

Glass Wombs, Cyborg Women, and Kangaroo Mothers: How a Third-World Practice May Resolve the Techno/Feminist Debate

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Abstract

Various technologies commonplace in Western reproductive care, like ultrasound and sonogram, render the pregnant woman a transparent body. The technofeminist position construes the womb ensconced on the monitor as a reproductive “cyborg”; the traditionally feminist stance rejects these technologies as tools of the patriarchy, reducing the woman to a screen to be read, a body to be improved upon. Kangaroo MotherCare (KMC) is an organic technology, one borrowed from developing nations, which solves this conundrum. The bi-directional flow between “nature” and “technology” exemplified by KMC undermines the rigidity of these terms and suggests a global dialogue about what constitutes (post)humanity.

KEYWORDS: technofeminism, posthumanism, reproductive technology, enabling technology, cyborgs

Introduction

The woman’s body, with its potential for gestating, bringing forth and nourishing new life, has been through the ages a field of contradictions: a space invested with power, and an acute vulnerability; a numinous figure and the incarnation of evil; a hoard of ambivalences, most of which have worked to disqualify women from the collective act of defining culture. (Rich 102)

As Adrienne Rich asserts in the above quotation, the female body is a site imbued with divisive and contradictory significations. Many feminist theorists have noted that tension between the reproductive body’s inherent capabilities and its increasing reliance on medical technology often results in the sense that the female body is fragmented. A discursive operation

which refigures the natural body as inherently technologic will resolve this sense of “fracture.” We consider this to be a posthuman, feminist perspective in line with the work of theorists like Donna Haraway and N. Katherine Hayles, who have sought to illuminate the pitfalls of humanist doctrine, and embrace the breakdown of binary categories, of which gender is but one among many which we see KMC as disrupting, like disabled/nondisabled and organic/synthetic.

To present our argument, we will touch upon several technologies commonplace in Western reproductive care and usually depicted as usurping the powers of the female body: test tubes, incubators, ultrasound and fetoscopy.¹ Our goal is to present alternative modes for considering these technologies, not as transparent wombs that intervene in a “natural process,” but as supplementary apparati that enhance rather than efface the “organic” technology of the woman’s body. *En route* to our position, we will review some of the early feminist and techno/feminist discourse with and against which we position our argument.² Primarily, we put forth the example of Kangaroo Mother Care (KMC), a practice that serves both as an example of a bodily technology and as a model for how to re-envision the body as technologic. Rather than viewing KMC as a surrogate that replaces an inferior womb (as some read *in vitro*), or that excises the fetus to the exclusion of the mother (as some feel ultrasound does), we argue that KMC exemplifies and nuances the woman as posthuman: her “natural” body acts technologically.³ KMC manifests a twofold discursive technology: it reminds us that biological gestation and reproduction is always already a “natural technology,” but it also illustrates that, in some instances, the body itself is a next-generation technology as it surpasses and supercedes the incubator. In the example of KMC, we can see how many of the issues that have raised debate among technophobic and technophilic feminists are resolved by a discursive figuration. Just as Haraway invoked the cyborg to argue that much of the gender trouble implicit in humanist doctrine could be undone by conceiving (of) the posthuman, the model of KMC demonstrates that much of the trouble with gender theory can likewise be undone by reimagining the body as always technologic.

Kangaroo Mother Care

In conducting research for this study, we visited the Packard Hospital at Stanford to tour a neonatal care facility that offers training and encourages mothers to practice Kangaroo Mother Care (KMC). Like other neonatal

intensive care unit (NICU) facilities, the rooms that house the prematurely born infants are abuzz with the hum and whirr of the machines that support the tiny beings—rows of miniature babies in plastic and glass trays with a network of wires attaching them to monitors, breathing machines and IVs. Infants born between 24 to 34 weeks after conception are housed in this facility and cannot survive without machine intervention; at this stage, hospitals frequently prohibit direct contact with the newborns due to their improperly developed immune systems and internal organs. Parents watch through the glass walls of the incubators as all of their infant’s life functions are monitored or supplied by machines.

The set-up is similar but less dire in the room for the intermediate infants. These are babies born at more than thirty-four weeks, or who have recuperated in the first room and have transitioned. Here, the space resembles a bedroom more than a hospital: there are rocking chairs and whole families are allowed to visit; this is the space where the hospital integrates Kangaroo Mother Care. In the breast-feeding workshops that are held several times a day, women are taught that their breast, being five degrees warmer than the rest of the body, can act as an organic incubator for the child. They are encouraged to use this practice at the hospital and to keep up skin-to-skin contact once they have taken their baby home. Fathers are also encouraged to participate, and when parents of the “preemies” are not around, volunteer “cuddlers” patrol the room, holding and rocking babies.

Stanford hospital places great emphasis on touch as a technology that can aid in the recovery process for both preemies and mothers. We were—perhaps naively—surprised that this hospital, which specializes in neo-natal cardiac operations, should be so invested in emphasizing the organic body’s ability to act technologically; what we saw at Stanford is a perfect model for the way that KMC is being integrated into Western medicine; not as a replacement for an incubator, but as a supplemental technology. We believe that it is reductive to embrace KMC as a more natural alternative, but in seeing it practiced in one of the U.S.’s most renowned medical facilities, we are nonetheless reminded that the body can perform certain tasks that a machine could never provide, like the comforting, reassuring function of human contact. KMC begets the question: can we rightfully see the body itself as an enabling technology in some circumstances? Consequently, how does discursive operation justify our view of the body as technologic?

KMC not only demonstrates that the maternal body is both natural and technologic, but also illustrates the benefits to be found in a globally shared medical discourse. KMC was first developed in 1978 to deal with overcrowding in neonatal units in Bogotá, Colombia. Mothers and fathers *become* incubators, powering this support by a body heat exchange with their infants.⁴ In Colombia KMC was practiced on infants with birth weights under 2 kg. In the 1990s Dr. Nils Bergman and Sister Agneta Jurisoo extended KMC to all newborn infants in their practice at Manama Mission, Zimbabwe. In their study, survival of very low birth weight newborns increased from 10% to 50%. In the U.S., KMC has been implemented as an adjunct to “technologic care” for “stabilized” premature infants (meaning they have stable oxygen, breathing, heart, and temperature rates). Current evidence indicates that KMC is at least as good as traditional care with incubators after the infant has attained stable functions. Studies have shown that KMC is safe, works at a fraction of the cost of an incubator, and is a universally available and biologically sound method of care for all newborns, and in particular, for babies born prematurely. KMC is not privileged over external technology in either developing or industrialized nations; rather, KMC is used in conjunction with other technologies to enhance premature infant care.

KMC is now practiced in twenty-five developing countries in Asia, Africa, and Latin America; it is also used in a supportive capacity in industrialized countries such as France, Sweden, the United Kingdom, and the United States. Over two decades of implementation and research have made it clear that KMC is more than an alternative to incubator care, and should continue to be encouraged in affluent settings due to the physiological benefits of child development as well as facilitating mother-child bonding.

Our interest in KMC stems from its emphasis on the body-machine: as such, it is a technology available far more widely than other techniques which require expensive apparatus. KMC is a non-proprietary technology participating in an information flow that authorizes third-world nations as the source of information. The heat-exchange powering KMC (from the parental to the infant body) is analogous to the information-exchange which flows between the third-world and Western medical institutions that have implemented the practice, as Stanford’s hospital has done.

N. Katherine Hayles, a key posthumanist theorist, insists that while many would prefer to consider information and materiality inevitably divided, “the body cannot be left behind [and] the specifics of embodi-

ment matter” (246). KMC’s embodiment should not be forgotten: the KMC body illustrates the benefits to be found in globally shared medical discourse. It is crucial that we remember that medical discourse carried KMC from developing to industrialized nations, and we wish to stress the possibility of KMC to enact a bilateral flow between them as well. KMC allows a symbiotic exchange which parallels its epistemic history: in the example of KMC we are reminded of our potential to disrupt the traditional status of knowledge as flowing from industrialized to developing nations, opting instead for mutual discourse exchange between both spheres.

There is ample research to support a drive to make KMC a standard part of Western reproductive care. Several studies have tried to establish that newborns’ neurophysiology craves and requires the mother’s presence to encourage adjustment to a new environment.⁵ More recent studies show that KMC babies grow at an average of 30g per day, three times the rate of an incubator baby. Subsequent research on KMC has found that when the baby is placed in contact with the mother, her chest temperature automatically increases to warm a cold baby and will drop if her baby has an elevated temperature, both of which help maintain a stabilized body temperature: “As Richard Lanham has pointed out, in the information-rich environments [...], the limiting factor [...] is human attention” (Hayles 287). With KMC the maternal body pays that “human attention” in its responses to the skin-to-skin contact. Here is a “distributed cognition” specifically embodied and recursively operating in a feedback loop with the infant.⁶ The efficacy of this body-machine calls into question the utility of describing a “natural” body as if it were not already technologic.

Again, we return to our emphasis that KMC offers tremendous potential as a discursive operation encouraging a global dialogue and reconstituting rigid definitions between “developing” and “industrial,” “body” and “technology.” It is our hope that the significance of this disjunction will not participate in the woman’s sense of herself as fragmented, but instead, illustrate that the boundary between internal and external is not as relevant in a posthuman era.

Limning the Posthuman Womb: A Brief History of the Techno/Feminist Debate

As Adrienne Rich asserts, the female body has been the battleground of a discursive war that leaves it a fragmented “field of contradictions.” Char-

acterization of the maternal body as “natural” and “untechnologic” arises from a dichotomy that continues to shape the female body in the age of assisted reproductive technology (ART). Both the patriarchy and feminist theorists deploy such language, perpetuating an unhelpful division of the body from itself. Many feminists, like Adrienne Rich and Emily Martin, are skeptical of allying the female body with technology: they feel that patriarchal rhetoric has characterized the pregnant woman as a baby-making factory, making the fertile woman into an assembly line and increasingly, in the age of *in vitro* fertilization, allowing men control mechanisms in the process of reproduction. Rosalind Petchesky, expressing this concern, portrays ultrasound as surveillance, enabling not medical intervention but a “panoptics of the womb” (411).

In a similar vein, feminists have identified medical discourse’s intervention, some of which has become so ubiquitous that it seems to have rewritten the female body. Some of the rhetoric feminists have used against these interventions inadvertently cedes the argumentative ground by embracing the discursive opposition between nature and technology that enabled the womb’s cooptation in the first place. We want to argue that the mechanizing language that has been deployed against the maternal body can be figured as productive in the posthuman era. That is, rather than reject technology and its rhetoric because they have so often been turned against the maternal body, we prefer to harness this discourse to undermine its destructive effects, and reconstitute the maternal body as already technologic. While visions of technology as (male) medical practice colonizing the maternal body have been effective, we reject the invasion and erasure of the maternal body by asserting its inherent *techne*; this definition is not opposed to the magic of the womb’s workings of which traditional feminists like to speak, rather it renames this magic “technology.”

Seeing the damage mechanic metaphors have done to the maternal body, some feminists condemned technology as the industry of the patriarchy. However, there has consistently been tension surrounding the issue of reproductive technology. Ann Oakley, for example, concedes that the medical profession is “male-dominated” and worries that *in vitro* fertilization (IVF) and ART give doctors an unfair authority (283). Many claim that recent technological innovations have reduced the woman’s body to a fetal support system: “As a potentially ‘maternal body’ [...] the female body is also evaluated [...] as a [...] container for the fetus” (Balsamo 90).⁷

In 1985 this sentiment in public healthcare led Allan Rosenfield and Deborah Maine to challenge third world healthcare providers and their sources of funding. Referencing data on maternal morbidity rates, they asked, “Where is the M in MCH? [Maternal Child Health]”⁸ However, some feminist anthropologists have argued that Western prenatal technologies such as ultrasound and amniocentesis render the pregnant female body transparent (and thus invisible); for them, the M is effaced even in Western MCH. This argument portrays technologies as eclipsing the maternal body or, worse, *monitoring* its progress so that medical intervention can improve upon the work of the “insufficient” female body.

We claim not the sufficiency of the female body but rather that the “unnatural, technologic” interventions upon the “natural, untechnologic” female body require a posthuman reimagining. Emily Martin discusses the ways that language and metaphor contribute to negative characterizations of women’s biological identities. Martin has famously critiqued medical textbooks’ characterizations of sperm as “active,” vigorously searching out the egg, which rests “passively” until it is fertilized. Martin thus illustrates that scientific language describing human reproduction reinforces the image of the pregnant woman as a “docile body,” in Foucauldian terms, and the discursive construction of the feminine body is something that few feminists would contest. Martin urges that we pay attention to the language we use to describe our reproductive (or non-reproductive) bodies and actions, in order to expose the conventional discourses that we have unwittingly interpolated and internalized. Although Martin proceeds to advocate the rejection of “medicine and its techniques”—a rejection that we find more problematic than ultimately productive—we recognize and appreciate the discursive move she makes in restoring agency to the woman in labor.

While Martin acknowledges that her stance may alienate those women who would like to have hospitals and technology be a part of their experience of birth, we approach with skepticism the sense of “wholeness” that she insists can be recaptured by turning away from medical science (xvii). To dismiss women within the medical-technical network as “fragmented” is to disregard the benefits that come from medical technology, but such dismissal also tacitly eschews discursive transformation as a less effective tool than the cold forceps of patriarchal medicine, which according to some, pried feminine power away from the midwife. The answer might be, then, to abandon the dream of putting the reproductive woman back together again, and seek instead a feminist *posthumanity*.

When posthuman discourse reconstitutes the woman, it will eliminate the boundaries not only between natural and technological woman, but also between the disabled mother or infant who survives by medical technology alone, as well as her non-disabled counterpart who chooses what kind of birth she will have.⁹ Some women have glass wombs, and others have x-ray vision; we need not see these as divisions of the body but rather as integral parts of the body in the age of the cyborg. Before launching into an explanation of how we see the model of KMC as in line with the work of posthuman theorists like Haraway and Hayles, it might be useful to trace some of the rhetoric drawn on by those, like Rich and Martin, who celebrate a “natural” female body.

Andrew Kimbrell has written that the discursive transformation of the body from divine image to biological machine—historically rooted in the mechanistic view of the universe proposed by the “New Scientists” of the seventeenth century—allowed men of science to begin tinkering with the body machine (Kimbrell 235-43). This calls to mind a rhetorical Frankenstein, in which the female body is reassembled as a machine; this discursive operation renders her uterus less threatening territory for men to invade and justifies the search for medical-technical innovations that would improve upon it. It bears mentioning that the womb becomes the “natural” locus for such tinkering as the originary site of human life, making the scientist both mother and master as creator of improved-upon-life, simultaneously claiming and superseding the “magic of maternity.” Some feminists imagine that medical technology aims at nothing less than the psychological amputation of the feminine womb and the incarceration of developing fetuses (on screen, in glass) for surveillance and manipulation.¹⁰ We feel that the most powerful counterargument to this “nightmare” is to illustrate that what is needed to wrest control is merely a discursive operation.

Instead of imagining the woman who has had *in vitro* fertilization and the woman whose uterus is magnified on the sonogram screen as subjects with transparent wombs whose bodies are tampered with or invaded by medical technology, we need to begin talking about these as posthuman bodies: bodies that are no longer purely organic, or purely contained within the space of the skin; but bodies that expand across the laboratory and the examination room, bodies that are glass, plastic and metal as well as flesh and bone. On this point, we refer to Hayles’s discussion of posthuman potential to abate our fears: just as Hayles invokes a network of distributed cognition—combining hardware and wetware

without perpetuating a narrative of mastery via the autonomous will, we invoke KMC. In our argument that the discursive transformation involved in reading KMC as a natural, visible technology that works to defragment the maternal body, we thus ally ourselves with Hayles' hope for a posthumanity wherein "embodiment replaces a body seen as a support system for the mind" (288). The promise of the posthuman is the reclamation of the female body as a site that is not fragmented by medical technology, but *enabled* by it; however, the transformation is one that can only be effected through discourse.

Whereas medical discourse has long made woman into a machine, non-human, animal, or sub-human, embracing the hybrid potential of the posthuman identity reformulates these categories, and a new interpretive space yawns. Within her groundbreaking text of posthuman theory, Donna Haraway's "Cyborg" lends itself to an understanding of the woman whose reproductivity is infused with medical technology as a posthuman figure. Haraway's "A Cyborg Manifesto," emphasizes, "It is the simultaneity of breakdowns that cracks the matrices of domination and opens geometric possibilities" (174). We locate in KMC three of the "breakdowns" which are central to Haraway's elucidation of the posthuman: between human and animal, between organism and machine, and between physical and non-physical (151-3). The practice of KMC necessarily analogizes the maternal body to the incubator, and draws comparison to the kangaroo's pouch: the KMC body is therefore like Haraway's cyborg: human, machine and animal. Furthermore, KMC's psychological effects broach the boundary between physical and non-physical: real, physiological benefits are accrued because of the KMC mother's increased sense of control.¹¹ KMC arises from the "simultaneity of breakdowns" between the categories of human, machine, body and technology and answers them with a cyborg: an inherently plural form drawn from (and nullifying) tension between the natural and technologic.

Techno-feminists have argued that the image of woman as machine has transformative power; technology and discourse can work synchronously to produce a new woman—posthuman and unfettered by the historical rhetoric that reduced her to reproductive functions. We agree, but here want to focus on a cyborg that is primarily discursive, one constituted by the realization of an inherently technological natural body. Our vision for the recovery of the reproductive power of the female somewhat ironically involves the resurrection of the image of *Woman-as-Machine*: we re-envision technology—broadly—as *enabling* rather than acting upon

the woman as an object of medical science. We imagine the reproductive female as a modern day “cyborg” whose body is a technology that may incorporate external devices as a part of its function, and we are reclaiming the term postfeminist for ourselves.

The term “post-feminist” invokes several possible meanings. First among these is the possibility that first and second wave feminism’s battles are over, and that, therefore, “feminism” needs to be re-envisioned if it is not to be a gyno-centric chauvinism. “Post-feminism” might also suggest that feminism is a superannuated movement that, in a rear-guard action, actually loses ground for the women on whose behalf it fights. Aware of both of these possibilities, we nonetheless use the term for its association with *posthumanism*: ours is a feminism seeking the posthumanist rather than the humanist paradigm.

In the next part of this paper we will describe two of the new reproductive technologies that are often characterized as invading or subsuming the uterus. We have tried to show how a discursive operation can alter the way we perceive these technologies so that they enable rather than replace the womb. Our main contribution to the postfeminist conversation is our description of the phenomenon of Kangaroo Mother Care as a process involving a cyborg practice, a discursive manipulation, a natural body and an enabling technology all at once.

Glass Wombs: Enabling or Subsuming Women?

The most negative feminist reading of reproductive technologies associates it with a patriarchal plot to usurp the womb: a trend that has been noted in various religious myths and ceremonies; which is exercised in the “alchemists’ dream”¹² of paternal reproduction from *Frankenstein* to *l’Eve Futur*; and which some have seen in the fantasy of the (traditionally masculine) artist who breathes life into all of his Galateas. Feminist historians like Rich and Martin have examined the way reproductive technologies shift the balance of power from the mother to her physicians, and specifically question the role that surveillance plays.¹³ Ultrasound technology, *in vitro* conception, and the post-natal incubator might all be construed as glass wombs that seek to improve upon or correct a “deficient” female body. In our description of the reproductive cyborg, we show how discourse can be made to shift characterizations of these glass wombs from surrogacy to inclusion in a posthuman narrative, thereby allowing the woman to claim these instruments as part of her own body.

Ultrasound, often construed as a “window into the womb” through which meddling outsiders may peer, has been drawn into a discursive war that shifts the boundary lines of the womb and calls into question ownership of this sacred jurisdiction. Because the invention of ultrasound technology came out of sonar technology first implemented in submarine warfare, some feminists have emphasized its military origins, imbuing the visual technology with a subtext of surveillance and violence.¹⁴ What interests us here, however, is not the negative history of ultrasound and fetoscopy but the way by which discourse can be made to rewrite ultrasound as a technology that enables the pregnant body, rather than acting upon it.

The first images of a fetus *in utero* were published by Swedish photographer Lennart Nilsson in 1962. In the 1950s, x-rays provided a few “shadowy glimpses” of the embryo, but warnings about health risks stymied the examination of the pre-born until Nilsson’s photographs and sonographic images were published in *Look* (1962) and *Life* (1965) magazines (Stabile 177). More than one feminist theorist has taken issue with these photos, pointing out that the images are arranged so that fetal independence is emphasized.¹⁵ The mother is virtually erased from the pre-birth drama. Alice E. Adams analyses the photos at length:

The book (1966 edition of *A Child Is Born*, a compilation of Nilsson’s images) depicts stages of fetal growth through an amazing series of photographs. In some the fetus is illuminated against a dark background flecked with white particles, like stars against a night sky. Umbilicus and placenta intact, enveloped in a transparent caul, the body of the fetus floats as if suspended in the sky ... The fetus of *A Child Is Born* presents the semblance of a kindly alien in orbit, patiently awaiting its birth into humanness. In these photographs the mother’s body has disappeared, or rather it has become a vast nothingness, a universe in which the fetus is the only well-organized, complete system. (Adams 118)

Ultimately, the image of the little spaceman was commandeered by the “right-to-life” movement’s resurgence in the United States in the 1980s. It seems likely that the organizers who made Nilsson’s photos the unwitting icons of the anti-abortion movement were not just striving for a trans-

parent womb, but for total erasure of the mother, thereby undermining her argument for reproductive rights. Since the first images of intrauterine life were made public, they have been drawn into various battles. Despite the militaristic origins of this particular technology, the ultrasound images made available to pregnant women today are more than just relatively innocuous: they can be a tool facilitating “maternal bonding” and woman’s own sense of “empowerment” (Petchesky 279).

It should not be disregarded that women consistently report that seeing an ultrasound of their own fetus contributes to “a greater sense of control” (Petchesky 279). Lorna Weir conducted a study of fifty-one Canadian women about their experiences of ultrasound; most women reported that seeing the fetus made the pregnancy more “real” or made them feel that it was more “their baby” (85). This study recorded women’s emotional reactions to sonogram, and attempted to determine what women typically do with the photos they are given, and whether they connect to the fetus anytime or only when its traits are recognizable as “human.” Overall, the study concludes that most women consider a fetal sonogram an early “baby picture,” and report that they felt more connected to the fetus and their own pregnancy after viewing the image. The women identified sonogram subjects as their “kin,” even when the fetus looked like a “much wanted little shrimp,” as one woman lovingly described her own (85).

There is no doubt that public consciousness about fetal life has been greatly shaped both by Nilsson’s images and their usurpation on picket boards outside abortion clinics. Rosalind Petchesky points to John Berger’s analysis of public versus private photographs to address the fact that fetal images conflate the boundaries of this distinction (280-1).¹⁶ In *About Looking*, Berger distinguishes between public and private photographs as such: a private photo is an image from one’s own life to be remembered, to be preserved; a public photograph will educate and inform someone of something he or she has never seen (*this is our trip to Niagara Falls* versus *this is a red blood cell*). What makes the sonogram so interesting, therefore, is that it is indeed a conflation between private and public, but not in the sense that Petchesky identifies: a photo of one’s unborn child is “public” in that it informs the mother of what her own child looks like. It is a photo of something that cannot be seen, and thus, by Berger’s own definition, our most private pictures of our own insides, are, in fact, public.¹⁷

Our aforementioned goal is to appropriate a discursive model that will redeem the sonogram as a tool which empowers rather than effaces the pregnant woman. Ultrasound technology has been implicated in various public and private narratives of fetal life, but as Weir's study shows, sonograms most often allow the mother to name the narrative of her own pregnancy. If the result of this technology is most often in the service of the mother and her unborn child—not only to detect problems early on, but also to facilitate maternal bonding—then we must consider ultrasound an *enabling* technology. Thus the technologies that render the womb transparent enable it to go beyond normal human capability. As much as ultrasound allows medical physicians to see inside, it also gives the woman x-ray vision.

Further, and this is the point at which we begin to configure the technologized woman as a reproductive cyborg, such a discursive transformation breaks down the boundaries of internal and external: the womb on the monitor is not perceived as a displacement, but as an expansion of the reproductive body into space. Part of the complications that arise from the fantasy of the glass womb is the sense that the transparent woman loses her hold on the distinction of her body as having a private inside and a public outside. If we can start to imagine certain reproductive technologies as enabling the dispersion of the woman into a posthuman plane where such distinctions are no longer relevant, then she will not be erased by these technologies, but her body will colonize the technological apparatus, making them a part of her expanding self. Her womb is not ensconced on the glass and plastic monitor; it is speaking through the machines.

Rather than subsuming organic capabilities to the status of an inferior machine, ultrasound—inasmuch as it makes the workings of the womb visible—is neither replacing the uterus with an alternative technology, nor adjusting for a deficiency in a natural womb. Because ultrasound is widely employed today, this part of our argument may seem to sidestep the issue of disability, which is a factor determining the role of reproductive technology that feminists too often ignore. However, we turn now to discuss two other technologies that might be called synthetic, surrogate wombs: the proverbial “test-tube” of *in vitro* fertilization, and the post-natal incubator. Though these two glass wombs were created to amend the natural body (adjusting for conception difficulties whether the problem lay with the male or female partner, or to continue the incubation period when a body prematurely ended gestation), our goal here is to show how a discursive operation can alter the way we think of this technology.

Pat Spallone conducts an investigation of the way discourse ensured the social survival of new reproductive technologies. She considers how language has been employed to protect scientific innovation from accusations of immorality. Spallone tells us that the word “pre-embryo” was coined sometime after the first *in vitro* fertilization, (which occurred in Britain in 1978); this designation delineates the first two weeks after conception as a stage in and of itself (208). The term “pre-embryo” is used to distinguish an *object* upon which scientists conduct research and experiments, from that which would eventually be allowed to become an embryo and then a fetus. The “pre-embryo” existed only for a two-week window that was meant to coincide with the period when the fertilized egg travels to the womb to implant itself (Spallone 222). The pre-embryo occupies the space of *tentative* life, thus “*pre-embryo*.” Thereby, a semantic device altered perception of the subject from a life to a “potential life” serving as a tacit rationalization of its use in experiments:

Society could have its “embryo,” an unchanging ideological apparition, while science could experiment on embryos (pre-embryos) by shifting the origin point of the embryo to a later date. (Spallone 218)

Medical technology depends upon discursive technology to run interference— in this example, discourse acts like a kind of clandestine propaganda, protecting the practice’s right to exist by changing previously accepted biological terms.¹⁸

Discursive technology, as Emily Martin, Pat Spallone, and others point out, has been previously used to make the natural female body seem inferior. Spallone demonstrates that the same rhetoric which created the “pre-embryo,” relegates the *in vitro* mother to an inferior status; she is referred to solely as the embryo’s “source of nourishment or its environment” (219). Just as in Nilsson’s photos, where the womb was cropped out of the frame, here the mother has been discursively amputated from the rhetoric that describes *in vitro* technologies. We might also notice that while ultrasound establishes a fetal narrative, so too does the discursive naming of the “pre-embryo” raise questions about the starting point of the life narrative. Both of these technologies operate discursively in that they make claims about the presence or absence of “life.” This shows us, in the most concrete terms possible, that discursive technology is in itself *a womb machine*: it pronounces a subject as existing or not existing; it

produces a narrative; and it gives names to the systems at work. We suggest that a new kind of discursive technology is possible: one that would entail a reimagining and renaming of the reproductive body's relationship to technological apparatus with the outcome of resolving the sense of division between categories like "nature" and "technology" by encouraging their conceptual breakdown.

The power that comes from naming an object is unquestioned. Haraway herself notes that her conception of the cyborg involves a "condensed image of both imagination and material reality" (Haraway 150), thus requiring a discursive operation as well as technological appendage. A generation of critics has already called for the acceptance of the posthuman as a feminist figure, but this has continued to meet with resistance, and tensions still divide feminist scholars on the issue of reproductive technologies, where the natural female body is portrayed as invaded by technologies tainted with a patriarchal history of self-serving agenda. It is our hope that by reinvigorating a sense of the natural woman as a biological machine, we will resolve the tensions dialectically—embracing not only the technologically enhanced body, but also the "natural" body as inherently technologic.

Woman-the-Machine

The nineteenth-century French poet Paul Valery wrote, "Man is himself, is man, only at the surface. Lift the skin, dissect: here begin the machines" (qtd. in Russell). This quotation reminds us that bodies are machines and that woman, just by virtue of being, is always already connected to technology—the natural technologies of the life process. This is not to say that bodies which do not perform certain functions (reproductive or otherwise) are "disabled." Women who do not or cannot give birth, for example, are not deficient; birth is just one technology that they do not perform, there are many others which they do experience.¹⁹ Leaving aside the issue of *why* external apparatus enables the body to become a cyborg, we want to turn to the question of *how* this transformation can be effected through discourse. The first step in this transformation (which we might dub, "how to make yourself a body with technological organs") is the realization that the body is inherently technologic, and that discourse is as well.

In order to establish that we can consider discursive phenomena technologic, we turn to Heidegger's essay on the "Question Concerning Technology." Heidegger argues that alongside the tenets which define

instrumental technology as socially constructed, we should add another category, one defined by the act of “bringing forth.” He includes in this description the natural world, which brings forth blooms from the earth, and art, which brings forth truth. “Bringing-forth brings hither out of concealment forth into unconcealment. Bringing-forth comes to pass only insofar as something concealed comes into unconcealment” (11). As we see in Heidegger’s reading, this kind of “bringing forth” is itself a technology, and although Heidegger does not make it explicit, it seems axiomatic that by this definition, birth is naturally a technology.

Like *in vitro* fertilization and the incubator, what KMC *reveals* is that the function of the womb is immediately technologic as we commonly define it: it involves the exchange of flows, fluid, and heat. Furthermore, KMC solves the conundrum created by those technologies that facilitate the womb’s transparency. Whereas technologies like test tubes, ultrasound, and incubators can be figured as “glass wombs” which allow physicians to monitor gestation, giving them power over the happenings of the otherwise cloistered fetus, KMC creates an externalized uterus that is, nonetheless, very obviously the sole property of the maternal body. KMC is not a miracle panacea that is universally unlimited in its application; it should be used only appropriately and in addition to the benefits of technology. It should be noted that our interest lies as much in KMC’s real world application in hospitals and birthing centers as in its use as a tropic device which disrupts the categories of nature and technology, human and machine, and which reveals the bidirectional flow of knowledge from developing to industrialized nations.

Conclusion

We consider the theoretical implications of KMC a lucrative entry point into the ways traditional discursive technologies can be “rewritten” because of their potential to replace the machine with the human body— a symbolic inversion whereby the incubator, which originally stands in for the womb, is replaced by the mother’s body and restores sustentative agency to the female form. KMC allows the exterior space of the female body to function as the interior womb space without the need for machine technology either acting on or within her body.

The techno-feminist position has struggled against the pitfalls of discursive fragmentation. Yet, there is still a danger of fragmentation here: we cannot say that the womb is a machine or we risk dividing the

woman into subordinate parts; we cannot claim that birth is *the* natural technology or we risk categorizing women who do not have children as disabled. Rather we must say that pregnancy and birth are among many of the technologies involved in the life processes of the body. We hope that this examination of the KMC body will enable women to see that technology is not always man's instrument that acts upon them, but rather, a methodology to reclaim. In the practice of Kangaroo Mother Care, the female body replaces a medical technology (the incubator) that was to begin with a synthetic imitation of the womb, meant to stand in where a human body had failed. In KMC, the woman's body is the technology; the body itself becomes a technological device, rather than being replaced by one, and the sense of the body's failure to carry an infant to term is lessened by allowing the body to perform another kind of primary and "natural technology." Our contribution to the feminist discussion of assisted reproductive technologies is our reading of how KMC participates in the narrative of technological, extra-uterine gestation. Like *in vitro* fertilization and the incubator, KMC makes visible the function of the womb. However, our point here is not to claim that KMC is better than the incubator, but only to show that, in its example, we see how a "natural" body can be reimagined as inherently technologic by discursive apparatus. However, central to maintaining this argument is viewing the human body as a preexistent technology.

Whereas the incubator was brought in to amend a disabled body with the added bonus of rendering the process of gestation visible, the practice of KMC offers an alternative like the incubator, providing not only visibility, but also the added benefit of human contact. Our framing of this technique illustrates how discursive technology operates to establish the maternal body as a natural cyborg. In putting these theories and practices in dialogue with each other, we "bring-forth" a new way to perceive the maternal body as technological, and thus, to further disrupt the categories that have fragmented the female body, strewing her across a "field of contradictions." Where Haraway says this problem can be resolved by integrating technology into the body, we insist (à la Hélène Cixous²⁰) that we have only to see that this contradiction was never really there: technology is not in conflict with a natural body if the woman herself is a technology.

KMC joins two bodies pulsing with flows and drives, and denies that the womb is a secret, hidden place—as such it calls the womb a body machine and shatters the myth that the glass womb replaced a natural woman. Haraway wanted to be a cyborg rather than a goddess (181) and

we agree. For the reproductive cyborg is a natural machine, and has the benefit of both kinds of technologies: her body heat is her battery, and she has the benefit of x-ray vision, a kangaroo pouch, and, when her needs dictate, a glass or Mylar womb—the best of both worlds, first and third.

Notes

The authors would like to thank Peter Donaldson and Cheryl Francisconi, whose conversations and support were instrumental in facilitating this project.

¹ The terms *sonogram* and *ultrasound* are used interchangeably to refer to the process of intrauterine imaging that uses sonar technology to make visible the muscle tissue and internal organs of the fetus. *Fetoscopy* is the practice of taking pictures of the fetus with a micro-camera that is physically inserted into the womb. The test-tube has become a symbol commonly associated with *in vitro* fertilization, the practice of fertilizing the ovum outside of the womb before implanting it in a woman's uterus. *Incubator* is the common term for the heating beds in which prematurely born infants are kept warm until they have attained stable functions.

² Within feminist discourse questions of technology's relationship to the female body naturally arise. We consider that the responses to these questions—and articulations of these questions—comprise a distinct thread, which we characterize as “technofeminist.”

³ Posthumanism pursues the human subject beyond the limitations of humanist discourse. We understand the posthuman in part as the subject/agent of a new *episteme* (one coming together, Foucault writes, along with the dispersion of man “when language regains its unity” [386]). Once again, the pervasive effects of technology alter the grounds of knowledge and culture, reconstituting these fields and the agents within them. In particular, in pursuit of the posthuman we turn our attention to the relationship among information, identity, and embodiment, central concerns of N. Katherine Hayles' *How We Became Posthuman*.

⁴ It is important for the terms of our discussion to note that while paternal bodies also incubate, breastfeeding is an essential component of KMC, making this primarily a technology of the maternal body.

⁵ Lorenz's (1952) study first looked at the mother-offspring bonding via imprinting in baby geese, but it was Bowlby (1969) who applied this idea to the infant-caregiver bond. Bowlby believed that human infants are genetically programmed with inherent behaviors that keep the parent in close proximity ensuring both protection and nourishment, yet Bowlby stresses that feeding is not the origin of attachment. Additionally, Spitz's (1946) often cited study showed that war orphans who were not handled beyond basic feedings and hygiene, failed to thrive and showed delayed development mentally, emotionally and physically.

⁶ Skin-to-skin contact also allows the infant constant access to the mother's

breasts and stimulates production of breast milk, which contains all the nucleotides necessary for brain-growth and antibodies for immunity in the colostrum. Further, babies who receive skin-to-skin care feel more relaxed, which lowers stress hormone levels and prevents many problems including brain bleeds. This evidence seems to validate Spitz's (1946) findings that babies handled thrive and develop faster than those who receive only basic, life-sustaining care.

⁷ Susan Bordo cites the example of Angela Cardher, who was kept alive by machines so that she could incubate her unborn child: "Here a still living human subject had become, for all legal purposes, dead matter, a mere fetal container," making her, in effect, "a life support system for a fetus" (77).

⁸ Rosenfield and Maine are interested in MCH programs in developing nations; interestingly, our study turns to a practice that Western medicine inherited from such nations to point out that the C in KMC might stand for "cyborg."

⁹ A recent bumper sticker proclaims, "Our children were born at home." This kind of pride in one's decision to deliver without technology is itself guilty of eliding the mother: specifically the disabled mother, or the woman who anticipates a complicated birth. It would be no more appropriate to boast: "Our children were made at home," offending those bodies that do not naturally conceive. This bumper sticker strikes us as little more than a celebration of able-bodied-ness.

¹⁰ An analogous "nightmare" vision within the mainstream of posthuman discourse is N. Katherine Hayles's invocation of Hans Moravec's proposed uploading of human consciousness to a computer as "a roboticist's dream that struck [her] as a nightmare" (1). Our concern for the maternal body mirrors Hayles' concern that information's body—its materiality—be retained.

¹¹ The psychological benefits provided by KMC should not be overlooked. Premature deliveries often cause mothers to have a sense of guilt and anxiety about a perceived "failure" of their maternal bodies, and they may be more prone to postpartum depression; Kangaroo Mother Care helps the mother feel that she is completing her baby's gestation. Studies have shown that KMC mothers had a better feeling of competence for caring for and raising their premature infants than mothers who had little skin-to-skin contact with their premature infants. Skin-to-skin care at birth also helps the mother bond with her baby immediately and helps the dyad settle into a rhythm of sleeping and waking together called "sleep synchrony," which allows the mother to get more sleep.

¹² This is Gena Corea's term, from *The Mother Machine*.

¹³ See Adrienne Rich, *Of Woman Born* and Emily Martin, *The Woman in the Body*.

¹⁴ See the work of Lorna Weir, Carole Stabile, Rosalind Petchesky, and Ann Oakley for a more detailed discussion of ultrasound technology. Consult the bibliography for full references.

¹⁵ Carole Stabile offers a reading of the text of "Drama of Life Before Birth," (the layout of images in *Life* magazine) that emphasizes the "ideological amputation of embryos and fetuses from female bodies" (Stabile 174). Stabile reveals that

the present tense is continually used in the text “to sustain the illusion of ‘life’” despite the disclaimer that “the embryos on the following pages had been surgically removed for a variety of reasons.” What the viewer is actually looking at, Stabile emphasizes, are backlit autopsies, but the accompanying text preserves a sense of “chronological narrative,” as if the fetus comes to being entirely on its own.

¹⁶ In fact, it seems likely that women’s personal experience with ultrasound technology will also lend credence to the narratives constructed on the posters of anti-abortionist demonstrators; for, the private in utero “baby pictures” will seem to collapse with the anonymous, public fetal autopsies, thus strengthening the ad campaign of the right-to-lifers.

¹⁷ Perhaps this justifies the right-to-life movement’s adoption of an anonymous fetus as a public icon, but what seems crucial about this distinction is the sonogram’s place in narrative. Berger emphasizes “context” and “time,” claiming, “Photographs are relics of the past, traces of what has happened” (57). As a captured instant, the photograph’s relationship to time is self-evident. A sonogram, therefore, as a private image working in a public vein, is an anachronism: it is a representation of a narrative, the otherwise non-visible process of gestation, but it is an image of something that will be seen in the future, it is, in a sense, *pre-narrative*.

¹⁸ This nomenclature is also extremely important in other medical ethics discussions such as stem-cell research, cloning, and abortion, which points to the larger cultural conversations and ramifications of such naming practices, but we will focus our exploration only to its relevance to KMC.

¹⁹ Ability is semantically opposed to disability, but the absence of a technology does not signify deficiency: a toaster is not an insufficient microwave, after all. A part of posthuman theory calls for an expansion not only of bodies to include technological apparati, but also an expansion of definitions, so that we can undo binaries like man and woman, and disabled/nondisabled.

²⁰ Hélène Cixous wrote, “Wouldn’t the worst be, isn’t the worst, in truth, that women aren’t castrated, that they have only to stop listening to the Sirens (for the Sirens were men) for history to change its meaning?” (2048).

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