Physiologically Support the Extreme Premature Lamb." *Nature Communications* 8, 15112: 1-15.
- PAUL, Eden. 1930. *Chronos, or the Future of the Family*. London: Kegan Paul, Trench, Trubner.
- RAYMOND, Janice G. 1993. *Women as Wombs: Reproductive Technologies and the Battle over Women's Freedom*. New York: Harper.
- RICH, Adrienne. 1976. *Of Woman Born: Motherhood as Experience and Institution*. New York: Norton.
- . 1986. *Of Woman Born: Motherhood as Experience and Institution*. 2nd ed. New York: Bantam.
- ROSEN, Christine. 2003. "Why Not Artificial Wombs?" *The New Atlantis: A Journal of Technology and Society* 3: 67-76.
- ROTHMAN, Barbara Katz. 1994. "Beyond Mothers and Fathers: Ideology in Patriarchal Society." In Glenn, Chang and Forcey 1994, 139-57.
- RUDDICK, Sara. 1989. *Maternal Thinking: Towards a Politics of Peace*. Boston, MA: Beacon.
- SANGER, Margaret. 1922. *The Pivot of Civilization*. Project Gutenberg. [Accessed November 13, 2019].

- SEDGWICK, Helen. 2017. *The Growing Season*. London: Harvill Seeker.
- . 2019a. "Reinventing Motherhood." Interview. *The Vintage Postcast* audio, 20:06. March 31, 2019. [Accessed September 17, 2019].
- . 2019b. "External Wombs, Progress and Protest: Helen Sedgwick on her Second Novel, *The Growing Season*." Interview by Frances Gertler. *Foyles*. [Accessed August 27, 2019].
- . 2020. "Helen Sedgwick." *Scottish Book Trust: Live Literature Author Directory*. [Accessed June 20, 2020].
- SOLINGER, Rickie. 2001. *Beggars and Choosers: How the Politics of Choice Shapes Adoption, Abortion and Welfare in the United States*. New York: Hill and Wang.
- SQUIER, Susan Merrill. 1994. *Babies in Bottles: Twentieth-Century Visions of Reproductive Technology*. New Brunswick: Rutgers UP.
- STANWORTH, Michelle. 1987. *Reproductive Technologies: Gender, Motherhood and Medicine*. Cambridge: Polity.
- TONG, Rosemarie. 2006. "Out of Body Gestation: In Whose Best Interest?" In Gelfand and Shook 2006, 59-75.
- TUCKER, Judith Stadtman. 2010. "From 'Choice' to Change: Rewriting the Script of Motherhood as Maternal Activism." In O'Reilly 2010, 293-309.
- VILELLA, Felipe et al. 2015. "Hsa-miR-30d, Secreted by the Human Endometrium, is Taken up by the Pre-Implantation Embryo and Might Modify its Transcriptome." *Development* 142 (18): 3210-21.
- WALLACE, Rachel L. 2017. "The 14 Day Rule: Scientific Advances and the End of Abortion Rights." *Journal of Science Policy and Governance* 11 (1): 1-11.
- WOOLF, Virginia. (1938) 2015. *Three Guineas*. Oxford: Oxford UP.

Received 10 August 2020

Revised version accepted 16 September 2020

Jessica Aliaga-Lavrijsen is Lecturer in the Department of English and German Philology at the University of Zaragoza. She obtained her PhD with a thesis on Scottish identity in the work of Brian McCabe (Peter Lang, 2013). Her research interests are contemporary Scottish fiction, trauma studies, contemporary science fiction, feminism and transmodernity, on which she has published extensively.