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Of Woman Born? Technology, Relationship, and the Right to a Human Mother

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OF WOMAN BORN?[1] — TECHNOLOGY, RELATIONSHIP, AND THE RIGHT TO A HUMAN MOTHER

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Abstract

This article explores the legal implications of a scientific fantasy: the fantasy of building artificial wombs that could gestate a human child from conception. It takes as its touchstone a claim by sociologist Barbara Katz Rothman, who writes, "Every human child has a right to a human mother."

While the article discusses the legal principles that would apply to artificial wombs, it is skeptical about the technological possibility of artificial wombs in the foreseeable future. Accordingly, the focus of the article is the effect that the *fantasy* of artificial gestation has on the legal discourse around pregnancy and reproduction today.

The article first places the fantasy of artificial gestation in the context of theories of reproduction propounded by western science. The history of scientific theorizing about reproduction is a history of male scientists' efforts to prioritize the male contribution and minimize the degree to which men are dependent on women for the creation of their offspring. Feminist scientists and philosophers of science have demonstrated how sex-based ideology has skewed and hampered scientific efforts to understand the biology of reproduction. Scientific pronouncements about the prospects for building artificial wombs reflect the biases that have historically plagued reproductive science, making it likely that those prospects are systematically overstated.

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[1] The title refer refers both to the riddle at the heart of *Macbeth* and to Adrienne Rich's classic distinction between the institution of motherhood as a form of social control and the practice of mothering as individual expression and empowerment. *See* WILLIAM SHAKESPEARE, MACBETH act 4, sc. 1 (Macbeth cannot be killed by any man "of woman born"); *id.* at act 5, sc. 7 (Macduff revealing that he was "from his mother's womb, untimely ripp'd"); ADRIENNE RICH, OF WOMAN BORN: MOTHERHOOD AS EXPERIENCE AND INSTITUTION 13 (1976); *see also* ANDREA O'REILY, FROM MOTHERHOOD TO MOTHERING: THE LEGACY OF ADRIENNE RICH'S *OF WOMAN BORN* 2 (2004).

[2] Associate Professor, University of Tennessee College of Law. Special thanks to my brother, S. Michael Hendricks, post-doctoral fellow in Organismic and Evolutionary Biology, Harvard University, who guided me through the scientific issues discussed in this article while always reminding me not to expect science to provide answers to social and moral questions. For comments on earlier drafts of this article, thanks are also due to Cyra Choudhury, Shelley Cavalieri, Richard Delgado, and Jean Stefanic.

The article then turns to how legal discourse uses the prospect of artificial gestation to shape current practices regarding reproduction and control of women's bodies. For example, legal scholars increasingly cite the prospect of artificial wombs as a solution to the controversy over abortion, since the fetus could survive without requiring the pregnant woman to sustain it. Pregnant women seeking abortions could instead be required to choose between continuing the pregnancy or undergoing an extraction procedure in which the embryo or fetus would be transferred to an artificial womb. This predicted "solution" informs legal analysis of the scope of reproductive rights today by constructing the woman and fetus as separate individuals with opposing interests. Similarly, comparisons between mechanical and human gestators shape legal rhetoric about commercial surrogacy and the legal control of pregnant women.

Finally, the article reconsiders this legal-technological discourse about gestation from the perspective of a feminist project of re-visioning the human condition as one of mutually dependent relationships rather than autonomous individuality. Feminists have demonstrated that the autonomous individual is a myth; the fantasy of artificial wombs is a psychic representation of that myth. It constructs motherhood in a way that minimizes the importance of the human connection of pregnancy. A child born through natural gestation or through individual-initiated artificial gestation enters the world with a claim to that connection; for the state to create a child through artificial gestation would be to create an intentional orphan, the family-level equivalent of a stateless person. Therefore, although this Article tentatively concludes that artificial gestation should be permissible as a means for individuals to reproduce, it rejects state-mandated gestation as a moral alternative to abortion. Every child may not be entitled to a human gestator, but every child is entitled to a human parent, in the fullest sense of the word.

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A theory about the stars never becomes a part of the being of the stars. A theory about man enters his consciousness, determines his self-understanding, and modifies his very existence.[3]

This Article explores the legal implications of a scientific fantasy: the fantasy of building artificial wombs that could gestate a human child from conception. It takes as its touchstone a claim by sociologist Barbara Katz Rothman, who writes, "Every human child has a right to a human mother."[4] I understand her to make two claims in this statement:

> First claim: A child has a right to have her gestational parent recognized as her initial legal parent. Pre-birth adoption or surrogacy agreements should not be enforceable by specific performance.[5]
>
> Second claim: The child has a right to be gestated by a human being, not by "ectogenesis," meaning gestation outside a person's body, in either a machine or a non-human animal.[6]

This Article supports the first claim but partially rejects the second from a feminist legal perspective. It connects this inquiry to the project of re-visioning the human condition as one of mutually dependent relationships rather than autonomous individuality.

The first claim is the mirror image of an argument I have made in prior work, in which I have argued that a birth mother has constitutionally protected parental rights.[7] Working within existing U.S Supreme Court precedent on parental rights, I have previously supported this claim from the adult perspective.[8] This Article shows that the same conclusion is correct when considered from the child's perspective. The parental right of the birth mother has a counterpart in the right of the child to legal recognition of the child's first human relationship.[9]

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[3] Abraham Joshua Heschel, *quoted in* Athena Beldecos et al., *The Importance of Feminist Critique for Contemporary Cell Biology*, 3 HYPATIA 61, 73 (1988).
[4] BARBARA KATZ ROTHMAN, RECREATING MOTHERHOOD: IDEOLOGY AND TECHNOLOGY IN A PATRIARCHAL SOCIETY 257 (1989).
[5] *See id.* at 254-56.
[6] *See id.* at 257.
[7] *See* Jennifer S. Hendricks, *Essentially a Mother*, 13 WM. & MARY J. OF WOMEN & L. 429, 473-82 (2007).
[8] *See id.*; *see also infra*, part III.A.1.
[9] *See infra*, part III.A.2.

Of course, we can assign parental status to the birth mother only if she exists, which is guaranteed only if the second claim is also correct. Moreover, if artificial gestation is possible, as some scientists claim, then we must decide whether it should be encouraged, discouraged, or prohibited.

The idealized possibility of ectogenesis already influences the way legal culture thinks about pregnancy, its regulation, and its commodification. To date, legal commentators have discussed the prospect of artificial gestation primarily as a potential solution to the problem of abortion.[10] Some have also noted that artificial wombs would be an alternative to surrogacy, which has been criticized from a variety of perspectives.[11] Although legal commentators have also noted potential legal or ethical problems with artificial wombs, the primary role of this technological prospect in legal discourse is as a beneficial development that will help resolve current legal conflicts. These expectations about resolving deep-seated problems and controversies through technology are overly optimistic. Artificial wombs, if understood as alternatives to human pregnancy, are as likely to be used to control rather than to liberate or empower women, especially women who are disadvantaged by race and/or class.

While this Article discusses the legal principles that would apply to artificial wombs, it is skeptical about the technological possibility of artificial wombs in the foreseeable future. Accordingly, the focus of the article is on the effect that the *fantasy* of artificial gestation has on the legal and scientific discourse around pregnancy and reproduction today.

Part I of this Article describes the current lay of the land with respect to artificial womb technology: its definition, potential uses, and stage of development.

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[10] *See, e.g.,* Vernelia R. Randall & Tshaka C. Randall, *Built In Obsolescence: The Coming End to the Abortion Debate*, 4 J. HEALTH & BIOMED. L. 291, 307-08, 309 (2008); PETER SINGER & DEANNE WELLS, MAKING BABIES: THE NEW SCIENCE AND ETHICS OF CONCEPTION 119-20 (1985); Michael Buckley, *Current Technology Affecting Supreme Court Abortion Jurisprudence*, 27 N.Y.L. SCH. L. REV. 1221 (1982); Mark A. Goldstein, *Choice Rights and Abortion: The Begetting Choice Right and State Obstacles to Choice in Light of Artificial Womb Technology*, 51 S. CAL. L. REV. 877, 894 (1978); Ken Martyn, Comment, *Technological Advances and* Roe v. Wade: *The Need to Rethink Abortion Law*, 29 UCLA L. Rev. 1194, 894 (1982).

[11] *See, e.g.,* SINGER & WELLS, *supra* note 10, at 118-19.

Part II.A places the fantasy of artificial gestation in the context of theories of reproduction propounded by western science. The history of scientific theorizing about reproduction is a history of male scientists' efforts to prioritize the male contribution and minimize the degree to which men are dependent on women for the creation of their offspring. Feminist scientists and philosophers of science have demonstrated how sex-based ideology has skewed and hampered scientific efforts to understand the biology of reproduction. Scientific pronouncements about the prospects for building artificial wombs reflect the biases that have historically plagued reproductive science, making it likely that those prospects are systematically overstated.

The rest of Part II discusses how legal discourse uses the prospect of artificial gestation to shape current practices regarding reproduction and control of women's bodies. For example, legal scholars increasingly cite the prospect of artificial wombs as a solution to the controversy over abortion, since the fetus could survive without requiring the pregnant woman to sustain it. Pregnant women seeking abortions could instead be required to choose between continuing the pregnancy or undergoing an extraction procedure in which the embryo or fetus would be transferred to an artificial womb. This predicted "solution" informs legal analysis of the scope of reproductive rights today by constructing the woman and fetus as separate individuals with opposing interests. Similarly, comparisons between mechanical wombs and human gestators shape legal rhetoric about commercial surrogacy and legal control of pregnant women.

Part III proposes a different legal response to the prospect of artificial wombs, analyzing the possibilities through a lens that rejects the dichotomies that have traditionally structured and constrained legal discourse about reproduction. It puts the legal-technological discourse about gestation in the context of a feminist project of re-visioning the human condition as one of mutually dependent relationships rather than autonomous individuality. Feminists have demonstrated that the autonomous individual is a myth[12]; the fantasy of artificial wombs is a psychic representation of that myth. It constructs motherhood in a way that minimizes the importance of the human connection of pregnancy. A child born through natural gestation, or even through individual-initiated artificial gestation, enters the world with a claim to that connection;

[12] *See generally* MARTHA ALBERTSON FINEMAN, THE AUTONOMY MYTH (2005).

for the state to create a child through artificial gestation would be to create an intentional orphan, the family-level equivalent of a stateless person. Therefore, although tentatively concluding that artificial gestation should be permissible as a means for individuals to reproduce, it rejects state-mandated or state-initiated gestation as a moral alternative to abortion or for any other purpose.

I. THE FANTASY OF ARTIFICIAL GESTATION

This Part introduces the proposals for creating artificial wombs that can be found in scientific and bioethics literature. Part I.A discusses what is meant by the term "artificial womb," focusing on the use of artificial wombs for ectogenesis, meaning human reproduction that occurs entirely outside the body. Part I.B summarizes the benefits that proponents cite as justifying the development of artificial womb technology. Part I.C discusses the technical barriers to artificial gestation and argues that proponents tend to emphasize the challenges of providing basic fetal life support but gloss over the developmental challenges that ectogenesis would entail. This point provides the foundation for Part II, which shows that this imbalance reflects long-standing gender bias that has frequently skewed reproductive science.

A. DEFINITIONS

What is an "artificial womb"?

If a child could be created from gametes without ever growing inside a person, the device that accomplished this feat would be considered an artificial womb. Such freestanding gestation is the ultimate goal of a few scientists who have designed their research specifically to that end.[13] The technology that might accomplish this goal comes from two, more general lines of research: First, the technology of in vitro fertilization and other research on embryos has lengthened the period of time a fertilized egg can be kept alive and developing in a laboratory. Second, medical science strives to save premature infants at increasingly early points of delivery. If these two lines of research eventually meet somewhere in the middle, we will have artificial wombs capable of complete ectogenesis—the

[13] *See infra*, Part I.C. (discussing the work of Drs. Kyoshinori Kuwabara and Hung-Ching Liu).

creation of a human child without any period of gestation in a woman's body.[14]

At least some proposed uses for artificial wombs involve more modest technological ambitions and are akin to neonatal medicine. An embryo or fetus that began its development inside a woman might be transferred to the device at some point during pregnancy.[15] That possibility raises the question: What are the features that would make such a device qualitatively different from current neonatal-ICU technology and thus warrant the designation "artificial womb"?

One distinction may lie in the nature of the technology and the underlying science. In the last few decades, technology has pushed back the survival age for premature infants by a few weeks and improved the survival rates within that period.[16] Many scientists believe they are reaching the limit of current technological approaches, due to the need for a threshold level of lung development before an infant can tolerate artificial ventilation.[17] To move the point of viability further back in pregnancy would require a quantum leap, a qualitatively different technology that would support the infant more comprehensively. For example, it might involve providing oxygen other than through the lungs, and it might require

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[14] *See* Scott Gelfand, *Introduction, in* ECTOGENESIS 1, 2 (Scott Gelfand & John R. Shook, eds., 2006) (discussing the convergence of these two lines of research as the most likely path to complete ectogenesis); STEPHEN COLEMAN, THE ETHICS OF ARTIFICIAL UTERUSES: IMPLICATIONS FOR REPRODUCTION AND ABORTION 5 (2004) (same).

[15] Transfer from a pregnant woman to a machine might be desired for medical reasons or in lieu of abortion. Proposals to use artificial wombs as alternatives to abortion are discussed *infra*, Part II.B. Depending on how the technology develops, a mid-pregnancy transfer to a machine might be either more or less difficult than mechanical gestation for the full term.

[16] *See* Nancy K. Rhoden, *The New Neonatal Dilemma: Live Births from Late Abortions*, 72 GEO. L.J. 1451, 1452-1453, 1461 (1984); Paul Reidinger, *Will Roe v. Wade Be Overruled?*, 74 A.B.A. J. 66 (1988) ("The gist of all this is that the point of viability does not seem to be moving inexorably backward as Justice O'Connor suggested, indeed has moved barely at all since Roe was decided. The rates of survival for premature infants jump dramatically in most studies between the 24th and 28th weeks. One recent study showed that while only 20 percent of infants born at 24 weeks survived, 83 percent of those born at 28 weeks did.").

[17] *See* Rhoden, *supra* note 16, at 1465-66 ("At present, fetal lung development is a limiting factor for neonatal survival because an infant whose lungs completely lack surfactant cannot survive.").

submersion in a liquid that simulates amniotic fluid.[18] This technology might strike us as visually very similar to natural gestation. We would think of the submersion container as an artificial womb even if it could not substitute for a woman's body for the entire period of pregnancy.

Another basis for distinction might lie in our beliefs or practices regarding the status of the fetus. We may collectively be inclined to deem a device an artificial womb, rather than merely another piece of neonatal technology, if it is able to take over from the human mother early enough that the embryo or fetus does not yet seem visually like a baby.[19]

This Article focuses on the prospect of true artificial wombs: human-made machines that can perform all the functions of gestations. There are also proposals for what we might call quasi-artificial wombs, which straddle the definitional borders between artificial gestation, surrogacy, and surgical cures for infertility.

First, there is the possibility that an artificial, human-made womb could function inside a person's body. A woman or man who was not otherwise able to gestate could use the device to do so. Depending on the path of technological development, this could be either more difficult than freestanding gestation (because it would require miniaturization of the device) or less difficult (because it would involve supplementing existing organs and bodily processes rather than building a device from scratch). The former path of development would necessarily take us through all of the questions and problems raised by complete ectogenesis. The latter path would be relatively unproblematic from a legal and cultural perspective, since the use artificial components could easily be understood as

[18] Alternative means of providing oxygen have been tried but have not yet surpassed ventilation as a means of effective treatment. *See infra*, notes 57-61 and accompanying text.

[19] *Cf.* Joyce M. Raskin & Nadav Mazor, *The Artificial Womb and Human Subject Research, in* ECTOGENESIS 159, 168 (Scott Gelfand & John R. Shook, eds., 2006) ("We will become more sympathetic and attribute greater moral value to the fetus, growing in a glass tank, as it gains the shape of a human being."); Goldstein, *supra* note 10, at 894 (arguing that a fetal development standard should replace viability as the cutoff for legal abortion); Martyn, *supra* note 10, at 894 (1982) (same). This line of distinction is discussed further below, in connection with the effect of artificial wombs on abortion rights and the concept of viability in abortion doctrine. *See infra*, Part II.B.

treatment for infertility.[20] We would not have to face the unique questions raised by ectogenesis, since children would still be gestated inside an existing person's body.

Second, non-human animals could be used to gestate human infants. Most writers appear to consider this option ethically more problematic, even if it may be technologically easier, as compared to gestation in a machine.[21]

Third, women who are brain dead or in a persistent vegetative state could serve as gestational surrogates.[22] Women could be asked in advance whether they would be willing to gestate a fetus after their own brain death, in the same way that people today are asked to consent to be organ donors.[23] Doctors have already successfully sustained pregnancies in women who were raped while in a vegetative state[24] and others who were already pregnant when they

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[20] *See* Noa Ben-Asher, *The Curing Law: On the Evolution of Baby-Making Markets*, 30 CARDOZO L. REV. 1885 (arguing that society is more willing to accept reproductive technologies that are perceived as cures for disease); ROTHMAN, *supra* note 4, at 257 (supporting gestational technology used within the body, including by men, but opposing extracorporeal gestation) ("Men are free to develop the technology to become mothers."). Use of an artificial womb by a person otherwise considered male would raise cultural and legal questions similar to those that were raised in recent popular discussions of a pregnant transgendered man.

[21] *See* COLEMAN, *supra* note 14, at 1-2 (excluding non-human gestation from the scope of discussion in a book-length treatment of ectogenesis because the use of animals raises additional ethical issues). Coleman does not specify whether he perceives the additional issues as pertaining to the animals' interests, the humanity of the resulting child, or both. For an interesting discussion of legal and cultural concerns about the use of animals in human reproductive processes, see Maneesha Deckha, *Holding On to Humanity: Animals, Dignity, and Anxiety in Canada's Assisted Human Reproduction Act*, 5 UNBOUND 21 (2009).

If animal gestation were pursued, it would involve large mammals such as cows or horses, since other primates are too small to gestate human babies. The challenges presented by differences in bodily systems and nutritional requirements would thus be even greater than would be present with primate systems. When asked about the prospects for gestation by a non-human animal as compared to gestation in a machine, one development biologist told me that use of an animal would be "definitely easier, I think, but also impossible." Personal communication from S. Michael Hendricks, 9/25/10; *see also* Coleman, *supra* note 14, at 1 (positing a cow or donkey as the likely animal).

[22] *See* Rosalie Ber, *Ethical Issues in Gestational Surrogacy*, 21 THEORETICAL MED. & BIOETHICS 153, 164-65 (2000).

[23] *Id.* at 165.

[24] *See* Daniel A. Manion, *Rights That Are Wrong*, 72 NOTRE DAME L. REV. 1, 4 (1996) (describing a case involving rape of a comatose woman); *Doe v. Westfall*

experienced brain death.[25] Initiating and staging an entire pregnancy by IVF in a brain dead woman would likely pose additional challenges, but it would be easier and cheaper than inventing and building gestation machines.[26]

B. USES AND BENEFITS OF ARTIFICIAL WOMBS

Most scientists whose research could lead to ectogenesis are focused on developing treatments either for infertility or for complications of pregnancy and premature birth.[27] Bioethicists and legal commentators, however, have identified additional benefits that may flow from artificial gestation.

If artificial wombs were widely available, they could release the women who used them from the risks and burdens of even normal pregnancy, without transferring those risks to other, lower status women.[28] Artificial wombs could therefore be seen as a liberating technology for women. For example, Shulamith Firestone famously called pregnancy "barbaric" and looked forward to the day when technology would free women from the physical demands of reproduction.[29] She believed that sex equality would not be possible until technology equalized the sexes when it came to making

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Health Care Ctr., Inc., 755 N.Y.S.2d 769 (N.Y. App. Div. 2002) (ruling on a tort suit involving rape of a patient in a chronic vegetative state).

[25] Julien S. Murphy, *Is Pregnancy Necessary? Feminist Concerns About Ectogenesis*, 4 HYPATIA 181, 183-84 (2009); James M. Jordan, III, Note, *Incubating for the State: The Precarious Autonomy of Persistently Vegetative and Brain-Dead Pregnant Women,* 22 GA. L. REV. 1103, 1107-1109 (1988).

[26] *See* Murphy, *supra* note 25, at 184 (noting that the doctor in one case, who was prepared to obtain a court order if any relatives of the brain-dead woman tried to intervene, stated that the woman had no legal rights and that the bodies of brain-dead women are "the cheapest incubators we have"); *cf.* Jordan, *supra* note 25, at 1165 n. 25 (comparing the costs of neonatal intensive care to the cost of maintaining a pregnant, brain-dead woman on life support).

[27] Ethicists often cite medically indicated surrogacy as the primary use. *See, e.g.,* SINGER & WELLS, *supra* note 10, at 118; Rosemarie Tong, *Out of Body Gestation: In Whose Best Interests?, in* ECTOGENESIS 59, 70 (Scott Gelfand & John R. Shook, eds., 2006) ("[Because many women value a genetic connection with a child,] and because of serious concerns I have about one woman using another woman's body to make a baby for her for money, I am prepared to accept the better surrogacy argument in favor of ectogenesis.").

[28] Contract surrogacy has been criticized for transferring these risks to lower-status women. *See, e.g.,* Dorothy E. Roberts, *Spiritual and Menial Housework*, 9 YALE J.L. & FEMINISM 51, 65-68 (1997).

[29] SHULAMITH FIRESTONE, THE DIALECTIC OF SEX: THE CASE FOR FEMINIST REVOLUTION 198 -199 (1970).

babies.[30] Importantly, Firestone did not believe that the technology of artificial gestation, standing alone, would be liberating; she advocated radical restructuring of society, including abolition of the family as an institution, with freedom from pregnancy only one factor supporting women's equality.[31] Other feminist writers, however, have more directly hailed reproductive technology as a path to sex equality.[32] By diminishing the mother's greater role in the creation of a child, technology could free women from their disproportionate physical burden. It could also put men on an equal footing with women at the outset of family life, including by allowing men to reproduce without a female partner or gestational surrogate.

It seems unlikely that elective use of artificial wombs would be available to any but the wealthy. Even medically indicated ectogenesis would be available only to the relatively well-off, as is true today for expensive treatments for neonates and for infertility. That more options are available to those with higher incomes is, of course nothing new, so an argument against ectogenesis on those grounds is no different from a similar argument against any advanced reproductive technology.[33]

Proponents of artificial wombs have also argued that artificial gestation would be safer for the fetus than human gestation under a range of circumstances. Some of these proposals predictably reflect current debates about control of pregnant women, suggesting that

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[30] *Id.* at 238.

[31] *Id.* at 8-9; *see also* Murphy, *supra* note 25, at 191 (arguing that Singer and Wells's claim that the technology would be liberating "ignores the theory of revolution implicit in Firestone's support for ectogenesis").

[32] *See, e.g.,* Marjorie Maguire Shultz, *Reproductive Technology and Intent-Based Parenthood: An Opportunity for Gender Neutrality*, 1990 WISC. L. REV. 297; *but see* Randall & Randall, *supra* note 10, at 307-08, 309 (arguing that apparent equalization would have disproportionate effects on women, especially poor women and women of color).

[33] *See* Joan Woolfrey, *Ectogenesis: Liberation, Technological Tyranny, or Just More of the Same?, in* ECTOGENESIS 129, 130-33 (Scott Gelfand & John R. Shook, eds., 2006) (arguing that ethical issues regarding resource allocation weigh heavily against pursuit of artificial womb technology); LAURA M. PURDY, REPRODUCING PERSONS: ISSUES IN BIOETHICS 229-30 (1996) (suggesting that pursuing reproductive technology diverts resources from other health care needs and is "not just a matter of letting the wealthy decide how to use their disposable income"); *but see* COLEMAN, *supra* note 14, at 38-41 (responding to the resource allocation objection to reproductive technology).

women who are addicted to drugs or have other particular problems could be required to transfer their fetuses to artificial wombs.[34] Others have gone so far as to posit that ectogenesis would be safer for the fetus as a general matter.[35] Artificial gestation would protect the fetus from various dangers in the "real world," including irresponsible maternal behavior and "dietary fads" among pregnant women.[36] The fetus would be nurtured in a scientifically designed, calibrated, and controlled environment, with exactly the right kinds and amounts of sustenance and stimulation.

This construction of the pregnant woman as a threat to the fetus has been thoroughly critiqued in feminist legal literature.[37] In the context of ectogenesis, the most important critique is of the arrogance of both the medical and legal establishments about what they think they know. Many "dietary fads" among pregnant women and mothers—say, the "fad" for formula over breast milk—originate

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[34] *See, e.g.,* Gregory Pence, *What's So Good About Natural Motherhood? (In Praise of Unnatural Gestation), in* ECTOGENESIS 77, 82 (Scott Gelfand & John R. Shook, eds., 2006) (discussing women with drug addictions and HIV infection).

[35] *See id.* at 82 (arguing that ectogenesis would allow for "careful monitoring and study of the *best possible* nutrients for the fetus") (emphasis added); Edward Grossman, *The Obsolescent Mother: A Scenario*, 5 THE ATLANTIC 39, 48 (1971), *cited in* Amel Alghrani, *The Legal and Ethical Ramifications of Ectogenesis*, 2 ASIAN J. WTO & INT'L HEALTH L. & POL'Y 189, 205 (2007) ("An efficient artificial womb, far from increasing the incidence of birth defects, would reduce them by keeping the foetus in an absolutely safe and regular environment.").

[36] Emily Jackson, *Degendering Reproduction*, 16 MED. L. REV. 346, 360 (quoting ROGER GOSDEN, DESIGNER BABIES: THE BRAVE NEW WORLD OF REPRODUCTIVE TECHNOLOGY 179 (1999), and criticizing the view that fetuses need to be protected from their mothers as a general matter); *see also* Scott Gelfand, *Ectogenesis and the Ethic of Care, in* ECTOGENESIS 89, 102 (Scott Gelfand & John R. Shook, eds., 2006) (arguing that it is reasonable to assume that ectogenesis would be healthier for both the mother and the child and would protect the child from "second-hand smoke, alcohol, and an unhealthy diet").

[37] *See* Jackson, *supra* note 36, at 360-61 (applying those critiques in the context of ectogenesis); Reva Siegel, *Reasoning From the Body: A Historical Perspective on Abortion Regulation and Questions of Equal Protection*, 44 STAN. L. REV. 261, 341-42 (1992) (arguing that "selective regulation of women's conduct is justified on the grounds that pregnant women have a unique physical capacity to harm children, when the regulation may in fact reflect the view that pregnant women have a unique social obligation to protect children"); Dorothy E. Roberts, *Punishing Drug Addicts Who Have Children: Women of Color, Equality, and the Right to Privacy*, 104 HARV. L. REV. 1419 (1991).

with the medical industry.[38] Rothman explains the risks of relying on mass-scale, technological solutions to complex and difficult questions about creating and sustaining life:

> We cannot know who will be right, but we do know that, inevitably, anyone making these decisions will sometimes be wrong. To me, it comes down not to whose *judgment* we trust, but whose *mistakes*. … Why, then, do I trust the idiosyncratic mistakes of parents? Precisely because they are idiosyncratic. The mistakes of medicine and those of the state are systematic, and that alone is reason not to trust.[39]

For these reasons, claims that artificial wombs should be welcomed as superior to human gestation should be greeted with skepticism.

Even if ectogenesis is inferior to natural gestation, it might be good enough to serve as an alternative to abortion. In the case of medically necessary abortions, the artificial alternative would be analogous to neonatal care. There might also be situations in which a woman who today might give birth and place the child for adoption would strongly prefer an earlier divestiture.[40] For the most part, however, writers who posit artificial gestation as an alternative to abortion contemplate outlawing abortion and requiring women to instead undergo a fetal extraction and transfer procedure.[41]

Finally, artificial wombs could be used to create stem cells, organs, and other spare parts, rather than for the complete gestation of a new person.[42] This potential use raises many additional

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[38] *See* Tong, *supra* note 27, at 65-66 (summarizing the history of the medical establishment's assertion of control over pregnancy, including telling pregnant women "when to eat, sleep, exercise, have sex, and the like"); Linda C. Fentiman, *Marketing Mothers' Milk: The Commodification of Breastfeeding and the New Markets for Breast Milk and Infant Formulas*, 10 NEV. L.J. 29, 36-38 (2010) (describing the medical industry's promotion of formula over breastfeeding).

[39] ROTHMAN, *supra* note 4, at 193.

[40] For example, a woman who was opposed to abortion but became pregnant through rape might find the alternative of artificial gestation to be an acceptable compromise.

[41] *See, e.g.,* SINGER & WELLS, *supra* note 10, at 119-20.

[42] This might be feasible on a part-by-part basis, or it might require the intentional creation of brain-dead, but otherwise complete, individuals. *See* SINGER & WELLS, *supra* note 10, at 132-35 (describing and partially rejecting this potential use of artificial womb technology). Singer and Wells argue that embryos could be used for these purposes as long as they are not yet in any way sentient. *Id.* at 133. On the prospect of creating intentionally brain-dead individuals to circumvent that barrier,

questions, and ethicists and other commentators reject most such uses of artificial womb technology.[43] Accordingly, this Article focuses on true ectogenesis designed to substitute for the gestation and birth of a child. Of course, that technology, once built, would also have the potential to be used for research and organ replacement purposes. Indeed, if artificial womb research is pursued, therapeutic and research uses would likely become feasible before complete ectogenesis is possible.[44]

C. TECHONOLOGICAL PROSPECTS

Since at least the 1920s, scientists have claimed that the technological capacity for ectogenesis is imminent,[45] but the years

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they acknowledge that this would be permissible under their utilitarian framework but "emphatically urge caution" because of the potential collateral effects on people's ability to bond with infants. *Id.* at 133. For a more detailed discussion that concludes with a more emphatic rejection of this path, see COLEMAN, *supra* note 14, at 161-65.

[43] *See* works cited, *supra* note 42.

[44] Technically, the "spare parts" endeavor does not require an artificial womb; a live woman could work just as well. Presumably, not enough women would be willing to serve in this capacity for it to become widespread. *See* Raskin & Mazor, *supra* note 19, at 166 ("[C]onsidering that the in vitro fetus is no longer protected by the natural shield of a female womb, it is further exposed to the scientific hunger for research than the in vivo fetus."). However, a woman might want to do so if it were herself, her own child, or another family member who was in need of tissue or a transplant. *Cf.* Fazal Kahn & Brian Lea, *Paging King Solomon: Towards Allowing Parents to Donate Organs of Anencephalic Infants*, SSRN (discussing the use of encephalitic infants as organ donors and proposing a ban on the intentional creation of encephalitic fetuses).

[45] Tong, *supra* note 27, at 60-61 (summarizing from SUSAN SQUIER, BABIES IN BOTTLES: TWENTIETH-CENTURY VISIONS OF REPRODUCTIVE TECHNOLOGY (1995)). The earliest documented claim for artificial gestation was a sixteenth-century recipe for creating a human form by allowing a man's semen to putrefy in the sealed womb of a horse. The resulting creature, however, was believed to lack a soul. *See* Gelfand, *supra* note 14 at 3. Interest in and anticipation of ectogenesis has come in cycles, with a spate of interest in the 1920s, another in the 1970s and 1980s, and the current cycle, which began around the turn of the millennium. *See* Tong, *supra* note 27, at 60-67 (describing the three periods). These cycles are reflected in spurt of interest in ectogenesis in law reviews in the late 1970s and again in the last five years. *See* Jessica H. Schultz, *Development of Ectogenesis: How Will Artificial Wombs Affect the Legal Status of a Fetus or Embryo?*, 84 CHI.-KENT L. REV. 877 (2010); Eric Steiger, *Not of Woman Born: How Ectogenesis Will Change the Way We View Viability, Birth, and the Status of the Unborn*, 23 J.L. & HEALTH 143 (2010); Randall & Randall, *supra* note 10 (2008); Jackson, *supra* note 36 (2008); Alghrani, *supra* note 35 (2007); Buckley, *supra* note 10; Martyn, *supra* note 10 (1982); Goldstein, *supra* note 10 (1978).

come and go and no artificial wombs are built. Great progress has been made in both embryonic research and care for premature infants. However, recent anticipation of ectogenesis among ethicists and legal scholars appears to be overly optimistic.

The most frequent announcements of imminent ectogenesis have been made by non-biologists writing about law or ethics rather than by scientists themselves.[46] Recent popular and academic discussions of the advent of artificial wombs typically cite the same two researchers, Dr. Kyoshinori Kuwabara of Juntendo University, Tokyo, and Dr. Hung-Ching Liu of Cornell University, New York State.[47] Dr. Kuwabara's research approached ectogenesis from the direction of fetal survival, trying to push back the point of viability for premature babies. He predicted in 1997 that partial ectogenesis—from the sixteenth week of pregnancy—would be possible in about ten years.[48] Dr. Liu worked from the other direction, developing techniques for maintaining embryos and encouraging them to implant in artificial environments. She, too, has predicted that her techniques would lead to complete artificial wombs within a few years.[49] Both of these lines of research are provocative enough to capture press attention periodically.[50] Indeed, their work continues to

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[46] Gelfand, *supra* note 14, at 1; SINGER & WELLS, *supra* note 10, at 118; Steiger, *supra* note 45, at 144; Goldstein, *supra* note 10, at 880; Martyn, *supra* note 10, at 1244.

[47] *See* COLEMAN, *supra* note 14, at 11; Schultz, *supra* note 45, at 881-82; Alghrani, *supra* note 35, at 194-95; Randall & Randall, *supra* note 10, at 297; Jackson, *supra* note 36, at 358.

[48] *See* Gelfand, *supra* note 14, at 2.

[49] *See id.* at 2.

[50] Those of us who are interested in the legal and ethical problems of artificial reproduction may be eager to seize on the promise of technological imminence. For example, Stephen Coleman's book devoted to ectogenesis canvasses the state of current research in the field. COLEMAN, *supra* note 14, at 5-14. His survey includes the usual citations to the work of Dr. Kuwabara, as well as an embryo study by Dr. Carlo Bulletti in Bologna. The only other current research cited is what Coleman describes as "the theoretical work of Dr. William Cooper," as evidenced by a 1991 patent application for a "placental chamber." *Id.* at 12. As best as I can determine, Dr. Cooper is an obstetrician with no apparent research credentials who practiced in Tulsa, Oklahoma under the business name Christian Fertility Institute. According to the website of the Oklahoma Medical Board, his license was revoked in 1998 following disciplinary actions in Georgia and Pennsylvania for "failure to provide a proper setting and assistive personnel for medical act," "fraud obtaining license credentials," and "unprofessional conduct." *See* www.okmedicalboard.org/licensee/MD/15621 (last visited 12/21/10).

be cited even though Dr. Kuwabara died in 2000 and Dr. Liu has not published her results.[51]

Technical barriers to creating artificial wombs can be thought of as falling into two categories: life-support barriers and developmental barriers. "Life-support barriers" refers to the difficulties involved in artificially performing the ordinary bodily functions that the developing body cannot yet do for itself. These are familiar from neonatal intensive care: the body must have mechanisms for absorbing oxygen, taking in nutrients, and expelling waste. "Developmental barriers" refers to difficulties in directing the growth of a fertilized egg so that it correctly follows the path from embryo to fetus to healthy infant.

Before describing these challenges, I hasten to add that the dichotomy between life-support barriers and developmental barriers is artificial. In natural gestation, the uterus performs both life-support and developmental functions, and it would be difficult to draw a clear line between the two categories. My distinction between the two categories is intended only to draw attention to a feature of legal and ethical discussions of artificial wombs. Discussions of the technological prospects for ectogenesis tend to focus on the life-support barriers that are familiar from neonatal care. While these discussions acknowledge the concern that artificially gestated fetuses will experience developmental problems, they generally do not treat embryo development as one of the functions of the uterus; the implicit assumption is that if the life-support functions are performed correctly, proper development will occur. In Part II, I argue that this implicit assumption reflects a long-standing ideological view of reproduction that is likely inconsistent with the scientific facts.

From a life-support perspective, one challenge for artificial gestation is to replicate the placenta. The placenta is the medium for fetal inputs and outputs: nutrition, oxygen, and waste.[52] A successful artificial womb would be able to perform the functions of the placenta, as well as protect the fetus with something akin to amniotic

[51] *See* Alghrani, *supra* note 35, at 194 (noting Dr. Kuwabara's death and that Dr. Liu's work was unpublished). A member of Dr. Kuwabara's research team stated that their approach might be able to push the point of viability back to twenty weeks but that he personally had no plans to pursue that line of research. *See* Alghrani, *supra* note 35, at 194.

[52] COLEMAN, *supra* note 14, at 7 (describing the functions of the placenta).

fluid.[53] Neonatologists have had greatest success when they approach such tasks in a manner that mimics ordinary gestation, rather than in a manner that attempts to treat the newborn as one would treat a fully developed infant.[54] For example, doctors deliver nutrition to very premature infants intravenously, rather than relying on their incomplete digestive systems.[55] Similarly, their fragile skin is protected by a moist environment or even by creams that can mimic amniotic fluid.[56] The exception is the provision of oxygen.[57] Premature babies are typically treated with high-frequency ventilators that supply oxygen through the lungs rather than through the bloodstream.[58] This requires additional treatment to encourage the lungs to develop as quickly as possible.[59] Although in the past there has been research on how to mimic the provision of oxygen through the placenta, the techniques that were developed failed to out-perform ventilators because the equipment could not be made small enough for the infants' blood vessels but still large enough to transport sufficient oxygen.[60] The need for sufficient lung development to tolerate a ventilator is thus the most significant factor in setting the current limit of fetal viability.[61]

Given the difficulties of recreating the uterine environment in order to sustain a mid-term fetus, it almost begins to look easier to rely on natural processes by initiating the pregnancy *in vitro* and allowing the mechanisms for sustaining the fetus to develop organically. If an embryo could implant in an artificial container that behaved like a womb, the blood vessels and other connections

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[53] *Id.* ("The amniotic fluid acts to regulate foetal temperature, to prevent dehydration, and as a barrier to infection.").
[54] *Id.* ("When treating extremely premature newborns, neonatologists attempt to mimic the uterine function when treating problems of these types.").
[55] *Id.* at 7-8.
[56] *Id.* at 8.
[57] *See* COLEMAN, *supra* note 14, at 9 ("The treatment of respiratory problems in premature infants is clearly quite different from the treatment of most other problems, as the treatment relies exclusively on the body system that is responsible for oxygenation of the blood after birth: the lungs.").
[58] *Id.* at 8-9.
[59] *Id.*
[60] *Id.* at 9-11.
[61] *See* Pence, *supra* note 34, at 85 ("For thirty years, viability of the lungs of the premature baby has been the absolute barrier to progress towards an artificial womb. Reports of success using liquids to substitute for the mother's placenta have usually been exaggerated.").

necessary for sustaining life could grow themselves. In this scenario, the difficulty would lie in directing fetal development: the artificial womb would have to deliver the correct hormones and growth factors at the correct times.[62] This developmental challenge, however, has received little attention in the popular, ethical, and legal literature about artificial gestation, which focus on life-support issues.[63] There is an underlying assumption that providing the proper climate and nutrition will enable the embryo's development to unfold naturally and of its own accord. As shown in Part II, this assumption is more ideological than scientific.

Contemplating artificial gestation from a developmental perspective also has important implications for ethical barriers to this sort of research. When the focus of research is on life-support measures for saving premature infants, there are opportunities for doctors to experiment with new methods. If an infant is certain to die without intervention, even an untested technique can be tried, and thereby become tested.[64] By contrast, experimentation is more fraught when it attempts to simulate the maternal-fetal signaling that shapes development. Errors may or not be detectable immediately and could result in seriously damaged children. Moreover, many developmental cues are likely to be species-specific, so animal experimentation may not provide an adequate basis for extrapolating to humans.[65]

Even if developmental barriers were overcome, at least some of the proposed uses for artificial wombs would require more sophisticated technology. For example, in order for artificial gestation to substitute for abortion, scientists would have to return to the problem of recreating placental connections once the original placenta has been severed from the natural womb. They would also

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[62] *See* Jackson, *supra* note 36, at 358 (describing Dr. Liu's research agenda and explaining that directing the development of organs in the early embryo would be more difficult than later life-support tasks).

[63] *See, e.g.,* COLEMAN, *supra* note 14, at 5-13 (as background to a book on the ethics of artificial gestation, describing life-support issues in detail without mentioning hormonal or other developmental processes).

[64] This is not to suggest that all ethical decisions about the treatment of imperiled newborns are easy ones. They are, however, beyond the scope of this Article.

[65] Personal communication from S. Michael Hendricks, 9/25/10; *cf.* Mark A. Rothstein, Yu Cai, and Gary E. Marchant, *The Ghost in Our Genes: Legal and Ethical Implications of Epigenetics*, 19 HEALTH MATRIX 1, 22 (2009) (noting that epigenetic changes tend to be species-specific and even tissue-specific).

have to develop techniques for safely removing the embryo or fetus from the pregnant woman. In order for artificial wombs to be a plausible alternative to most abortions in the United States, these techniques would have to be usable in the first trimester. At this stage, the embryo or fetus is already embedded in the uterus but is still quite small and not highly differentiated, both of which would make locating and transferring it difficult.

In the end, the best argument for the likelihood of ectogenesis is generalized faith in scientific progress and capacity: science has accomplished many things that would have been thought impossible before they were done; why should this be any different?[66] That is not an argument, however, for expecting the technology to be available in the near future. Moreover, as a counterweight to this presumptive optimism, consider the example of infant formula as a substitute for breast milk.[67] Formula is generally considered an adequate nutritional substitute when breast-feeding is not possible.[68] In recent years, however, evidence has accumulated about the relative health benefits of breastfeeding for both mother and infant. Simulating breast milk is a vastly simpler scientific endeavor that simulating gestation. The desired end-product can be sampled and tested without limit, and the goal is merely to replicate that substance. Yet this goal has not been met, despite decades of research funded by a robust market in formula sales. It is difficult to imagine that scientists are on the verge of offering up an artificial womb that is equivalent or superior to human gestation when they have not yet produced a convincing substitute for lactation. For these reasons, this Article is skeptical of the technological prospects for ectogenesis in the foreseeable future. The ideological history of reproductive science discussed in the next Part provides further grounds for skepticism.

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[66] *See, e.g.,* Gelfand, *supra* note 14, at 1 (noting that the first successful cloning of a sheep took many scientists by surprise); Alghrani, *supra* note 35, at 192 (invoking this reason for expecting success with ectogenesis).

[67] *Cf.* Maureen Sander-Staudt, *Of Machine Born? A Feminist Assessment of Ectogenesis and Artificial Wombs*, *in* ECTOGENESIS 109, 118 (Scott Gelfand & John R. Shook, eds., 2006) ("[S]cientists … have not even been able to identify, much less duplicate, all of the components of breast milk.").

[68] *See* NAOMI WOLF, MISCONCEPTIONS: TRUTH, LIES, AND THE UNEXPECTED ON THE JOURNEY TO MOTHERHOOD 268-71 (2001) (describing the benefits of breastfeeding but criticizing advocates who treat it as a "moral imperative" for putting too much pressure on women).

II. THE FANTASY AS A DREAM DIARY

A dream diary is a journal in which a person records her dreams, usually for the purpose of gaining insight into her own psychological state and processes. The practice of keeping a dream diary is based on the theory that our dreams reflect and reveal our psyches. This Part argues that the legal/scientific fantasy about artificial wombs can be read as a dream diary, reflecting and revealing a prevailing ideology about sex, gender, and reproduction.

Part II.A situates the science of artificial wombs in the history of reproductive science. Feminist scientists and philosophers of science have demonstrated how sex-based ideology has frequently skewed and hampered scientific efforts to understand the biology of reproduction. In particular, since Aristotle, reproduction has been theorized through a series of related dichotomies that minimize the role of gestation: the physical versus the spiritual or cognitive; the passive versus the active; the female versus the male; and the pregnant woman versus the fetus. Expectations for building artificial wombs reflect these dichotomies and the bias that has plagued reproductive science, making it likely that those prospects are systematically overstated.

On the strength of that bias, the fantasy of artificial wombs has become part of the legal discourse around reproduction. The word *fantasy* here refers not only to an ambition but to the creation of "unrealistic or improbable images in response to psychological need."[69] Even if ectogenesis is unlikely to be possible in the near or even the foreseeable future, legal analysis is already anticipating the possibility and is affected by that anticipation. Parts II.B and II.C discuss how this anticipation informs legal discussion of abortion rights and commercial surrogacy. By examining the cultural and scientific fantasy of creating artificial wombs, we can better understand current ideology about pregnancy and reproduction.

A. THE IDEOLOGY OF REPRODUCTIVE SCIENCE

My mother used to say that women made a mistake when they let men know they had anything to do with making babies. The disclosure, however, was probably unnecessary. The history of western reproductive science is a history in which men have rarely underestimated their own role in reproduction. Despite what would

[69] WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 449 (1988).

seem to be overwhelming evidence to the contrary, they have long theorized their role as greater and more important than women's. Only in the last century or so has women's lesser contribution (and general inferiority) ceased to be an axiom of scientific inquiry.[70]

Relaxation of that axiom has coincided with and gradually enabled better science. Nonetheless, early assumptions die hard. The scientific, legal, and ethical speculations about ectogenesis reflect the same biases that have long permeated reproductive science. It is therefore likely that the prospects for building artificial wombs are overstated.

1. From Ancient Times: Theorizing Reproduction Through Aristotle's Dichotomies

Western reproductive science begins with Aristotle, whose model of conception is reminiscent of Genesis.[71] Just as God formed Adam from the dust of the earth, Aristotle believed that men's semen contained the motive force that acted upon the raw materials contained in the woman to form a new being.[72] His model thus established two dichotomies as the basic framework for understanding reproduction: a dichotomy between the active male and the passive female and a second dichotomy between the immaterial life force of the man and physical body of the woman. Although some other classical theorists believed that both parents contributed to fetal development, "they uniformly held that woman's contribution was weaker than that of man."[73]

Aristotle's model of reproduction is considered "epigenetic." in that it supposes the embryo to be "newly produced through gradual development from unorganized material."[74] The organizing motive force comes from the outside and gives form to the raw materials. Epigenetic models of reproduction fell out of favor in the 1700s because they appeared to require a non-mechanical, spiritual force to

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[70] *Cf.* Nancy Tuana, *The Weaker Seed: The Sexist Bias of Reproductive Theory*, 3 HYPATIA 35, 41 (1988) ("We can see from such inconsistencies in Aristotle's theory that the doctrine the female sex was inferior to the male was not a premise to be proved or justified, but was rather an implicit belief underlying Aristotle's development of his biological theory and an axiom upon which he founded his theory of reproduction.").

[71] *See id.* at 38 (making this comparison).

[72] *See id.*

[73] *Id.* at 41.

[74] SHIRLEY A. ROE, MATTER, LIFE, AND GENERATION: 18TH CENTURY EMBRYOLOGY AND THE HALLER-WOLFF DEBATE 1 (2002).

mold the new being. Enlightenment scientific theory favored the clockwork universe.[75] The epigenetic theory of reproduction was thus replaced by "preformation" doctrine.[76] Preformationists believed that fetal development consisted of the "growth or unfolding of pre-existing structures."[77]

Originally, preformationists believed that the form of the fetus was contained within the mother's egg, and that the father's semen provided the trigger to stimulate growth.[78] It followed that an egg contained a series of Russian nesting dolls, with all the generations of humanity contained originally in Eve's eggs. However, this "ovist" view of reproduction was "almost uniformly rejected" once sperm was observed and recognized as the male analogue to the egg.[79] The pre-existing fetus was quickly transferred to the sperm. A famous eighteenth-century illustration of the preformationist view depicts a tiny man squatting in the head of a sperm, his own head either replaced by or enclosed in an oversized bulge.[80] This small creature was believed to take root and grow in the mother "just as the seed does in the field."[81]

Female inferiority continued to function as an axiom to justify preformationist theory. Erasmus Darwin, grandfather of Charles and a proponent of preformation, held that "the embryon is produced by the male, and the proper food and nidus by the female."[82] As support for his view that the female contributes no part of the embryo, he offered a proof by contradiction: If the female as well as the male helped to constitute the embryo, then her overall contribution would be greater than the male's; she would give both form and nutrition, he only form. That cannot be. QED.[83] The pre-existing embryo thus

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[75] Tuana, *supra* note 70 at 51.
[76] *Id.* at 51 ("The idea of an evolution of complexity from unstructured material lost favor toward the end of the seventeenth century as a result of the general scientific commitment to a mechanistic worldview and the insufficiency of mechanical explanations of the gradual development of living organisms."); ROE, *supra* note 74, at 4 (describing Rene Descartes's unsuccessful effort to reconcile an epigenetic theory of reproduction with a mechanistic, particle-based theory of matter).
[77] Tuana, *supra* note 70, at 51.
[78] *Id.* at 52.
[79] *Id.* at 52-53.
[80] *Id.* at 54
[81] *Id.* at 55.
[82] *Id.* at 55-56 (quoting Erasmus Darwin).
[83] *Id.* at 55.

assumed the role of Aristotle's motive force, while the pregnant woman remained a source of nutrients and other raw materials for sustaining growth. The dichotomy between these two parental contributions remained intact.

2. The Modern Era: Preformation and Genetic Determinism

Scientific discoveries can be hard on human sensibilities. Sigmund Freud explained,

> In the course of centuries the *naïve* self-love of men has had to submit to two major blows at the hands of science. The first was when they learnt that our earth was not the centre of the universe but only a tiny fragment of a cosmic system of scarcely imaginable vastness. … The second blow fell when biological research destroyed man's supposedly privileged place in creation and proved his descent from the animal kingdom and his ineradicable animal nature.[84]

Freud posited his own theories of the unconscious as the third major blow, "prov[ing] to the ego that it is not even master in its own house."[85] Freud's theories never having attained a level of scientific acceptance equivalent to evolution or the Copernican model, a better candidate for the third great blow to *man* is the discovery of DNA in human eggs, which proved that the sexes contributed (at least[86]) equally to the genetic makeup of their offspring.

Preformation theory had required that the motive force for a new being come from either the mother or the father, since the new being was envisioned as already complete. Like the ancients, the preformationists assigned the father this role, and they pointed to active, swimming sperm as the vehicle for placing the new being inside the mother.[87] With the discovery that DNA resided in both the sperm and the egg, scientists and society at large were forced to

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[84] Sigmund Freud, *Introductory Lectures on Psychoanalysis* (1916), *IN* JAMES STRECHY, ED., 16 THE STANDARD EDITION OF THE COMPLETE PSYCHOLOGICAL WORKS OF SIGMUND FREUD 284-85 (1963).

[85] *Id.*

[86] In addition to downplaying gestation as discussed in this Part, the popular cultural belief that a mother and father contribute equally to a child's DNA appears to be impervious to the discovery of mitochondrial DNA, which comes only from the egg. *See* W. Nicholson Price, *Am I My Son? Human Clones and the Modern Family*, 11 COLUM SCI. & TECH. L. REV. 119, 142-43 (2010) (discussing mitochondrial DNA and noting the "common belief" that DNA exists only in the nucleus).

[87] Tuana, *supra* note 70, at 52-53.

accept that women contribute not just raw material but also design plans.

Recall that Darwin's grandfather rejected this possibility because it led to the absurd result of the woman having a greater role in reproduction than the man.[88] Disproof of old-fashioned preformation did not mean that the culture was willing to concede that greater role. It avoided doing so by translating preformation into genetic determinism.[89] With the new understanding of DNA, the fetus could no longer be thought to have pre-existed the pregnancy. Instead, the essence of the fetus was its newly formed set of DNA, to which mother and father contributed equally. Thus, the fallback position, still in effect today, was to deny women's greater role in reproduction and insist on equality by minimizing the importance of gestation and equating biological parenthood with the contribution of nuclear DNA.[90]

The continuity between preformation and modern genetic determinism can be seen in the metaphors that continue to influence our understanding of reproduction today: Preformationists believed that the little being inside the sperm "develo[ped] in the mother just as the seed does in the field."[91] Into at least the late twentieth century, children were taught that babies are made when "daddy plants a seed" in mommy.[92] The lay cultural understanding of reproduction, and to some extent the scientific understanding, is rooted in a DNA-based version of preformation. [93]

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[88] *See supra*, notes 82-83 and accompanying text.

[89] Other scholars have observed the continuity between old-fashioned preformation doctrine and modern genetic determinism. *See, e.g.,* Jane Maienschein, *Cloning and Stem Cell Debates in the Context of Genetic Determinism*, 9 YALE J. HEALTH POL'Y, L. & ETHICS 565, 574-75 (2009) (discussing "the preformism of genetic determinism").

[90] *See* ROTHMAN, *supra* note 4, at 36-37 ("When forced to acknowledge that a woman's genetic contribution is equal to a man's, Western patriarchy was in trouble. But the central concept of patriarchy, the importance of the seed, was retained by extending the concept to women. … Women do not gain their rights to their children in this society as *mothers* but as *father equivalents*, as equivalent sources of seed.").

[91] Tuana *supra* note 70, at 55 (quoting a 1930 text of reproductive theory).

[92] Barbara Katz Rothman, *Daddy Plants a Seed: Personhood Under Patriarchy*, 47 HASTINGS L.J. 1241, 1244 (1996) ("In Western patriarchal societies the classic where-do-babies-come-from tale we tell children is a variation on "Daddy plants a seed in Mommy.").

[93] *See* Maienschein, *supra* note 89, at 575 (arguing that some scientists and the public were caught off guard by the success of cloning in part because they

The continuity extends back to Aristotle and his dichotomy between the active, spiritual force of the father and the raw material of the mother. In addition, a parallel dichotomy stretches forward to shape the cultural construction of reproductive activities. Barbara Katz Rothman and Dorothy Roberts have both described the cultural division of mothering work into what Roberts calls "spiritual" and "menial" categories.[94] This division allows privileged women to participate in public life while maintaining their identities as mothers; they can perform the spiritual role of mothers while hiring lower-status women to perform the menial tasks.[95] Rothman points out that this dichotomy enables higher- status women to assume privileges that are traditionally male without challenging the basic structure of privilege that constructs our gendered experiences of reproduction and care work.[96]

Today, DNA is thought of as a blueprint or design—something more cognitive than physical.[97] As the design force, it is valued as the "spiritual" essence of identity and individuality. Once a new set of DNA is created in a zygote, it implants in the mother, and its developmental process unfolds, under the guidance of its own unique set of DNA. We think of the fetus's relationship with "the maternal environment" as similar to our own relationship with our surroundings. The mother is a source of needed inputs and outputs—food, oxygen—and protection from certain harms. She provides basic, "menial" services. The new being is, however, essentially complete, preformed. As discussed in Part II.B and II.C, this conception of the embryo as essentially complete, merely waiting to unfold, has important implications for the law's approach to issues such as abortion and surrogacy. It is, however, an overly simplistic

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accepted the genetic determinist worldview); *id.* at 565 ("[T]his emphasis on genetic determinism [by scientists] has reinforced a popular misconception that what matters about the life of an individual organism, including its form and function, is laid out fully in all relevant respects with fertilization, at the time that the full complement of chromosomes comes together from the two parents.").

[94] Roberts, *supra* note 28, at 51-52.

[95] *Id.* at 57 ("Today, the spiritual/menial split enables many professional women to go to work without disturbing the sexual division of housework or relinquishing their role as spiritual housekeepers.").

[96] ROTHMAN, *supra* note 4, at 204-06.

[97] *See* Maienschein, *supra* note 89, at 574-75 ("Today, … the preformism of genetic determinism has overbalanced our understanding of complex developmental processes").

and systematically skewed model for understanding the creation of a new being.

3. The New Epigenetics: Science Resists the Dichotomies

In biology, epigenesis is on the rise once more, challenging and complicating the genetic determinism that took hold during the twentieth century. Today, the field of epigenetics studies how genes interact with environmental factors that influence gene expression—whether, when, and how particular genes are turned "on" or "off."[98] Rather than study the individual as a predetermined entity whose essence was fixed when the parents' chromosomes combined in a particular way, biologists study development as a complicated interaction between genes and other factors. The environment contributes not just raw materials but also form.

The interaction of genes and the environment breaks down the dichotomy between nature and nurture, between the cognitive blueprint and the physical implementation of a person. Importantly, epigenetics also challenges the prevailing cultural view that equates the genetic blueprint with parental inheritance and thus the essence of both identity and parenthood. The popular view is that genetic inheritance is fixed and that environmental factors, even if they operate on the genes, affect only the individual. The opposite, however, appears to be true. Epigenetic changes in gene expression affect not only the individual but also that person's descendants. That is, environmental factors create heritable effects. Thus, a more formal definition of the modern field of epigenetics is "the study of heritable changes in gene expression that occur without a change in DNA sequence."[99]

For example, one frequently discussed study of epigenetics involved the genes and epigenetic mechanisms that control the color of a mouse's fur.[100] The diet of a pregnant mouse can be manipulated

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[98] *See generally* Alan P. Wolffe and Marjori A. Matzke, *Epigenetics: Regulation Through Repression*, 286 SCIENCE 481, 481 (Oct. 15, 1999). For descriptions of the field of epigenetics that are written to be understandable by a legal audience, see Rothstein et al, *supra* note 65, at 5-23; Maienschein, *supra* note 89; Fazal Khan, *Preserving Human Potential as Freedom: A Framework for Regulating Epigenetic Harms*, 20 HEALTH MATRIX 259, 266-76 (2010).

[99] *See* Wolffe & Matzke, *supra* note 98, at 481.

[100] *See* Hugh D. Morgan, Heidi G.E. Sutherland, David I.K. Martin, and Emma Whitelaw, *Epigenetic Inheritance at the Agouti Locus in the Mouse*, 23 NATURE GENETICS 314 (1999). For a more accessible explanation, see Barry Starr, *Ask a*

so that her offspring are either black or yellow, even though they are genetically identical. More surprising, however, the difference in color is heritable: it persists into the next generation. The effect of the mother's diet is not "just" a matter of an environmental factor affecting a particular offspring; it becomes part of the heritable "instructions" that are passed down from one generation to the next. A similar process was likely responsible for a phenomenon observed in humans after the Dutch famine of 1944.[101] As one might expect, children who were in utero during the famine were adversely affected on several health measures. Surprisingly, however, the effect persisted into the next generation, with the children of the famine babies experiencing high rates of heart disease.

Just as the early vision of preformation gave way to more nuanced genetic determinism, today's science is not Aristotle's theory of epigenesis. Epigenetics does not displace the chromosome as the primary mechanism of biological inheritance. It does, however, challenge genetic determinism and the dichotomy between genes and environment. In the context of pregnancy and gestation, it challenges the dichotomy between form and matter, between genetic identity and the supportive environment of the womb.

This challenge to the genes-environment dichotomy should not be interpreted to mean that gestation is important because it can influence genetics. That conclusion accepts not only the dichotomy but the associated valuation of genes over environment as the determinant of identity. Rather, the conceptual dichotomy between genes and environment is a cultural construction that is often misleading. This dichotomy imagines genes as "instructions" or "blueprints," imbuing them with a cognitive, almost spiritual quality. Genes are thus deemed superior to the merely physical, including gestation, as a basis for identity. This dichotomy is artificial and resonates with other dichotomies that have harmful social effects, including the dichotomy of gender. Chromosomes are not, in fact, "blueprints" or "instructions," to be consulted by a self-aware builder. Chromosomes are substances that catalyze chemical reactions in complex ways to produce proteins; they are physical, tangible stuff. It is helpful, at times, for us to think of them metaphorically as "blueprints," but we should not allow the metaphor

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Geneticist (7/26/06), *available at* www.thetech.org/genetics/ask.php?id=183 (last visited 3/14/11).

[101] *See* Starr, *supra* note 100.

to replace the reality. Both gestation and the replication of chromosomes are physical processes that create us as ourselves.

The prevailing understanding of pregnancy was formed through the lens of the artificial dichotomy between form and matter. In this understanding, the fertilized egg is self-contained and complete as a new, individual human being. The DNA in the genes provides the blueprint and operating instructions for turning the egg into a baby. The mother's womb provides the raw materials and disposes of waste products. The embryo itself is thus self-executing. This construction of pregnancy makes an artificial womb seem relatively simple in concept, even if technically difficult to carry out. The technical problems would arise from complexity and from the microscopic scale of early development, but the basic tasks would be straightforward life-support tasks.

This vision of fetal development, however, is warped by ideology. A gestating woman's body shapes the fetus's development in ways which cannot be starkly distinguished from genetic inheritance. This suggests that we could as easily think of artificial gestation as akin to reproduction with synthetic DNA, rather than merely the replacement of one machine with another. It is therefore likely that we are overestimating the feasibility of artificial wombs because science and culture have traditionally discounted the role that gestation plays in development. This does not mean that gestation is a mystical process that is inherently incapable of mechanization, any more than it is inherently impossible to synthesize usable DNA. But the dichotomy between genes and environment is not as simple as popular and legal discussions typically assume. Similarly, gestation is more complex and developmental than the traditional view of the pregnant woman as a container suggests.

B. ABORTION

Overestimation of the technological capacity for artificial gestation is not merely an artifact but also an implement of ideology. Invoking the prospect of artificial wombs accomplishes a rhetorical function that instantiates the genetic definition of parenthood, the individual personality of the embryo, and the perception of gestation as passive provision of life support.

The most frequent example of this ideological process at work in legal analysis is the hypothesis that artificial womb technology

will eliminate the need for abortion and/or the right to abortion.[102] This inquiry begins as a thought experiment: *What would the law of abortion be if there were artificial wombs?*[103] The point of such a thought experiment is to deepen analysis by separating issues that are entwined in real life; the question seeks to disentangle the right to end a pregnancy from the right to end the life of the fetus. The thought experiment, however, eliminates context; it posits the appearance of artificial wombs without considering the experimental path that would be necessary for them to be built. Moreover, the thought experiment is often presented as not *merely* a thought experiment but as an imminent reality to be prepared for. The promise of imminence gives the scenario extra power and suggests that it offers essential truth: Because we will soon have artificial wombs, we should analyze rights and relationships today with artificial wombs as part of our understanding of reality. This line of speculation reveals as much about current ideology as about the problems of the future. In particular, belief in the near-term invention of artificial gestation reflects an ideologically tinged tendency to degrade pregnancy. That belief, in its turn, reinforces ideology.

Just as modern, gene-oriented views of reproduction derive from preformation doctrine, modern regulation of abortion derives from the preformationist period and its understanding of the embryo and fetus as essentially complete new beings. Opponents of abortion today continue to assert that life begins at conception as a matter of scientific fact. They insist that the combination of chromosomes created at conception is the essence of an individual human being, who needs only the opportunity to unfold over the course of nine months' gestation.[104]

Reva Siegel's foundational work on abortion restrictions in the United States highlights the preformationist views on which the nineteenth-century anti-abortion movement was based. "Doctors premised their campaign on a scientific understanding of human development as continuous from the point of conception in which 'quickening' had no special significance."[105] They analogized the fetus to a baby kangaroo or breastfeeding baby, arguing that the fetus

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[102] *See, e.g.,* SINGER & WELLS, *supra* note 10, at 119-20.
[103] *See e.g.*, LAURENCE H. TRIBE, THE CLASH OF ABSOLUTES 220 (1992).
[104] *See infra,* text accompanying notes 110-13.
[105] Siegel, *supra* note 37, at 282.

was autonomous and not even actually attached to the woman.[106] The embryo was described as "self-sustaining" and "self-developing": "Whatever it may become … is by growth and development of the original, and not by addition of new materials, or attributes."[107] This is a classic statement of preformation doctrine, made shortly before the advent of genetic determinism. As Siegel summarized, nineteenth-century doctors "defended the claim that life begins at conception with a claim that life developed by autogenesis."[108] Their theory of reproduction "systematically discounted women's role in reproducing life."[109]

Opponents of abortion continue to rely on the genetic-determinist version of preformation as the basis for their argument that abortion is the moral equivalent of murder. For example, Robert John Araujo's argument against the right to abortion repeatedly invokes science as "inexorably" refuting *Roe*'s use of the term "potential life" to refer to a developing embryo or fetus.[110] Similarly, Charles Lugosi begins his discussion of the question when life begins by asserting, "Science informs us as to the answer."[111] What science tells us, he says, is that a fertilized egg is a "unique individual" which will "develop according to its own genetic blueprint." A zygote is "internally activated"—i.e., development is triggered by the genetic blueprint itself rather than by the gestational process—and the genome *itself* " assumes control of the whole morphogenetic process from the beginning of embryonic development."[112] These claims are radically preformationist. According to Lugosi, the zygote proceeds to "execute a plan" that is best carried out "[u]ndisturbed by external intervention."[113] Ignored in this account are the zygote's need for several external interventions: a uterine wall into which to implant; a protective bath of amniotic fluid; a constant supply of

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[106] *Id.* at 289.
[107] *Id.* at 288 (quoting a speaker at an 1857 meeting of the Atlanta Medical Society).
[108] *Id.* at 289.
[109] *Id.* at 291.
[110] Robert John Araujo, *Abortion—From Privacy to Equality: The Failure of the Justifications for Taking Human Life*, 45 HOUS. L. REV. 1737, 1763-66, 1785 (2009).
[111] Charles I. Lugosi, *Conforming to the Rule of Law: When Person and Human Being Finally Mean the Same Thing in Fourteenth Amendment Jurisprudence*, 22 ISSUES L. & MED. 119, 123 (2006).
[112] *Id.* at 124.
[113] *Id.*

nutrients, oxygen, and waste elimination facilities; and a complex array of hormones and growth factors, all of which are provided by gestation. The embryo is seen as directing its own course of development, in isolation from the other factors that influence its development. This insistence that the moral status of the embryo can be determined as a matter of scientific fact depends on a genetic determinist and genetic essentialist view of reproduction and individual identity.

The ideological descendants of preformation doctrine thus continue to influence the abortion debate today. Moreover, the preformationist framing of the debate sets the terms of discussion even for those who accept *Roe*'s terminology of "potential life." In the legal academy today, the primary fantasy of artificial wombs, including among those who support the right to abortion today, is that they will eliminate both the need and the justification for abortion rights.[114] This discourse reflects and reinforces the preformationist theory of the fetus by positing that, throughout the entire course of pregnancy, abortion reflects a fundamental conflict of interest between the pregnant woman and the fetus.

Picking up on the arguments of Judith Jarvitz Thomson,[115] Larry Tribe,[116] and others that the right to terminate a pregnancy does not necessarily include the right to ensure the destruction of the fetus, commentators have suggested that artificial wombs could free women from unwanted pregnancies while allowing their fetuses to survive.[117] Artificial wombs that could allow termination of the pregnancy without the death of the fetus would "unbundle" the right to abortion.[118] A woman would still have the right to end her pregnancy but would have no right to insist on the death of the fetus.[119]

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[114] *See, e.g.,* Randall & Randall, *supra* note 10; Goldstein, *supra* note 10.
[115] Judith Jarvitz Thomson, *A Defense of Abortion*, 1 PHIL. & PUB. AFF. 47 (1971).
[116] TRIBE, *supra* note 103, at 220-27.
[117] *See, e.g.,* Randall & Randall, *supra* note 10, at 292-93 (quoting Tribe).
[118] *See* I. Glenn Cohen, *The Constitution and the Rights Not to Procreate*, 60 STAN. L. REV. 1135, 1139 (2008) ("unbundling" the rights to avoid genetic, gestational, and legal parenthood).
[119] She may be required to allow removal in a way that maximizes the chance of fetal survival, even if the necessary procedure is somewhat riskier to herself. *See* Gonzales v. Carhart, 550 U.S. 124 (2007) (upholding the federal Partial-Birth Abortion Ban Act despite its lack of health exception); Jennifer S. Hendricks, *Body and Soul: Equality, Pregnancy, and the Unitary Right to Abortion*, 45 HARV. C.R.-C.L. L. REV. 329, 348 (2010) (arguing that *Gonzales v. Carhart* can be used to

Many such proposals assume that the rate of pregnancy terminations would remain constant if abortion were replaced by transfer to an artificial womb. If the fetus is to survive, however, the factors affecting the woman's decision change. There is now a child to consider. Most women would prefer to endure the last few months of a normal but unwanted pregnancy, rather than to impose the risks of prematurity on a child. What little research exists on attitudes toward artificial wombs suggests that few women would consider them a realistic response to an unwanted pregnancy.[120] Women who are opposed to abortion rights state that transferring a fetus to an artificial womb would be an immoral abandonment of maternal duty, even if it protected the life of the fetus.[121] At the same time, women who support abortion rights reject artificial wombs for the same reasons that so many women choose abortion over adoption: they believe there is a relevant moral difference between a fetus and a baby and would be reluctant to give up a baby even if the pregnancy had been unwanted.[122] Both groups of women saw themselves as responsible for making a moral choice regarding the potential child, and artificial gestation was inconsistent with how they perceived their obligation.[123] Moreover, as with adoption, mandating ectogenesis would put the greatest pressure on women of color,

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justify a high standard of medical risk"); COLEMAN, *supra* note 14, at 81-83 (discussing the possibility that transfer might be substantially more invasive than abortion and arguing that it might nonetheless be required by law or by hospital policy).

[120] The only empirical effort to gauge women's responses to the prospect of ectogenesis as an alternative to abortion is Leslie Cannold's study of a small sample of Australian women. Leslie Cannold, *Women, Ectogenesis, and Ethical Theory*, 12 J. OF APPLIED PHIL. 55 (1995).

[121] *Id*. at 61-63 (summarizing: "For women opposed to abortion rights, good women make motherhood their top priority.").

[122] *Id.* at 58-61 (summarizing: "Over and over again women ground their rejection of adoption and ectogenesis in a belief that it would be morally irresponsible of them to bring a child into the world they were unwilling or unable to parent."); *cf.* ROTHMAN, *supra* note 4, at 107 "("If women took motherhood casually, abortion would be much less important.").

[123] Compare this reaction to the dilemma of ectogenesis to common assumptions about women seeking abortions, as reflected in comments like this one: "Under state-mandated womb-emptying, the state would bear the responsibility of dealing with the resultant children, isolating the mother from the red-tape of adoption." Goldstein, *supra* note 10, at 901. The implication that women prefer abortion to adoption because of the "red-tape" reflects a common belief that women have abortions for relatively trivial and selfish reasons.

whose children fare the worst in the adoption and foster care system.[124]

Most discussion of artificial gestation posits itself as preparatory. That is, we should discuss the prospect of artificial wombs not merely as a thought experiment but because we will soon have to face the prospect as reality. A world with artificial wombs, however, would be a different world in relevant respects than the world in which we live today. In particular, it would be a world with a history of the decisions, practices, and experiments that would be necessary to produce artificial wombs. That history, which we can ignore when we merely contemplate the fantasy of artificial gestation, would alter the cultural landscape around reproduction.

Proposals to substitute forced ectogenesis for abortion treat the embryo and fetus as having a cognizable interest in being developed into a person, subject only to the woman's right to control her body. They do so despite what appears to be an increasingly strong social consensus about the status of embryos in laboratories. Embryos are routinely destroyed or frozen indefinitely in the course of in vitro fertilization procedures. It is unthinkable that those embryos could be seized by the state and distributed to infertile couples in order to have babies. At most, courts have been troubled about whether one of the genetic contributors ought to have the unilateral right to use or dispose of the embryos.[125] Yet, we entertain the possibility that the state would forcibly seize aborted fetuses, grow them in artificial wombs, and then either give the resulting children to their progenitors or place the children in foster homes or orphanages to await adoption. Proponents of building artificial wombs are necessarily advocating experimentation on embryos and fetuses at increasingly advanced stages of development. Why, then, do they simultaneously posit that once an embryo has been in a woman's body, it acquires a right, or at least a legally cognizable interest, in being fully gestated? If the public interest in medical science justifies the destruction of large numbers of embryos that were created for precisely that purpose, it is unclear why a woman's interest in controlling her reproductive life should be trumped by the state interest in the fetus's potential life.

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[124] *See* Randall & Randall, *supra* note 10, at 308 (arguing that mandatory ectogenesis would disproportionately affect women whose babies are less likely to be adopted).

[125] *See, e.g.,* Davis v. Davis, 842 S.W.2d 588 (Tenn. 1992).

This argument overlooks a paradox of abortion jurisprudence that would be brought into sharper relief by the advent of artificial womb technology.[126] Under the strange logic of current abortion law the fact that the fetus is viable justifies requiring the woman to continue the pregnancy. The right to elective abortion ends when the fetus reaches viability.[127] Moreover, viability is defined by the current state of medical technology.[128] That is, the existence of technology that would permit the fetus to survive outside the womb justifies requiring the pregnant woman to continue to sustain the fetus inside the womb. Nothing in the viability rule is tied to the affordability of the technology that would be required to sustain the fetus.[129] Viability is treated as if it were a quality inherent in the fetus rather than a function of society's ability and willingness to provide the necessary technology. Neonatal technology therefore performs two functions: first, its intended function, of saving babies in emergency deliveries; and second, its legal function of marking the viability line beyond which woman may be forced to remain pregnant in the absence of medical emergency. The existence of the technology eliminates the possibility of its being used, except in unintended emergencies.

The availability of artificial wombs would make the abortion question harder, not easier.[130] Why does the right to abortion currently end at viability?[131] That appears to be the point at which we

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[126] For more extensive discussion of the paradox of viability doctrine, see, e.g., Hyun Jee Son, *Artificial Wombs, Frozen Embryos, and Abortion: Reconciling Viability's Doctrinal Ambiguity*, 14 UCLA WOMEN'S L.J. 213 (2005); Bruce Ching, *Inverting the Viability Test For Abortion Law*, 22 WOMEN'S RTS. L.REP.37 (2000).

[127] *See* Ching, *supra* note 126 at 38.

[128] *Id.*

[129] Commentators discussing forced ectogenesis as an alternative to abortion often assume that the state would be obligated to bear the costs. *See, e.g.,* Goldstein, *supra* note 10, at 916-20 (arguing that the state would have to pay at least when the woman could not afford to do so). Commentators differ in their assumptions regarding whether the resulting child would be presumptively a ward of the state or be deemed the child of the formerly pregnant woman. *See, e.g.,* Goldstein, *supra* note 10, at 901 (state responsibility); Jackson, *supra* note 36, at 362 (woman's responsibility).

[130] For others reaching the conclusion that artificial gestation would complicate rather than resolve the abortion controversy, see, for example, Gelfand, *supra* note 36, at 104; Son, *supra* note 126, at 221-222.

[131] Several commentators have discussed the tension between the viability doctrine and reproductive technology, as well as the general lack of a strong theoretical

deem the woman a mother and believe that she has a duty to continue to gestate. The current point of viability thus serves as a marker for when we roughly believe the fetus to have human status. In addition, viability currently occurs at approximately the same time that carrying to term becomes medically safer than abortion for the pregnant woman.[132] For a Supreme Court that has never provided a convincing rationale for relying on viability, this coincidence provides convenient cover.[133] The advent of artificial womb technology would force us to confront questions about viability and abortion more thoroughly than we have so far.

For many women, an abortion is not a refusal to care for a child; it is a decision not to create a child.[134] Imagining a machine that could create the child in a woman's stead, however, helps construct abortion as refusal to provide sustenance to a life in being. The construction implies that refusal may be justified or within the woman's rights, but it is nonetheless unfortunate that another (potential) life must pay the price for her refusal. This implicit presumption of a conflict of interest between the woman and the fetus is based on preformation doctrine. But calling the initial DNA contribution "nature" and everything else "nurture" is a cultural choice. At some point in pregnancy, it likely makes sense to think of the fetus as a separate being, but science cannot tell us when that moment occurs.[135] For the same reason, technology will not resolve the political controversy over abortion rights.

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basis for using viability to define the scope of the right to abortion. *See, e.g.,* Son, *supra* note 126, at 217-18; *but see* TRIBE, *supra* note 103, at 207 (mildly defending the viability rule).

[132] *See* Rhoden, *supra* note 16, at 639, 640 n. 9 (calculating that as of 1983, abortion was safer than childbirth until at least the twenty-first week); Council on Scientific Affairs, American Medical Ass'n, *Induced Termination of Pregnancy Before and After* Roe v. Wade: *Trends in the Mortality and Morbidity of Women*, 268 J. AM. MED. ASS'N 3231, 3232 (1992).

[133] *See* Hendricks, *Body and Soul, supra* note 119, at 345 ("The right to elective abortion has thus suspended much of the pre-*Roe* debate over the medical conditions justifying therapeutic abortion.").

[134] *See* ROTHMAN, *supra* note 4, at 123 (challenging the distinction between "contraception, not letting this month's egg grow, and abortion, not letting this month's fertilized egg grow).

[135] *See generally* R. Alta Charo, *The Hunting of the Snark: The Moral Status of Embryos, Right-to-Lifers, and Third World Women*, 6 STAN. L. & POL'Y REV. 11 (1995) (criticizing the work of the National Institutes of Health's Human Status Embryo Research Panel to determine the moral status of human embryos through the lens of scientific deduction).

C. COMMERCIAL SURROGACY

While legal scholars have been interested in artificial wombs primarily as a state-mandated alternative to abortion, others have focused on the voluntary use of ectogenesis as an alternative to human surrogacy. In this context, the prospect of artificial gestation heightens concerns about commodification of children but reaffirms the appropriateness of commodifying gestation.

The actual or potential availability of artificial wombs resonates with the ideology that supports commercial surrogacy. In the world of surrogacy, for example, "the woman gives the baby 'back to the father,' as if it came from him in the first place" in the classic preformationist sense.[136] If gestation can be performed by machine, that provides reassurance that it is not a core or essential part of mothering.[137] Pregnancy can be seen as "a mere biological function, … and not also as a human bond in formation of new life that can be had in no other way."[138] Using Dorothy Roberts's terms, gestation becomes one of the "menial" tasks of mothering rather than one of the "spiritual" components that make motherhood a desirable state.[139] The technological alternative also rationalizes thinking of the surrogate as a container, which in turn justifies controlling how she mothers the child she is creating.[140] Artificial wombs can have these effects even before they exist, as long as we believe in their possibility and desirability. The fantasy is both a product of our cultural ideology of pregnancy and a means of sustaining that ideology. If we predict a future in which gestation is mechanical and controlled, then gestation can be today classified as part of "menial"

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[136] ROTHMAN, *supra* note 4, at 80.

[137] *See* Richard F. Storrow, *Parenthood by Pure Intention: Assisted Reproduction and the Functional Approach to Parentage*, 53 HASTINGS L.J. 592, 619 (2002) ("This view of the primacy of genetics is only fed by attempts to render natural gestation fungible through the development of alternative means of gestation, namely artificial wombs, or to minimize its importance by pointing to the capacity of incubators to perform it in part.").

[138] Murphy, *supra* note 25, at 192.

[139] Roberts, *supra* note 28, at 65-68 ("While the 'surrogate' provides the menial labor of gestating the fetus to term, the contracting wife is designated as the baby's spiritual mother. … As the case of 'gestational surrogacy' illustrates, the background of racial inequality adds another, related set of concerns about contract pregnancy. 'Surrogacy' perpetuates the racial hierarchy within the division of reproductive labor, as well as the racist valuation of genetic material.").

[140] *Cf.* Murphy, *supra* note 25, at 192-93 (arguing that artificial gestation could "contribute to excessive concern for 'quality control' in fetal development).

mothering that can unproblematically be contracted out by those who can afford to do so.

In a world with artificial wombs, human surrogacy would likely remain a more affordable alternative to the machine. The existence of commercial surrogacy alongside ectogenesis would invite comparisons regarding both cost and quality. With respect to cost, it would be interesting to see the effect of artificial wombs on current efforts to impose price caps on surrogacy. Although discussions of artificial wombs often refer to the likely cost disparity between human and mechanical surrogacy, no one has argued that price controls should be imposed to keep the price of ectogenesis artificially low, in order to ensure that the providers of that service are doing it altruistically, with the child's best interests ultimately at heart. In contrast, that argument is routinely made about human surrogacy.[141]

Price caps on surrogacy help to avoid the stigma of baby-selling and to ensure that the surrogate will be a "good mother" who will not negligently or recklessly endanger the health of the fetus. The market for surrogacy, however, is now global,[142] which has several implications for its operation. Social similarity, including racial similarity, between the buyers and sellers of reproductive services is reduced, and the economic disparity is more pronounced.[143] It therefore becomes more difficult to insist that the surrogate's primary motivation is altruistic and that the payment is merely a form of reimbursement for expenses. In addition to more abstract concerns about commodification, this change presents the intended parents with a dilemma regarding quality control. As one might expect, trans-national surrogacy increasingly involves daily

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[141] *See* Kimberly D. Krawiec, *Altruism and Intermediation in the Market for Babies*, 66 WASH. & LEE L. REV. 203, 244-47 (2009) (criticizing such arguments).

[142] *See* MSNBC, *Surrogate Mother Business Booming in India* (MSNBC television broadcast Feb. 20, 2008), *available at* http://www.msnbc.msn.com/id/23252624/print/displaymode/1098 (last visited Feb. 11, 2011).

[143] *See* Lisa C. Ikemt. *Reproductive Tourism: Equality Concerns in the Global Market for Reproductive Services*, 27 LAW & INEQ. 271, 308 (2009) (noting that racial differences may make international surrogacy more attractive since it weakens the perceived relationship bewten the surrogate and the child); *cf.* Leslie Bender, *Genes, Parents, and Assisted Reproductive Technologies: ARTs, Mistakes, Sex, Race, and Law*, 12 COLUM. J. GENDER & L. 1, 54-76 (2003) (discussing the role face has played in custody battles involving surrogacy contracts and clinic mistakes—i.e., putting an embryo into the wrong woman).

supervision and control of the surrogate mothers to ensure the health of the babies they deliver.[144]

In the reproductive technology industry, discoveries in epigenetics have met with predictable cultural responses. That is, the role of gestation in development has been either accepted or rejected depending on a person's pre-existing ideology and/or financial interest. On the one hand, some businesses offering IVF with purchased ova have seized on epigenetic discoveries to help convince their clients that they are the "real" mothers of the children they bear, despite the prevailing cultural fixation on DNA. For example, the "Recipient Information Sheet" for one egg broker includes a section titled "Women who give birth to donor egg babies are the biological moms."[145] This section first discusses the importance of gestation, and the gestational mother, in providing the physical materials for constructing the child, explicitly invoking an analogy between the genes as blueprint and the gestational mother as builder.[146] It then goes on to explain epigenetics and the regulation of gene expression. It concludes with the following passage, reassuring the gestational mother about her role:

> A donor egg baby gets her genes from the donor; she gets the 'instructions' on the expression of those genes from the woman who carries her to term. …
>
> The child who is born would have been a physically and no doubt emotionally different person if carried by his genetic mother. …
>
> The implication of epigenetics is that the child inherits characteristics from the woman who carries the child even if the original DNA comes from a donor egg. In other words the birth mother influences what the child is like at a genetic level – it IS her child.[147]

On the other hand, women participating as both gestational mothers and intended mothers in surrogacy contracts reject this

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[144] *See* Krawiec, *supra* note 141, at n. 109 and accompanying text (noting that "the ability to supervise and control the behavior of the surrogate" is one of the reasons for outsourcing, since in India, "surrogates typically live together at the clinic or in a supervised home").

[145] Nurture Egg Donor Program, *Recipient Information Sheet, available at* www.nurture.co.za/the-tricky-subject-of-disclosure (last visited 3/11/11).

[146] *Id.*

[147] *Id.*

possibility. Responding to the passages quoted above, some participants on a surrogacy discussion board acknowledged "a fair bit o science" behind the claims, but others flatly rejected them and the underlying science as simply unacceptable.[148] Interestingly, some participants appeared to feel it was necessary to reject the scientific claim about genetic influence in order to reject the social conclusion—"it IS her child."[149] On both sides, then, genes were seen as preeminent, so that genetic influence defined whose the child "IS." This insistence on a biological answer to the question of ascribing parenthood is especially surprising and powerful in light of the fact that all the people in this discussion were involved in creating children through recently invented technologies that disrupt the biological mechanisms for reproduction in some fashion.

The fantasy of an artificial womb depends on and maintains a patriarchal definition of parenthood and the reification of DNA as the essence of identity. The womb is seen as merely the maternal environment, separate from the fetus in the way we think of ourselves as separate from our environment. Genes, on the other hand, are imagined as cerebral rather than physical. They are a "blueprint," not merely chemical chains that interact with nearby substances to catalyze particular reactions. Discoveries about the influence of gestation on development are assimilated not by increased respect for the process of gestation but by stepped-up efforts to control it, usually by controlling pregnant women.[150] In this cultural climate, the fantasy of the artificial womb helps us deny that gestation also shapes who we are, which is crucial to denying the parental status of a surrogate mother.

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[148] All About Surrogacy—Epigenetics—Importance of Birth Mother—What is your take on this?, *available at* www.allaboutsurrogacy.com/forums/index.php?showtopic=42386. One commenter asserted that epigenetic effects "can simply vanish" while genetic traits cannot. Another acknowledged that environment could influence development but stated, "I do not believe for a second that I being the carrier does anything to change the genetics of the baby." The same commentator drew a distinction between "epigenetics" and "ACTUAL genetics."

[149] *Id.*

[150] *See* Tong, *supra* note 27, at 72 (discussing artificial gestation and commenting, "Ectogenesis would, in the minds of many, be the perfect solution to the so-called maternal-fetal conflict problem.")

III. BEING HUMAN AND BEING IN RELATIONSHIP

This Part revisits the thought experiment of how artificial wombs should be regulated and how abortion rights would be affected by their invention. It does so through a lens that rejects the Aristotelian dichotomies and their corollary that there is an inherent conflict of interest between the pregnant woman and the fetus. It seeks to answer the question posed in the introduction: Does a "human child have a right to a human mother"?[151] As background for discussing artificial gestation, Part III.A discusses the first aspect of this claim, arguing that when a human person gestates a child, both the gestator and the child have a right to legal recognition of their parent-child relationship. Part III.B turns to the case of artificial gestation. It concludes that there is not, at this time, sufficient basis to support prohibition of artificial gestation, although there are serious concerns that might justify a ban in the future.[152] There is, however, a sufficient basis to prohibit state use of ectogenesis, including state-mandates ectogenesis as an alternative to abortion. Thus, although there is not necessarily a right to a human gestational mother, there is a right to a human parent.

A. GESTATION AND INITIAL PARENTHOOD

My previous work has argued in favor of constitutionally protected parental rights for gestational mothers. Part I.A.1, below, summarizes that argument. Part I.A.2 considers the question from the child's perspective. It concludes that the child has a mirror-image right to recognition of her initial parent-child relationship with her birth mother.

1. The Adult's Perspective

The conclusion that the gestational mother has constitutionally protected parental rights is based both on existing doctrine for identifying a "parent" and on the values that underlie constitutional protection for parents.

With respect to doctrine, the Supreme Court has held that constitutional parental status is defined by biological parenthood plus the establishment of a caretaking relationship with the child.[153] This

[151] ROTHMAN, *supra* note 4, at 257.
[152] There are also strong moral arguments against making artificial gestation a research priority or otherwise expending substantial resources on either developing or using the technology. *See* Woolfrey, *supra* note 33, at 130-33; Purdy, *supra* note 33, at 229-30.
[153] *See* Hendricks, *Essentially, supra* note 7, at 443-51.

"biology-plus-relationship" test was developed to address the parental claims of unwed fathers but was based on pregnancy and birth as the paradigm for a parental relationship.[154] A man who satisfies the biology-plus-relationship test is entitled to parental recognition as a matter of sex equality.[155] Men satisfy the "biology" requirement by their genetic contribution and the "relationship" requirement by participating in the care of the child.

This test implies a relationship model of pregnancy.[156] It requires men to engage in caretaking in order to obtain what a woman obtains by giving birth. The test thus posits pregnancy not as only a reflexive physiological function but also as a form of caretaking. It follows that a woman who gives birth to a child has constitutionally protected parental rights because she, too, has both a biological and a caretaking relationship with the child.[157]

The biology-plus-relationship test is a good test for defining parental status because it serves the values that justify parental rights in the first place. The two primary justifications for parental rights are (1) at the personal level: the concrete, emotional connection between parent and child, which makes the parent likely to be an appropriate caretaker for the child and which often means that one or both would be traumatized if the relationship were severed and (2) at the systemic level: ensuring de-centralization and limited state control over child rearing, in order to protect cultural pluralism.[158] Roughly speaking, the biology prong of the test can be said to

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[154] *See id.* at 443; Annete Ruth Appell, *Virtual Mothers and the Meaning of Parenthood*, 34 U. MICH. J.L. REFORM 683, 690-96 (2001) (arguing that "parenthood, as protected by the Constitution, is understood in relation to the mother" and that gestation and birth are the "paradigm for parenthood").

[155] *See* Hendricks, *Essentially, supra* note 7, at 438-39, 445 (discussing Caban v. Mohammed, 441 U.S. 380 (1979)).

[156] *See* Hendricks, *Body and Soul, supra* note 119, at 362-66 (describing the relationship model).

[157] This is true regardless of whether the woman who gives birth to the child is the genetic mother. In common parlance, the term *biological mother* is often used to refer to the genetic mother as distinguished from a gestational surrogate who lacks a genetic tie to the child. This limited conception of biology defines the experience of biological parenthood in male terms. *Cf.* ROTHMAN, *supra* note 4, at 34 ("In a patriarchal system, when people talk about blood ties, they are talking about a genetic tie, a connection by seed. In a mother-based system, the blood tie is the mingled blood of mothers and their children.").

[158] These are the modern justifications, which reject the notion that the child is the parent's property. *See* Hendricks, *Essentially, supra* note 7, at 453-54.

correspond to the pluralism concern: because the state is limited in its ability to control people's sexual and reproductive lives, relying on biology allocates children in a way that is insulated from manipulation by the state. Similarly, the relationship prong can be said to correspond to the more personal concern of preventing the state from inflicting "heart-crushing blow[s] to the pursuit of happiness"[159] by separating parents and children who have established caretaking relationships.

Using pregnancy as a paradigm for the establishment of parental rights does not mean that to become a parent by giving birth is superior to other ways of becoming a parent. Indeed, the point of the biology-plus-relationship test is that fathers who participate in caring for their children should be recognized as parents in the fullest sense. Moreover, the role that biology plays in establishing parenthood should make clear that the relationship model of pregnancy does not denigrate parenthood through adoption. Although some people place great emotional importance on genetic ties, others do not. The role of biology in the constitutional definition of parental rights is to insulate the initial allocation of parental rights from state manipulation. Some systems of foster care and adoption can threaten this value, such as when the state systematically removes children from a particular groups of parents.[160] At the individual level, however, nothing in the relationship model of pregnancy assumes that pregnancy is superior to other forms of parental caretaking.[161] To say that the gestational mother has parental rights does not mean that those rights are exclusive or that they are necessarily superior to other claims.

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[159] CHARLES BLACK, A NEW BIRTH OF FREEDOM: HUMAN RIGHTS, NAMED AND UNNAMED 105 (1997) (proposing this test for identifying state action that violates fundamental rights).

[160] *See* COLEMAN, *supra* note 14, at 37 (arguing that adoption is not a superior moral solution to infertility because most children are placed for adoption for economic reasons); Randall & Randall, *supra* note 10, at 308 (noting that substituting ectogenesis for abortion could result in "an increase in the already high number of unadoptable minority and disabled babies, particularly black babies).

[161] *Cf.* ROTHMAN, *supra* note 4, at 132-33 ("There is no question in my mind but that adoptive parents are true, real parents to their children. … There is an enormous difference between what works on an individual level and what works as a social policy. … [I]t makes us dependent upon the grief of one group of people to solve the problems of another group of people.").

2. The Child's Perspective

For reasons similar to those discussed above, the child has a right to a recognized parental relationship with her gestational mother. From the child's perspective, the choice of an initial parent should be governed by the concerns that parallel the two policies already discussed: the child's interest in continuation of an established caretaking relationship and society's interest in decentralized authority over child-rearing. The child's right is the right to have the legal system recognize her gestational mother as a legal parent at the time of birth.

a. The Child's Right to a Legal Parent

Modern notions of parental rights developed from a historical understanding of the child as akin to property, which would suggest that the right accrues only in favor of the parent.[162] The child's own interests, however, are increasingly paramount in the articulation of parental rights. Mary Pat Byrn and Jenni Vainik Ives have recently argued for recognition of a child's right to be assigned to parents.[163] They argue that the child is a juridical person from the moment of birth but that the child does not have legal parents until they are legally assigned.[164] In the paradigm case of the birth of a child conceived through heterosexual intercourse between married parents, the law operates simultaneously with the birth to designate the married couple as the mother and father.[165] In an increasing number of other cases, however, the identity of the legal parents is not immediately secured at birth, and the child may be left in limbo while legal parentage is determined.[166] Perhaps worse, the parental status assumed by the adults at the time of the birth might be questioned later in the child's life, such as when a husband discovers years later that he is not the genetic father.[167]

Byrn and Ives conclude that the state, as *parens patriae*, has a constitutional duty to assign the child to parents and that it must choose the people who are most likely to act in the child's best

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[162] Mary Patricia Byrn and Jenni Vainik Ives, *Which Came First the Parent or the Child?*, 62 RUTGERS L. REV. 305, 324 (2010).
[163] *Id.* at 328.
[164] *Id*. at 342.
[165] *Id*. at 334.
[166] *Id*. at 332.
[167] *Id.* at 339.

interests.[168] They further conclude that the people most likely to act in the child's best interests—and thus the people whom the state is obligated to recognize as legal parents—are the genetic parents of a child conceived through sexual intercourse and the intended parents of a child conceived through alternative reproductive technology.[169] "Intended parents" refers to the people intended at the time of conception; they would be identified in the contracts governing any arrangements for surrogacy or donated gametes.[170] The genetic parents of sexually conceived children would be identified by DNA testing, which Byrn and Ives argue should be performed immediately after birth in all cases of sexual reproduction in order to definitively establish paternity.[171]

This Article accepts and builds upon Byrn and Ives's argument regarding children's right to be assigned parents at the time of birth. It parts ways with their analysis, however, on the specifics of that right. Byrn and Ives correctly point out that both juridical persons and legal parents are constructs of the law.[172] They also suggest that it makes sense to think of the juridical person coming into being and *then* being assigned legal parents by the state.[173] It is not necessary, however, for these two steps to be separated in time. Rather, it would be better for the born child never to be without a legal parent. The act of birth both creates the child as a legal person and, as discussed below, creates the formerly pregnant woman as the child's mother. In the eyes of the law, birth transforms a single legal person into two legal people, a parent and a child. The child's constitutional rights are satisfied by awarding her one automatic parent: the woman who gave birth to her.

This attribution of parental status is not based solely on the "best interests of the child," the familiar test for custodial determinations in family law. There are other policies at stake, and the child's interests are only one piece. Moreover, the child is not entitled to the best possible parents. When Byrn and Ives argue that the state must assign as parents the "people most likely" to look out for the child's best interests,[174] they do not suggest an individual evaluation of a

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[168] *Id*. at 342-43.
[169] *Id*. at 343.
[170] *Id*. at 341-42; *see also* Shultz, *supra* note 32, at 97.
[171] Byrn & Ives, *supra* note 162, at 338.
[172] *Id*. at 307.
[173] *Id*.
[174] *Id*. at 342-43.

person's potential merits as a parent to a particular child. Rather, the state must assign parenthood *according to a rule* that in most cases is likely to identify parents who have the child's interests at heart. Thus, we assign parenthood in part according to our beliefs about the factual circumstances that would cause an adult to have a special feeling toward a particular child. These beliefs connect to cultural norms. Specifically, we have cultural norms that genetics, gestation, and use of reproductive technology to create a child all give rise to a duty toward the child and ought to kindle affection in the heart of the parent. Because the potential parents will in most cases subscribe to the same cultural norm, we can anticipate that assigning parenthood on these bases will generally result in choosing a parent who is motivated to do right by the child. In addition, as discussed above, reliance on a biological connection serves the pluralist interest in insulating the distribution of children from state control.

The child's interests and the other policies at stake can be satisfied by a constitutional right to have one legal parent recognized at the time of birth. Byrn and Ives agree that only one parent is necessary to satisfy the child's rights.[175] However, they argue for the two genetic parents to be constitutionally recognized in cases of reproduction through sexual intercourse.[176] In cases using technology, they state that the contractually intended parents should be recognized; perhaps there could be one, two, or more such individuals, although Byrn and Ives realistically assume that in most cases there would be two intended parents.[177] This approach is consistent with how most states treat parentage, but as a matter of constitutional law, guaranteeing rights to two genetic parents at birth would be a change. Under existing precedent, in cases of sexual reproduction, the mother has constitutionally protected parental rights. The father, however, has parental rights only if he satisfies the biology-plus-relationship test.[178] Byrn and Ives's approach would replace the biology-plus-relationship test with automatic parenthood for genetic fathers.

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[175] Byrn & Ives, *supra* note 162, at 328.
[176] *Id*. at 332.
[177] *Id*. at 341-42.
[178] For births within marriage, it is unclear whether the bare fact of marriage to the mother entitles the father to parental status, or whether the marital presumption exists at the state's option.

Instead, the child's entitlement should extend only to having one constitutional parent. A single constitutional parent provides the child with a person to look after her interests, and it ensures against state distribution of children according to its own criteria. Indeed, the pluralism concern may be best addressed by recognizing no more than one initial parent with constitutional rights. Other individuals may become entitled to be recognized as parents under the biology-plus-relationship test, marital presumptions, or other standards. Allowing those additional relationships to develop after birth gives the initial parent the freedom to choose among a variety of possible family forms.

In sum, the child has the right to have the state assign her to a legal parent at the time of birth, a person who can be expected to be responsible for and look out for the child's interests. This person should be selected according to a rule that protects and encourages emotional attachments deemed natural and/or socially desirable. The rule should also be substantially free from state control, so that the state cannot invidiously manipulate which individuals or subcultures have the opportunity to rear children.

b. Choosing the Gestational Mother

If we accept that the child is entitled to a parent, we must decide how to select that parent. Because I have argued that the gestational mother is entitled to parental rights, it would be convenient, of course, to select her. The child's perspective also supports that choice.

The child's interest lies in continuing the relationship with the gestational mother because she is the only person with whom the child has an individuated, personal caretaking relationship.[179] The child's entitlement to continue in relationship with the gestational

[179] An individuated relationship is important to caretaking. Many feminists have argued that the state should assume greater responsibility for the dependency needs of children, rather than entirely privatizing those needs within the family. *See, e.g.,* FINEMAN, *supra* note 12, at xvii. Collective responsibility for children, however, does not mean that the need for a parent disappears. We would still need constitutional protection for parent-child relationships even if it were not necessary to meet the child's basic material needs. *Cf.* MAXINE EICHNER, THE SUPPORTIVE STATE: FAMILIES, GOVERNMENT, AND AMERICA'S POLITICAL IDEALS 101 (2010) (noting that even adults have individualized caretaking needs that justify protecting their intimate relationships). The child's claim on a parent is non-transferable and makes each irreplaceable to the other; this specialness is part of what makes it worthy of protection.

mother can thus be understood as an extension of the concept of a "social parent."[180] Many scholars have argued, and a few courts have held, that a person who develops a strong caretaking relationship with a child while acting as a parent should be recognized as a parent, even in the absence of biological ties or formal adoption.[181] The gestational mother is similar to the social parent except that she also has a biological tie. The difference is only that her caretaking occurred prior to birth.

To many this distinction will seem crucial, not necessarily because the nature of caretaking immediately after birth is so different from pregnancy but because treating pregnancy as caretaking suggests that the fetus is a person. This inference is unnecessary, however, because a status that is defined by caretaking necessarily develops over time. In some contexts, the law needs to set a clear line that defines the status of a fetus. For reasons of history, tradition, and practicality, the moment of birth defines when the fetus becomes a juridical person.[182] For reasons that are less clear, the point of viability defines the permissibility of abortion.[183] But there is no need for a clear legal line to mark a point in pregnancy at which a parent-child relationship exists. The fetus does not need a legal parent, nor would it make sense to assign a legal parent until the child is a separate legal person. The fetus can remain a developing person, and the parental relationship develops until the time of birth.

At birth, the only existing, tangible human relationship on which a child can draw is with the woman from whom she has just separated. This concrete, factual basis for identifying the parent also resolves a contradiction in the argument for recognizing the child's right to a parent in the first place. Byrn and Ives argue that the child's right to a legal parent arises out of the state's duty as *parens*

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[180] *See generally* Monica K. Miller, *How Judges Decide Whether social Parents Have Parental Rights: A Five-Factor Typology*, 49 FAM. CT. REV. 72, 72-73 (2011) (discussing the social parenting rights of non-biological parents in same-sex couples).

[181] *See id.* at 74-77 (discussing relevant factors); ROTHMAN, *supra* note 4, at 209-10 (advocating for child care workers' right to maintain relationships with children they have reared).

[182] *See* Roe v. Wade, 410 U.S. 113, 157-58 (1973) (concluding that birth marks the point of constitutional personhood).

[183] *See* Planned Parenthood of Southeastern Pa. v. Casey, 505 U.S. 833, 860 (1992).

patriae. They limit the child's right, however, to a single set of parents at the time of birth. They do not address any *parens patriae* duty that arises if the genetic or intended parents are dead at the time of birth, or if they die later. This limit is probably necessary in light of the fact that our society does not recognize a continuing right to replacement parents.[184] However, the limit would not make sense if the obligation to identify parents arises solely from the state's obligation as *parens patriae*. The state is *parens patriae* to an orphan as much as to a newborn. Why does it not have the same obligation to come up with some legal parents for the child? The answer is that even the newborn is not starting from scratch at the moment of birth. The parental relationship the state must recognize is already in place. The discrete moment of aloneness after birth, in which Byrn and Ives say a child exists but not yet a parent, need not exist.[185] The law's recognition of a parent-child relationship should be simultaneous with the creation of the child as a separate legal person.

c. Other Possible Parents

There are three alternatives to assigning parental status to the gestational mother. First, the state could select parents according to criteria of its own choosing; second, genetics; and third, contract. The problems with the first option are apparent; as to the others, although genes and contract may often have a role to play in determining parental status, they should not supersede the initial assignment of parental status to the gestational mother.

Genes play a curious role in current debates over reproductive technology and parental status. On the one hand, genes are often treated as the essence of parenthood.[186] On the other hand, the sale of gametes has become normal and accepted: Although some people

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[184] *But see* Barbara Bennett Woodhouse, *Waiting for Loving: The Child's Fundamental Right to Adoption*, 34 CAP. U. L. REV. 297 (2005).

[185] *Cf.* Joan C. Callahan & Dorothy E. Roberts, *A Feminist Social Justice Approach to Reproduction-Assisting Technologies: A Case Study on the Limits of Liberal Theory*, 84 Ky. L.J. 1197, 1205 (1996) ("Postliberal feminists … tend to insist that persons 'arrive' in the world already inextricably imbedded in webs of relationships—in social contexts that in great part determine who they are and what they will become as individuals, as well as where their responsibilities will lie.").

[186] *See, e.g.,* Johnson v. Calvert, 851 P.2d 776, 787 (Cal. 1993) (analogizing a gestational surrogate to a foster mother and awarding parental status to the genetic parents); Perry-Rogers v. Fasano, 715 N.Y.S.2d 19 (N.Y. App. Div. 2000) (awarding parental status to the genetic parents after their embryo was mistakenly implanted in another woman).

question the moral effects of commodifying gametes and the exploitation that can occur in gamete markets, that horse has long since left the barn in the United States. What is curious is that the mystical status of genes has survived their commodification.[187] It suggests, perhaps, that reverence for property rights is at least as strong as, and may form the basis of, the reverence for DNA. The combination of genes and property produces the rule that Byrn and Ives propose for assigning parents to a child: genes in cases of sexual reproduction, contracts for reproduction through technology. The legal parents are either the genetic parents or the people to whom the genetic parents sold their genes.

While the sale of genes is widely accepted, the sale of gestation remains somewhat more controversial. Oddly, the sale of gestation is especially disfavored when it coincides with the sale of an egg: The law that is emerging through court decisions and statutes in many states contains a marked preference for "gestational surrogacy" through IVF over "full surrogacy" through insemination of the surrogate.[188] This preference is anomalous in light of the acceptance of gamete sales as unproblematic.

This preference for gestational surrogacy and the combination of genetics and contract principles proposed by Byrnes and Ives both reflect a distortion of the biology-plus-relationship test. Under the distorted version of the test, "biology" refers to genes, while "relationship" refers to pregnancy or other caretaking. Contract rules are able to overcome genes alone or gestation alone, but not both together.[189] A full surrogate, like the unwed fathers protected by the Supreme Court, has a genetic and caretaking relationship with the child. A gestational surrogate, however, has only the caretaking, and

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[187] *Cf.* ROTHMAN, *supra* note 4, at 233 (noting the incongruity that in surrogacy contracts the sperm is used to define the child as belonging to the man, but that men can also buy sperm and use it "as their 'own' to make their 'own' baby with a surrogate").

[188] *See, e.g.,* Jamie L. Zuckerman, *Extreme Makeover—Surrogacy Edition: Reassessing the marriage Requirement in Gestational Surrogacy Contracts and the Right to Revoke consent in Traditional Surrogacy Agreements*, 32 NOVA L. REV. 661, 667-71 (2008) (discussing the distinctions between traditional and gestational surrogacy contracts under Florida law, including that only the latter are enforceable).

[189] *Cf.* Noa Ben-Asher, *Baby-Making and Baby-Meaning: The Two Triangles of Reproductive Technology*, SSRN (observing an apparent "2-1 rule" in which intended parents can purchase up to two components (egg, sperm, and gestation) but must provide the third).

thus is not a parent. Under this version of the biology-plus-relationship test, a child born to a gestational surrogate arguably has no legal parent at the time of birth. She acquires a parent only through execution of the surrogacy contract and formation of a caretaking relationship with the intended parents.[190]

This application of the biology-plus-relationship test is incorrect because pregnancy is a biological relationship as well as a caretaking one. As Rothman says, the gestational mother is related to the child "by blood": not "the metaphorical blood of the genetic tie" but "the real blood of the pulsing cord, the bloody show, the blood of birth."[191] It is therefore error to equate "biology" in the biology-plus-relationship test to genes. To do so is to use men as the norm and say that because biological parenthood for men is limited to genetics, it must be limited for women too.

Finally, apart from the child's interests, the rule for assigning children to parents needs to protect the interest in pluralism. Enforcing surrogacy contracts is not the same as having the state select the parents it prefers. Nonetheless, the free market has its own

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[190] Under contract principles, the usual argument is that the intended parents are entitled to specific performance because the object of the contract is unique; surely, all can agree that a single human child is unique and irreplaceable. This argument admits that the child is the object of the contract; that is, that the child is being sold. In addition, it is not quite true that this particular child was the object of the contract, or that what was contracted for was unique. The intended parents contracted for "a child," made either from their own genes or from others. There is a very large number of potential children that could have resulted. The particular child who was born is different from all the other potential children only once she is encountered and known, so that at birth she is unique only from the perspective of the gestator. That uniqueness springs not only from the unique combination of DNA.

Moreover, the connection to a unique individual is what justifies allowing parents to act on behalf of their children. *See* Emily Buss, *"Parental Rights*," 88 VA. L. REV. 635, 649-50 (2002) (arguing that a primary reason for deference to parental choices is that "the parent knows herself, her child, and her entire household better than the state knows them"). A gestational mother who decides, after birth, to place a child for adoption is at that time entitled to act on the child's behalf, and to make a decision about what would be best, not solely for the child but also for herself and other family members. Because it is the child who is most deeply affected by this transaction, some party to the transaction needs to be entitled to act on the child's behalf. At the time that a surrogacy contract is signed, however, none of the signatories has established an individuated relationship with the child to be created. None is entitled to act on that child's behalf. Thus the child becomes the object of the contract rather than an interested party.

[191] ROTHMAN, *supra* note 4, at 45.

biases that are inconsistent with pluralist aims. The body and the physical connection of caretaking that occurs over the course of gestation are a better basis for defining family than the market.

B. GHOST IN THE MACHINE

The claim that the gestator should be the legal parent assumes human gestation. That is, if parental status must vest in the gestator, then the gestator must be human; we are not going to assign parental rights to other animals or to mechanical incubators. This Part carries out the thought experiment of artificial gestation through a lens that rejects the Aristotelian dichotomies: between the active and the passive; between the spiritual form and the material environment; between the woman and the fetus. It concludes that there is not, at this time, sufficient basis for prohibiting private, voluntary ectogenesis.[192] However, state-initiated ectogenesis, whether as an alternative to abortion or otherwise, should be prohibited.[193] That is, a child does not necessarily have a right to a human gestational mother as against the parents who seek to bring her into the world by other means. The state, on the other hand, may neither permit children to be grown ectogenecially under its auspices nor create intentional orphans by mandating artificial gestation in lieu of abortion.

1. Voluntary Use of Ectogenesis

Two principles support the conclusion that voluntary use of ectogenesis by prospective parents should be permitted. The first is the general presumption in favor of individual liberty. Second, although our constitutional understanding of parenthood is modeled on pregnancy, it does not require that pregnancy be the exclusive means of establishing a parental relationship; other ways of forming that connection are equally valuable. Although concerns about commodification of children and general alienation of people from their physical connectedness are substantial, they do not support a ban at this time.

Citizens in a liberal democracy are presumed to be entitled to make their own decisions, absent a showing of harm to others or to society as a whole. This principle is especially strong in the context

[192] *See infra,* Part III.B.1.
[193] *See infra,* Part III.B.2.

of reproductive matters.[194] Protecting individual choices in reproduction and child-rearing respects people's desire to be autonomous in their intimate lives, and it restrains the state. The more diffuse and decentralized reproductive decisions are, the better able society is to avoid the systematic effects of institutional biases and mistakes.[195] Moreover, the effects of artificial womb technology will depend more on the nature of society than on the nature of the technology.[196] Just as Shalumith Firestone saw the potential for liberatory uses of such technology but did not expect the technology itself to produce liberation,[197] the potential for harmful uses flows from society not from the machine.

If ectogenesis is used voluntarily for procreation, in most cases the resulting child would be welcomed into a waiting family. It would seem strange to say in those circumstances that the child's rights have been violated. The waiting parent would have invested a great deal, financially and otherwise, in the child. This intended parent would be analogous to the partner of a pregnant woman who supports the pregnancy in the ways she can. The doctrine is currently unclear whether such pre-birth conduct can satisfy the relationship prong of the biology-plus-relationship test.[198] If, however, it can do

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[194] Dien Ho, *Leaving People Alone: Liberalism, Ectogenesis, and the Limits of Medicine*, *in* ECTOGENESIS 139, 144 (Scott Gelfand & John R. Shook, eds., 2006) (applying the libertarian presumption, referred to as the principle of default autonomy, to the choice to use an artificial womb); Callahan & Roberts, *supra* note 185, at 1221 (distinguishing criticism and discouragement of reproductive technology from prohibition).

[195] This includes those who believe life begins at conception and wish to aid frozen embryos but lack the ability to gestate naturally as well as those who prefer to avoid pregnancy for reasons of their own.

[196] John A. Robertson, *Embryos, Families, and Procreative Liberty: The Legal Structure of the New Reproduction*, 159 S. CAL L. REV. 939, 1033 (1986) ("In the final analysis, the impact of noncoital technology on women depends on how it is used more than on what it is. While opportunity for misuse exists, there is a reasonable basis for thinking that people on the whole will use it well."); Woolfrey, *supra* note 33, at 129-30, 134-37. For example, artificial gestation could be seen as a way to address infertility without the potential exploitation of human surrogacy. *See* Tong, *supra* note 27, at 70.

[197] *See* FIRESTONE, *supra* note 29, at 8-9, discussed *supra*, text accompanying notes 29-31.

[198] *See* E. Gary Spitko, *The Constitutional Function of Biological Paternity: Evidence of the Biological Mother's Consent to the Biological Father's Co-Parenting of Her Child*, 48 ARIZ. L. REV. 97, 124-26 (1998) (arguing that pre-birth conduct would be sufficient only in extraordinary circumstances).

so in cases of natural gestation, then the intended parent of an ectogenic child should similarly be able to establish a protected relationship with the developing child. Some parents might even feel more connected to a child developing in the machine than to one growing inside a partner or a paid gestational mother.[199] Perhaps, for example, the machine would have a window; visually oriented people might feel closer because they could see the fetus. Because the biology-plus relationship test uses pregnancy as a model but does not hold it to be superior to other ways of forming a parental relationship, it does not suggest that the wanted ectogenic child has been seriously deprived.

For these reasons, it is too soon to say that we should ban artificial gestation. There are, however, three primary concerns about the effects of artificial gestation that warrant caution and could justify restrictions if the worst-case scenarios materialize. The first concerns the commodification of children; the second concerns the potential for undue social pressure to forego natural gestation; and the third concerns the intrinsic self of the child.

First, the primary concern about commodification is that prospective parents will expect to be able to walk away from the artificial womb if they are not satisfied with the product. In our consumer society, this attitude has already appeared in a few surrogacy cases.[200] With ectogenesis, everyone who participated in the child's conception would have the physical ability to do what a pregnant woman cannot: walk away. It is easier to walk away from a microscopic embryo than from a newborn baby. It is easier to walk away if you are a medical tourist in a poor country. Even when it is presumably hard to walk away, parents do. On the other hand, people who seek parenthood through technology have often exhausted other means and dearly wish to have a child. The vast majority of parents who rely on gestational surrogates raise the resulting child. While in a few cases intended parents have tried to refuse custody, they appear to have done so on the assumption that the gestational surrogate

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[199] *See* Beth Burkstrand-Reid, *The More Things Change…: Abortion Politics and the Regulation of Assisted Reproductive Technology*, SSRN (describing how seeing an embryo or fetus on ultrasound can influence a woman to think of herself as a mother, even before an in vitro embryo is implanted).

[200] *Cf.* Tom Blackwell, *Couple urged surrogate to abort fetus due to defect*, NATIONAL POST, Oct. 6, 2010, http://www.nationalpost.com/news/Couple+urged+surrogate+abort+fetus+defect/3628756/story.html.

would otherwise keep the child. Such abandonment might thus be less likely when it is clear that no other "mother" is available. Only if experience demonstrates that ectogenesis increases the chances of the child becoming parentless would prohibition become appropriate.

Second, insurance companies, employers, or a society repulsed by the physical body might pressure women to avoid natural gestation, perhaps in a dystopian *Brave New World*.[201] This concern warrants caution and regulation to ameliorate such pressure, but not an anticipatory ban.[202]

Finally, some commentators, including Rothman, have expressed the concern that a child created through artificial gestation would be a "little alien," a stranger to the human family who arrives without the concrete connection of a blood and flesh relationship.[203] This concern is not directed at concrete developmental impairments that might result from some reproductive technology; we have assumed those away by positing the availability of safe and reliable machines. Rather, the concern is an existential one. Does the creation of children in this way represent a fundamental rejection of human connectedness, our nature as social beings? This is a serious concern. But it is a leap to suppose that this existential question will inherently affect the individual child herself, as opposed to affecting the general society's understanding of human nature. Moreover, given that technology has a way of creating its own inevitability, it is unwise to suggest that a group of children who may come into existence whether we approve or not are in some way non-human.[204] As discussed below, these concerns are part of the reason to prohibit state use of ectogenesis, but to rely on them to prohibit voluntary ectogenesis would inappropriately romanticize natural gestation.

2. State Use of Artificial Wombs

Although a child is not necessarily entitled to a human gestational mother, a child is entitled to be assigned at birth to

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[201] ALDOUS HUXLEY, BRAVE NEW WORLD (1932); *see* Sander-Staudt, *supra* note 67, at 114.

[202] *See generally* Gelfand, *supra* note 89, at 98-103 (proposing strategies for regulating ectogenesis with respect to insurance and employment).

[203] ROTHMAN, *supra* note 4, at 103.

[204] Consider, for example, the dystopia imagined in KAZUO ISHIGURO, NEVER LET ME GO (2005), in which clones are created through ectogenesis and raised in orphanages to be used as organ donors; the cloned children are believed to lack souls. Or the medieval recipe for artificial gestation, which was said to produce a child without a soul, discussed *supra*, note 45.

parent(s) who have a concrete relationship to the child that is reasonably likely to cause the parents to act in the child's interest. For this reason, the state should not be permitted to initiate the creation of parent-less children through artificial gestation, whether from the point of conception or as a mandatory alternative to abortion.

To begin with the easier case, the state should not be permitted to create ectogenic children on its own initiative. While most readers will quickly agree with this proposition, the discussion below highlights two of the reasons why this proposition is important. The first is the value of human connection and relationship. The second is the political role of the family and the concept of family citizenship.

a. Human Connection

People are social creatures. In daily life, we define ourselves not by mythical DNA programming but by our relationships within families, subcultures, nations, and a species. Each level is part of both self-definition and the political organization through which we express and act on our needs and ideals. Gestation creates a belongingness that is simultaneous with the child's emergence as a separate being. It locates the child in a particular position within the human community and defines her not in isolation but in relation to others. Freestanding ectogenesis under the control of the state would challenge this understanding of the human condition.

This connectedness of pregnancy plays an important role in cultural feminist theory. The experience of pregnancy and related biological functions are said to foster in women a greater sense of connection to others and a greater capacity for empathy.[205] If that is true, then frequent use of ectogenesis would decrease the quantity of empathy available in society as a whole. Overall alienation from the body and from others would be increased.

On the other hand, it seems unlikely that the correlation between female embodiedness and relational capacity is created at the individual level. Girls and women may exhibit a typically "female" sense of connectedness without having experienced any uniquely

[205] *See* Robin West, *Jurisprudence and Gender*, 55 U. Chi. L. Rev. 1, 1-4 (1988) (outlining the connection thesis); Sander-Staudt, *supra* note 67, at 117 ("Care ethicists speculate that the physical aspects of women's reproductive biology can contribute to the development of a relational ethical perspective.").

female biological capacity beyond living in a female body.[206] The association between pregnancy and a female capacity for relationship appears to operate at a cultural rather than an individual level. As liberal feminists would point out, ectogenesis could be valuable precisely because it would disrupt the association of women with providing care.

This disruption would come at the cost of rejecting and devaluing embodied care. More fundamentally, it would also disrupt the association between being human and being *cared for.*[207] It is, after all, not only women who experience the connection of pregnancy; it is everyone, at least so far. Rather than looking at pregnancy and concluding that women are especially connected to others, we could conclude that everyone begins in a fundamental state of connection.

Voluntary ectogenesis by individuals could also further deteriorate any cultural sense of connection, but it has other benefits and would be understood as a medically needed substitute for the usual connection of gestation. State-initiated ectogenesis, however, has no such redeeming purpose. Much more so than individual use of artificial wombs, it would produce "little strangers" without a place in the human community. [208]

b. Family Citizenship

Belongingness in a family can be analogized to belongingness in other political communities. In the United States, membership in a family and membership in the political community are defined through the same act of birth: "All persons born … in the United States … are citizens of the United States, and of the State in which they reside."[209] In other words, if you are born here, then you are part of us. While this clause has rarely been construed by the Supreme Court, the Court's decisions about immigration law reveal the values embodied in Citizenship Clause. When parents transmit citizenship to

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[206] The foundational psychological work in this area, CAROL GILLIAN, IN A DIFFERENT VOICE: PSYCHOLOGICAL THEORY AND WOMEN'S DEVELOPMENT (1982), focused on moral development in children.

[207] It is possible that this disruption would operate on the individual level by interfering with the ectogenic child's relational capacity. *See* Sander-Staudt, *supra* note 67, at 121.

[208] *Cf.* ROTHMAN, *supra* note 4, at 103 ("Grown outside of a woman, outside of the human community, we would indeed create an alien baby, a little stranger, the living reification of our ideology.").

[209] U.S. CONST. amend. XIV.

their children, the connection with the mother that arises from the act of birth is an important part of the political connection that gives rise to a right to citizenship.[210]

The family is also a political institution, and initial membership has, traditionally, been established according to *jus soli*: a child's family is defined according to the woman from whom she emerges. While a non-gestating parent can establish some connections with a developing child, the child's initial connection is with the gestator, and with other people only through her. For the state to create a child in an artificial womb would be to create the family-level equivalent of a stateless person. Just as the state cannot deny citizenship to a child born here, the state should not be able to deny family membership to a child by creating her as an intentional orphan. The child would be "born without the presence of a woman who is most likely to have a physical and psychological bond to her."[211] While a stateless person might find a home and an artificially gestated child might find a family, this is not a condition to be desired or sought.

c. The Morality of Abortion

The proposition that the state should not be permitted to produce family-less children to be raised as wards of the state should be uncontroversial. The remainder of this section argues that the conclusion should be no different with respect to a more contested issue, state use of ectogenesis as a mandatory alternative to abortion. Moreover, this conclusion is warranted whether it is the state alone that wishes to use an artificial womb to continue the fetus's development after an abortion or whether it is the state in combination with the genetic father.

Two preliminary matters must be mentioned. First, recall that the technology necessary for ectogenesis to serve as an alternative to abortion may be more complex than what is needed for complete ectogenesis. In addition, extraction of the fetus for transfer to a machine is likely to be more invasive and risky to the pregnant woman than standard methods of abortion. One could argue that she has the right to refuse the extraction procedure due to those increased risks. However, the Supreme Court has recently laid the groundwork for permitting the state to impose health risks on women in the name

[210] *See* Nguyen v. INS, 533 U.S. 53, 64-68 (2001) (stating that the connection to the mother implies a connection to the United States, which justifies distinguishing between mothers and fathers with respect to their ability to transmit citizenship).
[211] Sander-Staudt, *supra* note 67 at 124.

of its interest in the fetus; it may conclude that only substantial additional risks should be prohibited.[212] Let us assume, then, that the transfer itself is either medically neutral, as compared to regular abortion, or that the additional risk is not so great as to trouble the Supreme Court.

Second, recall that the state demand for artificial gestation after abortion will mean, in most cases, that women who otherwise would have had abortions will instead carry their pregnancies to term. Women who consider abortion to be a moral choice are unlikely to feel the same way about artificial gestation.[213] To compel artificial gestation would be to compel motherhood (or illegal abortion) in our ectogenic future as surely as a ban on abortion does so today.

Turning to the main argument, the notion that the state can mandate artificial gestation is premised on the general notion that the state can act on behalf of the embryo or fetus, against the mother.[214] This premise is different from the state acting on behalf of a future child, such as by supporting maternal health for the sake of the future child. Rather, the very question is whether the embryo is to become a child. The specific premise is thus that a woman seeking an abortion has an inherent conflict of interest with the embryo. This premise is based on the traditional ideology of reproduction. Rejecting that ideology and the dichotomy between the woman's body and the developing embryo also requires rejecting the belief that state-mandated ectogenesis is a moral solution to an unwanted pregnancy.

The concept of "maternal-fetal conflict" appears frequently in discussions of pregnancy and reproduction.[215] Such a conflict is in one sense inherent in every pregnancy. From a genetic perspective, the fetus's genes "want" to use as much of the mother's physiological resources as they can, while the mother's genes "want" to invest appropriately in this potential offspring but also to preserve resources for existing and possible future children.[216] The same

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[212] *See supra*, note 119 (discussing Gonzales v. Carhart, 550 U.S. 124 (2007)).
[213] *See* Cannold, *supra* note 120, at 58-61.
[214] *See* Roe v. Wade, 410 U.S. 113, 150 (1973) (identifying the state interest in the potential life of the fetus).
[215] *See generally* Michelle Oberman, *Mothers and Doctors' Orders: Unmasking the Doctor's Fiduciary Role in Maternal-Fetal Conflicts*, 94 NW. U. L. REV. 451, 451-52 (2000) (summarizing circumstances in which maternal-fetal conflicts are identified).
[216] *See* RICHARD DAWKINS, THE SELFISH GENE 129 (1989) (discussing the maternal-child conflict with respect to when to wean the child). At some point, the

conflict of interest exists, however, with respect to any particular ovum or sperm, each of which contains genes that "want" to be reproductively successful. A person who uses birth control or seeks an abortion is making a decision not to create a child at a particular time in order to conserve resources (in a very broad sense of the word) for herself and for her family, including existing and future children.[217]

A conflict of interest, in this sense, between a woman and the genes of the ova, sperm, zygote, or embryo contained in her body is not necessarily a conflict of interest between the woman and the inchoate child of which any of those genes might become a part. That would be so only under the genetic determinist view that vests individual identity in the zygote. To posit state-mandated artificial gestation as a legitimate alternative to abortion is to overlook the moral claim of a woman having an abortion to make a decision not to reproduce, taking into account her family interests as well as her own. It is a decision "that continuing the pregnancy would harm her maternal/fetal-child unit."[218]

Proponents of mandatory ectogenesis in lieu of abortion have also failed to distinguish the current situation involving frozen embryos. The emerging consensus position is that those embryos can be gestated only with the consent of their progenitors; the state cannot declare them available to any willing gestator.[219] Why, then, could the state do so with respect to in vivo embryos that are aborted? Indeed, the latter proposal is more extreme, since the state would mandate gestation even without willing parents ready to care for the child after birth.[220] Only two reasons might distinguish the

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fetus's genes actually "prefer" to allow the mother to care for siblings, but that point comes beyond the point where the mother's genes would prefer her to do so.

[217] *Cf.* Cannold, *supra* note 120, at 54 (describing one of her study participant's expression of the view that abortion is a moral decision based on "an evaluation that continuing the pregnancy would harm her maternal/fetal-child unit").

[218] *Id.*

[219] *See generally* Bridget M. Fuselier, *The Trouble with Putting All Your Eggs in One Basket: Using a Property Rights Model to Resolve Disputes Over Pcryopreserved Pre-Embryos*, 14 TEX. J. C.L. & C.R. 143, 148-56 (2009) (describing the approaches that have been taken in disputes over frozen embryos).

[220] If a child were created through artificial gestation—which might involve gradually reduced technological support over some number of months—it is not entirely clear when the child would be deemed to be "born." Given the skepticism about ectogenesis displayed in the text, however, it seems unnecessarily tendentious to use a different term.

two cases. First, proponents may be imagining relatively late abortions, in which the fetus more plausibly resembles a human child than an early embryo. If so, however, we are back where we started, in need of a means for determining when a fetus is entitled to gestation. That is no solution to the abortion debate at all. Second, proponents may be responding to the status and duty of the pregnant woman rather than to the status of the embryo. That is, the difference between an in vitro and an in vivo embryo is that the latter has been inside a woman, which defines her as a mother with a duty to nurture, thus conferring on the embryo a right to be nurtured. This possibility would render the ectogenic "solution" to abortion merely another manifestation of the ideology that motherhood is obligatory.

Moreover, in some cases, women would accept the state's terms and undergo fetal extraction and transfer to an artificial womb in lieu of abortion. The state would thereby inflict the same harms on the resulting child as if it were to initiate conception and gestation on its own. That is, the child would be born an orphan, with no individuated, caretaking relationship with any adult. While children today can become orphans at birth, their connection to a mother who dies in childbirth also connects them, most of the time, to an extended family. A child born because the government decided a fetus had to be gestated is an orphan in an even lonelier sense of the word.

This harm to the child would be reduced if a family awaited her, which raises the question whether the genetic father ought to be able to insist on artificial gestation in lieu of abortion. There are two reasons why he should not. First is the reality, discussed above, that the threat of artificial gestation will serve primarily to coerce women to remain pregnant. Second is the analogy to current doctrine regarding frozen embryos. The emerging view is that a woman is entitled to gestate such an embryo over the objection of the genetic father only if it represents her only reasonable opportunity to have her own genetic child.[221] There is no reason to give a genetic father greater authority over an embryo merely because it has once been inside a woman, especially when that power is so susceptible to abuse. Once again, far from solving the debate over abortion, new

[221] *See* Davis v. Davis, 842 S.W.2d 588, 604 (Tenn. 1992) ("Ordinarily, the party wishing to avoid procreation should prevail, assuming that the other party has a reasonable possibility of achieving parenthood by means other than use of the preembryos in question.").

technology will require a deeper resolution of the problems of women's relationship with the institution of motherhood.

CONCLUSION

Artificial womb technology should not be the solution of choice for problems of infertility. Ideological bias that permeates reproductive science suggests that current expectations about the feasibility of artificial gestation are over-optimistic. Moreover, to the extent that the technology emerges from efforts to assist premature infants, this technology will have beneficial uses but also the potential to do harm. For the former to prevail will require a cultural and legal change from our current construction of pregnancy, which the current fantasy of artificial wombs and their potential uses is helping to maintain. Although individual use of ectogenic technology should be cautiously allowed, the state should neither use artificial wombs to create orphans nor threaten to do so as a means for coercing women to continue unwanted pregnancies.