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Could Artificial Wombs End the Abortion Debate?

Christopher Kaczor

Although artificial wombs may seem fanciful when first considered, certain trends suggest they may become reality. Between 1945 and the 1970s, the weight at which premature infants could survive dropped dramatically, moving from 1000 grams to around 400 grams.¹ In 1973, the U.S. Supreme Court, in deciding *Roe v. Wade*, considered viability to begin around twenty-eight weeks. In 2000, premature babies were reported to have survived at eighteen weeks.² Advanced incubators already in existence save thousands of children born prematurely each year. It is highly likely that such incubators will become even more advanced as technology progresses.

Researchers are working to make super-advanced incubators, “artificial wombs,” a reality. Temple University professor Dr. Thomas Schaffer hopes to save premature infants using a synthetic amniotic fluid of oxygen-rich perfluorocarbons. Lack of funding has thus far prevented tests on human infants born prematurely, but Schaffer has successfully transferred premature lamb fetuses from their mother’s wombs and used the synthetic amniotic fluid to sustain their lives.³ At Cornell University, Dr. Hung-Ching Liu has taken steps toward developing an artificial womb by removing cells from the lining of a woman’s womb and then, using hormones, growing layers

¹Bernard Nathanson and Richard Ostling, *Aborting America* (Toronto: Life Cycle Books, 1979), 280–281.

²David S. Oderberg, *Applied Ethics: A Non-Consequentialist Approach*, (Oxford, U.K.: Blackwell Publishers, 2000), 5.

³Sacha Zimmerman, “Fetal Position: The Real Threat to *Roe v. Wade*,” *The New Republic* (August 18, 2003).

of these cells on a model of a uterus. The model eventually dissolves, leaving a new artificial womb that continues to thrive. What is more, Liu's team found that, within days of being placed in the new womb, embryos will attach themselves to its walls and begin to grow. At that point, scientists must end the experiment to comply with in vitro fertilization (IVF) laws, so researchers do not yet know how long after the beginning stages of gestation this artificial womb would be viable.⁴

Liu hopes to develop these wombs so that they could be transplanted into women with pathological or missing uteruses. If successful, the research would be a breakthrough in helping successful implantation. At the Juntendo University in Japan, Dr. Yoshinori Kuwabara seeks to aid women facing miscarriage or very premature birth by developing an artificial uterus to enable the completion of the process of gestation: "For the past several years, Kuwabara and his team have kept goat fetuses alive and growing for up to ten days by connecting their umbilical cords to two machines that serve as a placenta, pumping in blood, oxygen and nutrients and disposing of waste products."⁵

If these researchers, and others like them, are successful, what would it mean for the abortion debate? There has been a good deal of recent speculation on this matter,⁶ but none considering the writings of intellectual defenders of abortion and none considering a distinctly Catholic perspective in terms of magisterial teaching.

If artificial wombs were made available and relatively affordable, and the procedure was no more intrusive than present-day abortion, would abortion defenders be satisfied with extractive abortion (removing the living human fetus for implantation into an artificial womb) or would they insist on the right to terminative abortion (ending human fetal life)? Would the use of an artificial womb in lieu of abortion be morally permissible for consistent critics, especially Catholic critics, of abortion? Or, has magisterial teaching or Catholic tradition excluded, if only implicitly, this practice? Depending on how these questions are answered, it could be the case that most consistent critics of abortion and most consistent defenders of abortion could

⁴Ibid. See also Paula Moyer, "Engineered Endometrial Tissue May Provide New Infertility Therapies," *Reuters Health Medical News* (October 24, 2001).

⁵Jeremy Rifkin, "The End of Pregnancy: Within a Generation There Will Probably Be Mass Use of Artificial Wombs to Grow Babies," *Guardian Unlimited* (U.K.) (January 17, 2002), <http://www.guardian.co.uk/Archive/Article/0,4273,4337092,00.html>. See also R.G. Edwards and P.C. Steptoe, "Current Status of In-Vitro Fertilisation and Implantation of Human Embryos," *Lancet* 2.8362 (December 3, 1983): 1265-1269; K.G. Gould, "Ovum Recovery and In Vitro Fertilization in the Chimpanzee," *Fertility and Sterility* 40.3 (September 1983): 378-383.

⁶In addition to the articles already cited, see Scott B. Rae, "The Advent of the Artificial Womb: A Prospect to Be Welcomed," The Center for Bioethics and Human Dignity, http://www.cbhd.org/resources/reproductive/rae_2003-01-29.htm; Robin McKie, "Men Redundant? Now We Don't Need Women Either," *The Observer* (U.K.) (February 10, 2002), <http://observer.guardian.co.uk/international/story/0,6903,648024,00.html>; Ronald Bailey, "Babies in a Bottle: Artificial Wombs and the Beginning of Human Life," *Reason Online* (August 20, 2003), <http://www.reason.com/rb/rb082003.shtml>.

both be satisfied, and the abortion debate among intellectuals, at least as we know it now, would change profoundly, if not altogether be ended. Needless to say, my remarks here are necessarily “exploratory” insofar as they apply traditional moral reasoning to an as yet nonexistent technology. It would be extremely difficult, if not impossible, beforehand to explore in depth the political, social, economic, and theological ramifications of an artificial uterus, and yet an admittedly incomplete consideration of the ethical dimensions of this possibility may better prepare us, if and when this possibility becomes a reality.

Artificial Wombs and Consistent Defenders of Abortion

Consistent defenders of abortion believe that abortion is morally permissible in all circumstances throughout all nine months of pregnancy. In moral and usually also legal terms, consistent defenders of abortion assert an absolute right to abortion, even as consistent critics of abortion defend an exceptionless norm against intentionally killing the human fetus.⁷ But what exactly is meant by the “right to abortion”?

One should distinguish two aspects of abortion that are currently but not necessarily linked—extraction and termination. Abortion rights might be understood as the right not to be pregnant, the right not to have the human fetus in the womb, the right of extraction. On the other hand, abortion rights might be defined as the right to end the life of the human fetus in utero, the right to terminate not just the pregnancy, but also the life of the fetus. These two understandings of abortion, although distinct, are at least for the present linked, since one cannot currently accomplish evacuation of the human fetus from the uterus at an early stage of pregnancy without also terminating the life of the human fetus. Accordingly, one could advocate the right of evacuation or extraction, that is, the right to have the fetus removed from the woman’s body, and yet not advocate a right of termination, that is, the right to have the fetus killed within the woman’s body. The question can then be asked, When someone defends the right to an abortion, does this include only evacuation or also termination?

Most defenders of abortion in fact only advocate a right to evacuation and not a right to termination. For example, the American College of Obstetricians and Gynecologists in 1977 wrote:

⁷For the record, I believe that the killing of any innocent person, including all preborn human beings, as a means or as an end, is always ethically impermissible; see my *Proportionalism and the Natural Law Tradition* (Washington, DC: The Catholic University of America Press, 2002). In chapters two and three of *The Edge of Life: Human Dignity and Contemporary Bioethics* (New York: Springer, 2005), I reject all “performative accounts” of personhood (e.g., functional rationality, the desire to live, sentience, viability, what a being “does”) and argue that every single human being from the very beginning of his or her existence, normally at conception, is a person and should be accorded due respect. At present, I am finishing a book *The Ethics of Abortion: Human Life, Women’s Rights, and the Question of Justice*, that defends this conclusion as applied to the abortion issue.

The College affirms that the resolution of such conflict (between woman and fetus) by inducing abortion in no way implies that the physician has an adversary relationship towards the fetus and therefore, the physician does not view the destruction of the fetus as the primary purpose of abortion. The College consequently recognizes a continuing obligation on the part of the physician towards the survival of a possibly viable fetus where this can be discharged without additional hazard to the health of the mother.⁸

If methods of nonlethal evacuation were available and safe for maternal health, then this statement would require that doctors use these means. Artificial wombs as envisioned are precisely the means that would enable the survival of a viable fetus without additional hazard to the health of the mother. If all physicians abided by this statement, this alone would dramatically change the abortion debate, for if the medical community refused to perform terminative abortions and would only perform evacuative abortions, then the abortion debate as we know it today would be over.

Among philosophers defending abortion, the most prominent, such as Mary Ann Warren, Judith Jarvis Thomson, and David Boonin, understand the right to abortion as a *right of evacuation* and *not a right of termination*. In Thomson's words,

While I am arguing for the permissibility of abortion in some cases, I am not arguing for the right to secure the death of the preborn child. It is easy to confuse these two things in that up to a certain point in the life of the foetus it is not able to survive outside the mother's body; hence removing it from her body guarantees death. But they are importantly different.⁹

Along the same lines, Mary Anne Warren writes, "If and when a late-term abortion could be safely performed without killing the fetus, [the mother] would have no absolute right to insist on its death (e.g., if others wish to adopt it or pay for its care), for the same reason that she does not have a right to insist that a viable infant be killed."¹⁰ Warren believes that the rights of the fetus to be in the womb do not trump the woman's right of freedom, which is violated by the pregnancy. However, if the fetus were removed and placed in an artificial womb, the rights of the woman would no longer be violated. Likewise, in his book *A Defense of Abortion*, David Boonin argues against abortion as termination:

[T]he claim that the woman has such a right [to terminate fetal life] would entail that if the baby survived an attempted abortion, or was born prematurely, before the woman had an opportunity to have the abortion performed, then she would still have the right to have it killed. And this is plainly unacceptable. It may well be true that many women who seek abortions do so because they want the fetus

⁸As cited by Nathanson in *Aborting America*, 179–180.

⁹Judith Jarvis Thomson, "A Defense of Abortion," in *Intervention and Reflection: Basic Issues in Medical Ethics*, 5th ed., ed. Ronald Munson (Belmont, CA: Wadsworth Publishing Company, 1996), 79.

¹⁰Mary Anne Warren, "The Personhood Argument in Favor of Abortion," in *Life and Death: A Reader in Moral Problems*, ed. Louis P. Pojman (Belmont, CA: Wadsworth Publishing Company, 2000), 267.

that they are carrying to be killed. And such women will to that extent be dissatisfied with a position on which it is morally permissible for them to have their viable fetuses extracted but not killed. But in the absence of an independent reason to think that they are entitled to have the fetus die when it is already viable, this seems to count more as a criticism of their desires than as an objection to the good samaritan argument.¹¹

So these philosophers, the most prominent defenders of abortion, defend only a right of evacuation, not a right of termination. Safe, practical artificial wombs should therefore end the abortion debate for them. An added advantage, from their perspective, would be that the right to evacuation abortion would be relatively, if not absolutely, uncontested, unlike the present heavily contested abortions—heavily contested because they include termination of the life of the human fetus.

The 1977 statement from the American College of Obstetricians and Gynecologists implicitly raises an important objection, namely, that partial ectogenesis (development of a baby outside the maternal womb for part of the gestational period) could be more dangerous for the woman and therefore abortion as termination would be preferable. In the words of David N. James:

A foetal transplant would be an elaborate surgical procedure aimed at the delicate removal of the foetus from the mother's placenta and its transfer and attachment to the external artificial womb. Unlike an early abortion, foetal transplantation would thus require general anesthesia as well as a surgical incision through the abdominal wall and uterus, with all the risks of medical complications which accompany these more invasive procedures.¹²

James also notes that intensive care for such children could be massively expensive and lead to many new orphanages, foster care homes, and related services.

These possible difficulties may or may not be realized. If these difficulties were to take place, they would be technological, economic, or social difficulties and not per se moral difficulties. Ex hypothesis, partial ectogenesis, as imagined in the future, would not be dangerous for women. Many procedures that were dangerous and invasive forty years ago are now safe and noninvasive. Many surgeries formerly requiring days in the hospital have become outpatient surgeries. The choice between termination and extraction would not be the choice between no danger and danger, but between two choices both risking dangers. As medical care advances, it is highly likely that the differences in danger among the various procedures will be negligible, and the cost for such treatments less expensive—as is seen, for example, in the cheap, fast, and powerful computers of today, compared with the expensive, slow, and not very powerful computers of the 1970s. Of course, a cataclysmic disaster could return humanity to the Stone Age, but if the past is any indication of

¹¹David Boonin, *A Defense of Abortion* (Cambridge: Cambridge University Press, 2003), 257. See also my review of Boonin's book in the *National Catholic Bioethics Quarterly* 5.1 (Spring 2005): 199–202.

¹²David N. James, "Ectogenesis: A Reply to Singer and Wells," *Bioethics* 1.1 (January 1987): 87.

the future, the projected course of technological development strongly suggests that the technological and economic problems that James foresees could be overcome.

The foreseen social cost of extraction rather than termination may also prove to be mistaken. The countries most likely to use partial ectogenesis in lieu of abortion are the same countries that will encounter *underpopulation* problems in the near future—Western Europe and, to a lesser extent (due to immigration), the United States. These countries will face severe financial difficulties in the future, with fewer and fewer workers to support a growing class of retirees. For them, an increase in the number of children and future workers may be a social boon, securing social support for seniors. Social considerations are not decisive arguments against evacuation and the use of artificial wombs.

Of course, not all doctors, philosophers, or activists defending abortion understand abortion rights in terms of evacuation rather than termination. For some, “abortion rights” includes the right to secure the death of the human fetus. However, even among advocates of infanticide, there is a recognition that insisting on fetal death in the context of the availability of artificial wombs might be going too far. As Peter Singer and Deane Wells wrote:

Freedom to choose what is to happen to one’s body is one thing; freedom to insist on the death of a being that is capable of living outside of one’s body is another. ... [Even if there is no fetal right to life,] it is difficult to see why a healthy foetus should die if there is someone who wishes to adopt it and will give it the opportunity of a worthwhile life. We do not allow a mother to kill her newborn baby because she does not wish either to keep it or to hand it over for adoption. Unless we were to change our mind about this, it is difficult to see why we should give this right to a woman in respect of a foetus she is carrying, if her desire to be rid of the foetus can be fully satisfied without threatening the life of the foetus.¹³

If consistent advocates of abortion and even infanticide such as Peter Singer can embrace the use of advanced incubators in lieu of abortion, then it is likely that there will be few advocates of abortion who will disagree. If advocates of abortion such as these are consistent, and really meant what they have said about not desiring the death of the human fetus, for at least these defenders of abortion, artificial wombs would end the abortion debate.¹⁴

Artificial Wombs and Consistent Critics of Abortion

The most consistent and forceful critic of abortion in the modern world is the Roman Catholic Church, so in assessing the acceptability of the use of artificial wombs in lieu of abortion, I will make special reference to the Church’s official

¹³Peter Singer and Deane Wells, *The Reproduction Revolution: New Ways of Making Babies* (Oxford, U.K.: Oxford University Press, 1984), 135–136.

¹⁴An interesting and related question concerns not intellectual defenses of abortion, such as those given by Singer, Boonin, Thomson, Warren, and others, but the political and social advocates of abortion. Here, the possibility of ending the debate is, I’m afraid, much less likely, as is evident in some popular reflections on the topic, such as Zimmerman’s “Fetal Position,” cited earlier.

teaching on matters relevant to this question, especially *Donum vitae*. The Catholic teaching on abortion is quite clear. In the words of John Paul II,

Given such unanimity in the doctrinal and disciplinary tradition of the Church, Paul VI was able to declare that this tradition is unchanged and unchangeable. Therefore, by the authority which Christ conferred upon Peter and his Successors, in communion with the Bishops—who on various occasions have condemned abortion and who in the aforementioned consultation, albeit dispersed throughout the world, have shown unanimous agreement concerning this doctrine—I declare that direct abortion, that is, abortion willed as an end or as a means, always constitutes a grave moral disorder, since it is the deliberate killing of an innocent human being.¹⁵

What I believe is not clear (indeed, has never to my knowledge been explicitly addressed) is the Catholic answer to the question of the moral permissibility of artificial wombs in lieu of abortion. However, Catholic teaching does provide principles that could be applied to this case. Indeed, although the magisterium may at some point in the future explicitly address this situation, several important arguments against artificial wombs from magisterial teaching should be acknowledged, namely, (1) the artificiality objection, (2) the IVF objection, (3) the embryo transfer objection, (4) the deprivation of maternal shelter objection, (5) the birth-within-marriage objection, (6) the integrative parenthood objection, (7) the surrogate motherhood objection, and finally, (8) the wrongful experimentation objection.¹⁶ Each objection to artificial wombs arises from the Catholic tradition and has some plausibility. However, I believe that each objection fails and that there are compelling reasons to conclude that the use of artificial wombs in lieu of abortion is morally permissible.

I should first clarify a number of key terms in the discussion. By complete ectogenesis, I mean the generation and development of a human being outside the womb from the beginning of embryonic existence until the equivalent of forty weeks' gestation. By partial ectogenesis, I mean the development of a human being during the typical gestational period outside the maternal womb for part of (but not the entire) gestational period. An artificial womb might be used for complete or partial ectogenesis; i.e., it could be used to generate and sustain development of an embryo or fetus during the entire period of gestation, or it might be used to sustain development after partial development within the maternal womb. Embryo transfer moves the human embryo, having never been planted in a womb, to another location, such as an artificial womb or maternal womb. Fetal transfer moves the fetus from a maternal womb to another maternal womb or to an artificial womb. So, let us now consider some of the likely objections to artificial wombs.

¹⁵John Paul II, *Evangelium vitae* (March 25, 1995), n. 62.

¹⁶These objections make more explicit, both in terms of content and linkage to the Catholic tradition, many of the concerns voiced by Christine Rosen in her important article "Why Not Artificial Wombs?" appearing in *The New Atlantis* 3 (Fall 2003): 67–76. Although I ultimately disagree with Rosen, the concerns she raises are both legitimate and reasonable, although in my view ultimately not persuasive.

(1) *The artificiality objection.* This possible objection against artificial wombs arises precisely because these wombs are *artificial*. As utilizing an artificial, man-made product for the purpose of gestation, ectogenesis of any kind would be against nature. Since human beings should act in accordance with nature, artificial wombs are impermissible.

However, the “artificiality” of such wombs is not sufficient grounds for rejecting their use. In speaking of various technologies used to create human life, such as IVF, *Donum vitae* indicates that

[t]hese interventions are not to be rejected on the grounds that they are artificial. As such, they bear witness to the possibilities of the art of medicine. But they must be given a moral evaluation in reference to the dignity of the human person, who is called to realize his vocation from God to the gift of love and the gift of life.¹⁷

Indeed, current advanced incubators are highly “artificial,” making use of cutting-edge technology of all kinds, but they are not ethically impermissible. Indeed, the artificial wombs envisioned by researchers are nothing more than extremely advanced versions of incubators routinely used today.

One can fairly easily imagine artificial wombs that would be acceptable to everyone. Imagine a woman greatly desiring to have children who discovers she has uterine cancer and must have her uterus removed in order to save her life. If the research of Hung-Ching Liu is successful, portions of a woman’s healthy uterine tissue could be used to fashion an artificial uterus for her that could be reimplanted into her own body, restoring her fertility. If successful, her womb would be “artificial,” fashioned by human hands outside the human body and using advanced technology, yet presumably no more morally problematic than an artificial heart.

(2) *The IVF objection.* This objection against artificial wombs arises from the Catholic opposition to IVF. The Catholic Church, it would seem, must oppose ectogenesis because it would seem to presuppose the use of cloning, parthenogenesis, or IVF in creating an embryo. In the words of *Donum vitae*,

attempts or hypotheses for obtaining a human being without any connection with sexuality through “twin fission,” cloning or parthenogenesis are to be considered contrary to the moral law, since they are in opposition to the dignity both of human procreation and of the conjugal union. . . . Such fertilization (IVF) is in itself illicit and in opposition to the dignity of procreation and of the conjugal union, even when everything is done to avoid the death of the human embryo.¹⁸

If ectogenesis is wrong, and the use of artificial wombs in lieu of abortion is a form of ectogenesis, our question has been answered.

However, this objection fails to distinguish between partial ectogenesis and complete ectogenesis. Catholic teaching as expressed in *Donum vitae* clearly ex-

¹⁷Congregation for the Doctrine of the Faith, *Donum vitae*, Introduction, 3 (original emphasis).

¹⁸*Ibid.*, I.6. and II.B.5. (emphasis removed).

cludes complete ectogenesis (because the document forbids fertilization outside the human body), but a condemnation of complete ectogenesis is not decisive for the question at issue, since the use of artificial wombs in lieu of abortion would be considered partial ectogenesis. A woman tempted to seek abortion *already has a human fetus within her*. Complete ectogenesis is already excluded. Partial ectogenesis is the continued development of an already generated human being in an artificial womb after transfer from a maternal womb. By definition, partial ectogenesis does not involve generation and development *entirely outside* the womb. So although the Catholic Church opposes IVF, twin fission, cloning, and parthenogenesis, and must therefore oppose complete ectogenesis, it does not necessarily follow that it would oppose partial ectogenesis.

(3) *The embryo transfer objection*. This possible objection arises from the belief of impermissibility of *embryo transfer* (ET). If embryo transfer is impermissible, fetal transfer (FT) from a maternal womb to an artificial womb would also seem to be impermissible. Partial ectogenesis necessarily involves FT, the transfer of the human fetus from the maternal womb to an artificial womb, and so partial ectogenesis would seem to be impermissible.

It is important to note that embryo transfer has not been explicitly condemned by the Catholic Church. Indeed, the previous issue of the *National Catholic Bioethics Quarterly* (Spring 2005) devoted several articles to the topic, which were written from various perspectives and came to different conclusions. In the condemnation of embryo transfer in *Donum vitae*, the problematic nature of embryo transfer is always spoken of in connection with IVF. It could be that IVF and ET are objectionable *as a combination*, and yet ET alone is not wrong *ex objecto*. *Donum vitae* condemns IVF and excludes implantation of an embryo into a surrogate mother, but the document does not explicitly condemn the reimplantation of an embryo which has been created through IVF into the genetic mother's womb. Indeed, many authors argue that the "rescue" of abandoned frozen embryos via implantation, even into adoptive mothers, is permissible, indeed heroic.¹⁹

A final case may make clear the acceptability of embryo transfer. In treating ectopic pregnancy, some doctors have removed the embryo from the fallopian tube and implanted the embryo in the mother's uterus. There have been reports of successful pregnancies resulting. Surely, such efforts to preserve the health of the mother and secure the life of the embryo are not only permissible but laudable. At least in such cases, the moving of the embryo to avoid potentially lethal harm to the mother and certainly lethal harm to the child is clearly permissible. If ET is not wrong *ex*

¹⁹In addition to the articles in the Spring 2005 edition of the *National Catholic Bioethics Quarterly*, also see Mary Geach and Helen Watt's debate of the question, "Are There Any Circumstances in Which It Would Be Morally Admirable for a Woman to Seek to Have an Orphan Embryo Implanted in her Womb?" in *Issues for a Catholic Bioethic: Proceedings of the International Conference to Celebrate the Twentieth Anniversary of the Foundation of the Linacre Centre, 28–31 July 1997*, ed. Luke Gormally (London: The Linacre Centre, 1999), 341–352; Helen Watt, "A Brief Defense of Frozen Embryo Adoption," *National Catholic Bioethics Quarterly* 1.2 (Summer 2001): 151–154.

objecto, then it would seem that transfer of a human being prior to full term from one location to another is not in itself impermissible—which is what is required for partial ectogenesis.

However, even if ET were unacceptable *ex objecto*, it does not necessarily follow that FT is problematic. Indeed, fetal transfer is already widely practiced and accepted. The emergency cesarean delivery of a preterm baby in danger of dying is not morally problematic, and may, in some cases, even be morally obligatory. As incubator technology progresses, some premature babies who now are seriously injured or who die because of preterm delivery will instead become viable and healthy.

(4) *The deprivation of maternal shelter objection.* This objection is more difficult. In the words of *Donum vitae*,

The freezing of embryos, even when carried out in order to preserve the life of an embryo—cryopreservation—constitutes an offense against the respect due to human beings by exposing them to grave risks of death or harm to their physical integrity, and *depriving them, at least temporarily, of maternal shelter and gestation*, thus placing them in a situation in which further offenses and manipulation are possible.²⁰

In justifying the conclusion that it is wrong to freeze human embryos, the document appeals to the impermissibility of depriving the human embryo of maternal shelter and gestation. Partial ectogenesis necessarily involves the deprivation of maternal shelter and gestation, and so the use of artificial wombs would seem to be objectionable.

It is possible, however, that deprivation of maternal shelter and gestation is *prima facie* wrong, but nevertheless may be justified in certain circumstances. Consider the case of a viable baby whose mother begins to die, or actually dies. Surgeons on-hand rush to remove the premature baby from the mother, depriving him or her of maternal gestation—but of course this removal is not in itself morally objectionable. One can imagine other situations in which a preborn child must be removed from the uterus or else he or she will die, such as a case of a mother who has an incompetent uterus, or a situation in which the mother has been poisoned, and the poison will kill the child unless it is immediately removed from the womb. In these cases, removing the child from the maternal womb does no offense to the dignity of the child. Maternal gestation and shelter are important to the human being in utero to the extent that they aid and support the well-being of the human fetus. In cases in which it endangers the life of a human being to remain in utero, depriving a human fetus of maternal gestation is not morally objectionable, but may be morally praiseworthy.

Of course, all the cases appealed to in the previous paragraph involve medical pathology threatening fetal life rather than a free choice of the will. If natural causes endanger the life of the human fetus, then removal is permissible and deprivation of maternal gestation does not offend the dignity of the human being in utero. On the other hand, if the life of the human fetus is threatened by the choice of abortion,

²⁰Congregation for the Doctrine of the Faith, *Donum vitae* I.6 (original emphasis removed, new emphasis added).

deprivation of maternal gestation is blameworthy. Depriving the human being in utero of care and shelter may be permissible in the first case of natural causes, but not permissible in the second case, in which the danger to the child is voluntarily caused and could be voluntarily removed.

Does the voluntary or involuntary nature of the danger mark a morally decisive difference between the two cases? Whether the danger is voluntarily or nonvoluntarily caused makes no difference from the perspective of the preborn who are threatened with death. Death is just as final from a voluntary cause as from a nonvoluntary cause. Indeed, many causes of danger to the human fetus which could be considered “natural” can be originally caused by voluntary actions. For example, one can imagine a case in which a pregnant woman is dying because she was in a car accident that she caused by her irresponsible driving, or perhaps a case in which a woman is dying from lung cancer because she smoked too many cigarettes. The details of a causal chain which ends with a human fetus being in danger of death unless removed from the womb do not, therefore, appear to be morally decisive in determining the permissibility of the use of highly advanced incubators.

Another important distinction between the two cases (partial ectogenesis instead of abortion on the one hand, and on the other hand, fetal removal on account of a maternal pathology threatening fetal well-being) is that in the first case, the removal is motivated by the (perceived) well-being of the mother, but in the second, the removal is motivated by the well-being of the child. Perhaps this difference could account for the impermissibility of the first act but the clear permissibility of the second.

However, there are other cases, not normally viewed as problematic, in which the removal of the child takes place for the well-being of the woman. In the case of a gravid cancerous uterus, the removal of uterus and child takes place to preserve the mother’s, not the child’s, well-being. According to widely accepted understandings of double effect reasoning, the removal of the gravid cancerous uterus is morally permissible even if the premature child would die. If fetal viability has already been achieved, the removal is even easier to justify. For a variety of reasons, some of which are legitimate and will be discussed below, many women choose to have labor induced so as to deliver their babies before their due date. It seems that there is tacit agreement that such practices are morally unproblematic so long as the safety of the mother and child is not endangered. Some women have labor induced because they have had extremely rapid labors in the past and want to make sure they deliver with proper medical care available; others due to their discomfort near the end of pregnancy; still others for reasons entirely unrelated to physical well-being, such as the preference for a certain date of birth for their child. None of these practices is impermissible. If ectogenesis can function in the future as currently envisioned, then induction of labor or surgical removal of the human fetus at any stage of pregnancy could become no less dangerous than induction of labor is now with contemporary technology a few days before the due date. In such circumstances, whatever would justify delivering a child a few days earlier would also justify ectogenesis.

This arguably proves too much, for even if partial ectogenesis might be permissible in lieu of abortion, it seems *prima facie* morally problematic to choose par-

tial ectogenesis for trivial reasons. One might then carve out a “middle position” such that partial ectogenesis ought *not* to be used for utterly trivial reasons, and yet *may* be chosen in circumstances in which a person might otherwise be tempted to choose abortion. It would be difficult, if not impossible, to detail all the circumstances. However, one might liken the use of partial ectogenesis to adoption generally. It would be wrong to place a child into another family by adoption simply because the child’s birthday fell on the “wrong” day or because one did not want to suffer other such trivial inconveniences. On the other hand, adoption in other circumstances, such as a broken relationship between the father and mother, could be fully permissible. Generally, the bond between mother and child should not be broken, but given appropriate circumstances, both adoption as we now know it and partial ectogenesis as it has been imagined here can be permissible despite undermining the natural mother-child bond.

(5) *The birth-within-marriage objection.* The right of a child to be born within marriage is another objection that could be raised to the use of highly advanced incubators in the context of possible abortion. In the words of *Donum vitae*,

Techniques of fertilization *in vitro* can open the way to other forms of biological and genetic manipulation of human embryos, such as attempts or plans for fertilization between human and animal gametes and the gestation of human embryos in the uterus of animals, or the hypothesis or project of constructing artificial uteruses for the human embryo. *These procedures are contrary to the human dignity proper to the embryo, and at the same time they are contrary to the right of every person to be conceived and to be born within marriage and from marriage.*²¹

This passage is particularly noteworthy in that it explicitly mentions the possibility of constructing artificial uteruses and seems to condemn ectogenesis.

Indeed, this passage of *Donum vitae* clearly indicates the moral impermissibility of complete ectogenesis, but it does not necessarily exclude partial ectogenesis. Whenever the human fetus leaves his or her mother’s womb, whether by surgical intervention or naturally, whether at full term or earlier, a human being can rightly be said to be born. Unlike complete ectogenesis, condemned by this passage, partial ectogenesis takes place after human birth, albeit a preterm, surgically initiated human birth. Hence, partial ectogenesis is simply not within the scope of this passage from *Donum vitae*, which discusses the right to be born within marriage.

(6) *The integrative parenthood objection.* *Donum vitae* does, however, clarify the meaning of the right to be born within marriage in the following passage, in ways that would seem to also exclude partial ectogenesis. Call this the *integrative parenthood* objection to partial ectogenesis. “The child has the right to be conceived, *carried in the womb*, brought into the world and brought up within marriage: it is through the secure and recognized relationship to his own parents that the child can discover his own identity and achieve his own proper human development.”²² Artificial

²¹Ibid., I.6 (original emphasis).

²²Ibid., II. A. 1 (emphasis added).

insemination using egg or sperm from someone outside the marriage is also impermissible for the same reason:

Heterologous artificial fertilization violates the rights of the child; it deprives him of his filial relationship with his parental origins and can hinder the maturing of his personal identity. Furthermore, it offends the common vocation of the spouses who are called to fatherhood and motherhood: it objectively deprives conjugal fruitfulness of its unity and integrity; it brings about and manifests a rupture between genetic parenthood, gestational parenthood and responsibility for upbringing.²³

At first glance, these passages seem to clearly exclude partial ectogenesis as undermining *gestational parenthood*, which is important in securing the well-being of the child. Integrative parenthood involves not separating genetic parenthood, gestational parenthood, and what might be called social parenthood, namely, the responsibility for raising and rearing the child. A child has a right to *integrative parenthood*, and even partial ectogenesis violates this right by depriving the human fetus of gestational parenthood.

However, this interpretation of the importance of integrative parenthood cannot be maintained. If a right to be conceived, gestated, and raised within marriage were understood to mean that every child *once conceived* must be brought up within marriage, it would follow that all women who find themselves pregnant outside of marriage (even by rape) must marry the father. In many cases of extramarital pregnancy, marriage of the father and mother constitutes the best response to the situation. However, marriage following pregnancy is not always advisable, let alone a moral duty. Indeed, in at least some cases of extramarital pregnancy, marriage not only would be gravely imprudent but indeed is not permissible or even possible, such as when a pregnancy occurs as the result of incest, when a prior valid marriage exists for one or both parties, or when a pregnancy involves a party of very young age.

In addition, if the right to integrative parenthood were interpreted as the right of every existing child to be nurtured in his or her mother's womb until full-term birth and then raised in a marriage, then every birth mother placing a child for adoption and every couple accepting a child for adoption would be acting impermissibly. Of course, given appropriate circumstances, birth parents and adoptive parents do nothing wrong in their acts of giving and receiving a child. Indeed, a birth mother acts generously and bravely in placing her child in another family through adoption. When adoption is in the child's best interest, the birth mother performs a loving and heroic act and those who adopt the child likewise perform a generous act. *Donum vitae* itself notes that adoption is an important service to life: "Physical sterility in fact can be for spouses the occasion for other important services to the life of the human person, for example, adoption, various forms of educational work, and assistance to other families and to poor or handicapped children."²⁴ A child's right to integrative parenthood is misinterpreted if this right would lead to a condemnation of adoption.

²³Ibid., II. A. 2.

²⁴Ibid., II. B. 8.

Integrative parenthood should be understood as the belief that one should not *cause a human being to come into existence* unless one can properly care for the child. A child's right to integrative parenthood means that parents should not set out to conceive a child unless there is a marriage of the child's mother and father, conception by mother and father in the act of marriage, and the intention to nurture the child within the maternal womb and then raise the child within marriage. However, *once conception of a new human being has taken place*, inside of marriage or outside, it is in certain circumstances permissible, and even praiseworthy, to choose adoption, if this option is judged by sound prudential judgment to be in the best interest of the individual child. Although it would be wrong to conceive a child simply in order to place him or her for adoption, the Catholic Church's teaching and ongoing support of adoption makes it clear that it is not wrong to choose adoption following the conception of a child. Whether this adoption takes place at a few weeks after birth, at forty weeks of full gestation, at twenty-five weeks following conception on account of premature birth, or at seven weeks following conception does not, in itself, seem morally relevant, so long as the well-being of the child is not endangered. The right to integrative parenthood does not exclude adoption and would seem also not to exclude partial ectogenesis.

(7) *The surrogate motherhood objection.* This objection would describe ectogenesis as a form of surrogate motherhood. *Donum vitae* clearly teaches that surrogate motherhood is ethically impermissible:

Surrogate motherhood represents an objective failure to meet the obligations of maternal love, of conjugal fidelity and of responsible motherhood; it offends the dignity and the right of the child to be conceived, carried in the womb, brought into the world and brought up by his own parents; it sets up, to the detriment of families, a division between the physical, psychological and moral elements which constitute those families.²⁵

If surrogate motherhood is wrong, and if ectogenesis is a form of surrogate motherhood, indeed an artificial surrogate motherhood, then ectogenesis would also be wrong. This might be called the *surrogate motherhood objection* to the use of highly advanced incubators in lieu of abortion.

In response, one should recall the very precise definition of surrogate motherhood given in *Donum vitae*:

By "surrogate mother," the instruction means:

(a) The woman who carries in pregnancy an embryo implanted in her uterus and who is genetically a stranger to the embryo because it has been obtained through the union of the gametes of "donors." She carries the pregnancy with a pledge to surrender the baby once it is born to the party who commissioned or made the agreement for the pregnancy.

(b) The woman who carries in pregnancy an embryo to whose procreation she has contributed the donation of her own ovum, fertilized through insemination with the sperm of a man other than her husband. She carries the pregnancy with

²⁵Ibid., II. A. 3.

a pledge to surrender the child once it is born to the party who commissioned or made the agreement for the pregnancy.²⁶

By neither of these definitions would partial ectogenesis be a form of surrogate motherhood. Both definitions of surrogate motherhood involve promises made by the surrogate mother to give up the baby once it is born to whomever commissioned or made the agreement for pregnancy. Obviously, an artificial womb cannot pledge or agree to anything, nor must partial ectogenesis involve giving the baby to those who initiated creation of the baby. Indeed, in cases where partial ectogenesis is chosen instead of abortion, the woman who otherwise would have chosen abortion does not want to raise the baby. In sum, one can reject the permissibility of surrogate motherhood as understood in *Donum vitae* without rejecting the permissibility of using highly advanced incubators in lieu of abortion.

(8) *The wrongful experimentation objection.* Finally, that this solution to the abortion problem might involve *wrongful experimentation* is perhaps the most powerful objection to partial ectogenesis. Pope John Paul II writes in *Evangelium vitae*,

This [negative] evaluation of the morality of abortion is to be applied also to the recent forms of *intervention on human embryos* which, although carried out for purposes legitimate in themselves, inevitably involve the killing of those embryos. This is the case with *experimentation on embryos*, which is becoming increasingly widespread in the field of biomedical research and is legally permitted in some countries. Although “one must uphold as licit procedures carried out on the human embryo which respect the life and integrity of the embryo and do not involve disproportionate risks for it, but rather are directed to its healing, the improvement of its condition of health, or its individual survival,” it must nonetheless be stated that the use of human embryos or fetuses as an object of experimentation constitutes a crime against their dignity as human beings who have a right to the same respect owed to a child once born, just as to every person.²⁷

If scientific experimentation on human beings before birth is only permissible when directed to the healing or sustaining of the well-being of the individual not yet born, then to attempt partial ectogenesis would be wrong. The use of artificial wombs in lieu of abortion subject the human fetus to risks, not for the sake of the human fetus’s own welfare, but for the sake of the mother being free from pregnancy. Although some day techniques of partial ectogenesis may be made eventually routine and no more risky than normal pregnancy, all early attempts at partial ectogenesis would be wrongful experimentation.

However, as others have pointed out, ectogenesis could be developed as an extension of saving premature babies (as Thomas Schaffer hopes to do with his synthetic amniotic fluid, as described at the beginning of this article). Experimental procedures undertaken to save the life of premature infants are fully acceptable given the principles suggested by John Paul II, since they would be directed towards the individual survival of the human beings in question. If these techniques were im-

²⁶Ibid., II. A. 3., asterisk footnote.

²⁷John Paul II, *Evangelium vitae*, n. 63 (internal quote is from *Donum vitae* I.3.).

proved over time by means of this type of acceptable experimentation, the sustaining of very young human fetuses outside the womb would eventually no longer be experimental but could become a common procedure, exposing its human subjects to no disproportionate risks. Partial ectogenesis may someday become *less risky* than normal gestation, since an artificial womb would not, presumably, get into car crashes, slip and fall, or be assaulted. Accepting that experimentation should only be undertaken for the good of the one experimented upon does not exclude the legitimate development of artificial wombs, if these artificial wombs are developed in the process of trying to save premature infants who would otherwise die. For the many couples experiencing painful premature deliveries due to an incompetent uterus, such technology would be a great blessing.

Having examined the artificiality objection, the IVF objection, the embryo transfer objection, the deprivation of maternal shelter objection, the birth-within-marriage objection, the integrative parenthood objection, the surrogate motherhood objection, and finally the wrongful experimentation objection, I can find no basis in Catholic magisterial teaching as presently articulated for the condemnation of the use of artificial wombs in lieu of abortion.

Doubtless there are objections and sources that could be brought to bear on this question that could lead to a different conclusion. However, even if it were to turn out that Catholic principles did lead to the moral impermissibility of highly advanced incubators in place of abortion, partial ectogenesis still might be counselled as the lesser of two evils in situations in which a woman is determined to end her pregnancy. In cases in which an agent is determined to do wrong, it is permissible to counsel him or her to do the lesser of two evils.²⁸ If an agent is intent on harming an innocent person as an act of “revenge,” and will not be deterred despite one’s best efforts, one can counsel the agent to do less harm rather than more. When comparing abortion to the use of artificial wombs, an extermination to an extraction, it is clear that abortion involves a more serious evil, since abortion involves a more serious harm to the preborn, the intentional taking of human life, and partial ectogenesis, even if morally problematic, does not involve harms that are as serious. Thus, even if artificial wombs are morally impermissible considered in themselves, their use might still be urged in lieu of abortion, if a woman was determined to terminate her pregnancy in one way or another, as it seems is often the case.

Thus far, I have sought to remove reasonable but ultimately, I believe, mistaken objections to partial ectogenesis based on magisterial Catholic teaching. I have not addressed the positive case for limited use of partial ectogenesis. The most obvious answer is that artificial wombs could save innocent human lives. In the year 2000 alone, there were approximately 1.31 million abortions in the United States,²⁹

²⁸John Finnis, *Moral Absolutes: Tradition, Revision, and Truth* (Washington, DC: The Catholic University of America Press, 1991), 98, note 33.

²⁹Lawrence B. Finer and Stanley K. Henshaw, “Abortion Incidence and Services in the United States in 2000,” *Perspectives on Sexual and Reproductive Health* 35.1 (January/February 2003): 6–15.

and in 1995, it is estimated that there were approximately 46 million abortions worldwide.³⁰ If only a small percentage of abortions were eliminated by the use of artificial wombs, this would be a great service to the human community. Like orphanages long sponsored by the Church, support of highly advanced incubators would help preserve the well-being of innocent preborn human persons who otherwise would be lost.

Artificial wombs could also be a great aid to couples facing infertility problems. Even aside from the abortion issue, such advanced incubators could help married couples who experience repeated miscarriages, due to maternal health problems, various kinds of maternal-fetal incompatibility, or other pathologies. Imagine, for example, if the work of Hung-Ching Liu described above were successful. A woman whose uterus had to be removed because of cancer could have an artificial womb constructed from those cancer-free sections of her own uterine lining and then have this artificial uterus transplanted in her body, facilitating “normal” conception, gestation, and birth. Like heart or kidney transplants, such medical advances would be welcomed by the Church as morally unproblematic. If an artificial womb could permissibly be used within a woman’s body, it is difficult to see why it could not permissibly be used outside a woman’s body.

Additionally, while some people allege that the Church’s teaching on abortion arises from an explicit or implicit desire to subjugate women by “tying them down” to children and pregnancy, in fact the teaching arises from an affirmation of the equality and dignity of every single human being, male or female, born or preborn. Support for partial ectogenesis in lieu of abortion would make this crystal clear to all. It is care and concern for the well-being of all human beings that leads to a condemnation of abortion, and the same care and concern leads to the approval of highly advanced incubators in lieu of abortion. There is no denying that the foreseen effects of giving live birth in cases of crisis pregnancy are characteristically much more difficult for the women involved than for the men. Not choosing abortion may be quite challenging, calling those involved to heroic generosity. The Church as an institution makes a tremendous effort to lessen the difficulties borne uniquely by women in such crisis pregnancy situations, by offering homes to mothers in need, providing child care, and making available other material and spiritual assistance. Many dioceses in the United States offer virtually full support to any woman facing a crisis pregnancy. Support of partial ectogenesis would be an extension of these efforts to make less difficult the burdens placed uniquely on pregnant women.

A thought experiment may make the acceptability of artificial wombs in this situation more clear. Imagine that scientists had discovered an injection that sped up the time of gestation. Rather than a full nine months of pregnancy, a woman who received this injection would give birth to a full term, perfectly healthy baby just nine minutes later. Imagine further that the injection was no more risky for mothers and their babies than normal gestation and childbirth. Would use of such injections be acceptable and welcomed according to Catholic teaching?

³⁰Stanley K. Henshaw, Susheela Singh, and Taylor Haas, “The Incidence of Abortion Worldwide,” *International Family Planning Perspectives* 25.6 Suppl. (1999): S30–S38.

I believe that the answer would be yes. Although these injections would not be “natural,” they would be no more contrary to nature, or wrong in a moral sense, than pain medication to ease the agony of labor. Rather than enduring morning sickness, interruption of educational or work schedules, and other hardships associated with a full nine months of pregnancy, a woman would be able to forgo these difficulties, if she chose, without endangering the well-being of the child in question. A woman who might otherwise be tempted to choose abortion rather than adoption (due to the long months of bonding with the child, making adoption later extremely difficult) would be able to place her baby with a family before extensive bonding occurred. Many who turn to abortion out of shame and fear of condemnation by others could speed up the gestation and deliver before anyone found out. Victims of rape impregnated by their attackers would not have to be reminded for nine months of their sexual assault. If such an injection existed, many women would be helped; the lives of many children preserved. All these considerations apply equally well to the use of artificial wombs as an alternative to abortion.³¹

In the minds of many, and I count myself no exception, the phrases “partial ectogenesis” and “artificial wombs” conjure images of Huxley’s *Brave New World* or scenes from *Star Wars: Attack of the Clones*. I think of bizarre technology put to evil use. However, what we are talking about is no more ominous, bizarre, or evil than highly advanced versions of the incubators widely used today in hospitals to save the lives of thousands of premature infants. Like any technology, one can imagine the possibility of abuses, but the same thing is true of very primitive technologies such as fire and knives. The Centers for Disease Control and Prevention reported that during 2002 alone, there were 480,812 babies born prematurely (before thirty-seven weeks) in the United States, more than 12 percent of all births that year.³² Although caring for these children is currently very expensive and many of them become seriously disabled, we can hope that these drawbacks might be lessened or eliminated in the future. In other words, we have primitive artificial wombs and stone-age partial ectogenesis right now—and they are accepted by everyone. The use of technologically advanced incubators in lieu of abortion is therefore morally permissible, especially when the other likely alternative ends with a dead child and a wounded woman.

An End to the Abortion Debate?

Important public debates do not end when there is not a single person left on a given side of an issue, but rather when the vast majority of both sides comes to a

³¹I do not wish to defend the view that artificial wombs may be used for any reason whatsoever, but rather to propose the more modest point that in situations in which a woman would otherwise have an abortion, they would be permissible. The detailing of circumstances in which they would be permissible falls outside the scope of my discussion. It may be, as mentioned earlier, that although the use of artificial wombs is not intrinsically evil, their use should be limited to relatively restricted circumstances, much as adoption, although not intrinsically evil, is not permissible for frivolous reasons.

³²Centers for Disease Control and Prevention, National Center for Health Statistics, Fast Stats A to Z, “Birthweight and Gestation” (2002), <http://www.cdc.gov/nchs/fastats/birthwt.htm>.

consensus. As noted in the first section of this article, the vast majority of defenders of abortion who have written about the topic in scholarly journals and books do not defend a right of extermination but rather the right of extraction. The termination of pregnancy, and not the termination of human life, is their stated goal. If they are consistent with what they have written, it would seem that the vast majority of these people could accept the use of artificial wombs in lieu of abortion. It was then argued that the foremost opponent of abortion in the modern world, the Catholic Church, has not condemned artificial wombs in lieu of abortion and has strong reason to support their use. If this is correct, then both consistent defenders and consistent critics of abortion could accept the permissibility of using artificial wombs in lieu of abortion. Of course, in this article, I have considered only a relatively small aspect of the “abortion debate,” namely, the intellectual debate, without taking into consideration its social, legal, and political aspects. Even if the use of artificial wombs could placate the “intellectuals” on both sides of the matter, whether the use of artificial uteruses instead of abortion would also satisfy what Alasdair MacIntyre has called “plain persons” is a different matter. Nevertheless, although many scientific, social, legal, and economic hurdles remain, the day may come when, thanks to the use of artificial wombs, the abortion debate is as settled and distant as debates over slavery are today.³³

³³Special thanks to my student Avi Wizenfeld, who worked with me doing research for this article. Thanks also to Fr. Michael Sherwin, O.P., who kindly invited me to give a version of this paper to the Dominicans at the Albertinum/L’Ancienne Académie in Fribourg, Switzerland.