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Limiting the Boundaries of Assisted Reproductive Technology and Physiological Autonomy

George P. Smith II

The Catholic University of America, Columbus School of Law

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**LIMITING THE BOUNDARIES OF ASSISTED
REPRODUCTIVE TECHNOLOGY AND
PHYSIOLOGICAL AUTONOMY**

GEORGE P. SMITH, II*

*Professor of Law Emeritus, The Catholic University of America; Residential Fellow, The Institute for Advanced Study, Indiana University, Bloomington. I am grateful to Jeremy Kidd for his critical review of an earlier draft of this article.

Abstract

This essay examines, critically, the wide successes of assisted reproductive technology (ART). With these successes have come concerns regarding its potential advancement of the boundaries of fecundity and of new levels of physiological freedom. One particular advancement involves efforts to utilize a phenomenon of nature termed parthenogenesis, or asexual reproduction. The potential for adapting this occurrence as a form of assisted reproduction is of particular interest for members of the LGBTQ community, holding great promise for embryo research and regenerative medicine. Parthenogenetic embryos could be derived from unfertilized human eggs and, thus, blunt—if not resolve—ethical concerns over experimentation on human embryos. These research embryos would, in turn, be a valuable source for producing stem cells which could then facilitate the growth of tissues for organ transplants. As a tool for expanding human fecundity, however, human use of parthenogenesis would be little more than a vain, glorious, and dangerous, scientific achievement. Having new avenues of reproduction for members of the transgender and lesbian communities is noble indeed. However, because there are other more practical and safer assisted reproductive technologies available to establish a family unit, this is an insufficient reason for experimentation in human parthenogenesis.

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I. Introduction And Overview

In 1745, Charles Bonnet, the naturalist and philosopher who “discovered” the new chain of being termed “parthenogenesis,” defined it succinctly as the sexual generation by a female without fertilization by male spermatozoa.¹ This form of asexual clonal reproduction is referred to as “virgin birth,” and is found routinely in plants and in invertebrates (e.g., ants, wasps, bees).² It has been reported that even in early Greek history, Aristotle (322 B.C. – 384 B.C.) “knew . . . that bees could procreate without copulation. . . .”³ It remained for Richard Owen in his 1849 Hunterian Lecture to the Royal College of Physicians and Surgeons in London⁴ to build upon Bonnet’s finding⁵ and address the challenge and the promise of achieving human procreation from a single ovum.⁶ In 1899, Jacques Loeb built upon this finding further, achieving laboratory, or induced parthenogenesis,⁷ with sea urchins.⁸

¹ CHARLES BONNET, TRAITÉ D’INSECTOLOGIE; OU OBSERVATIONS SUR LES PUCERONS [TREATISE ON ENTOMOLOGY] (1745) (More clinically, parthenogenesis is “the production of an embryo from a female gamete in the absence of any contribution from a male gamete, with or without the eventual development into an adult.”) Nathalie Rougier & Zena Werb, *Minireview: Parthenogenesis in Mammals*, 59 MOLECULAR REPRODUCTION & DEV. 468, 468 (2001).

² BONNET, *supra* note 1; See George P. Smith, II, *Manipulating the Genetic Code: Jurisprudential Conundrums*, 64 GEO. L. J. 697, 712 (1976) [hereinafter Smith, II, *Manipulating the Genetic Code*] (If the eggs of bees, wasps and other insects are developed by parthenogenesis, “they grow into males, while fertilized eggs grow into females.”); CHARLOTTE AUERBACH, THE SCIENCE OF GENETICS 108 (1961).

³ Ursula Mittwoch, *Parthenogenesis*, 18 J. MED. GENETICS 165, 172 (1978). See AUERBACH, *supra* note 2.

⁴ RICHARD OWEN, ON PARTHENOGENESIS OR THE SUCCESSIVE PRODUCTION OF PROCREATING INDIVIDUALS FROM A SINGLE OVUM (1849).

⁵ *Id.* at 23.

⁶ See generally OWEN, *supra* note 4.

Charles Darwin also studied the phenomenon of parthenogenesis. See CHARLES DARWIN, ON THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION, OR THE PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE 80 (1859) [hereinafter DARWIN, ON THE ORIGIN OF SPECIES] (In 1862, Darwin expressed his perplexity in understanding “why new beings should be produced by the union of the two sexual elements, instead of by a process of parthenogenesis”). Charles Darwin, *On the Two Forms, or Dimorphic Condition, in the Species of Primula, and on Their Remarkable Sexual Relations*, 6 BOTANICAL J. OF THE LINNEAN SOC’Y 77 (1862).

⁷ Rougier & Werb, *supra* note 1, at 465; *Id.* The other classification is spontaneous parthenogenesis.

⁸ Smith, II, *Manipulating the Genetic Code*, *supra* note 2, at 712. See JACQUES LOEB, ARTIFICIAL PARTHENOGENESIS AND FERTILIZATION (1913). Prior to 1957, spontaneous parthenogenesis had not been observed in any vertebrates. Landrum Shettles of Columbia University (although not verified), however, is said to have found cleavage without contact with spermatozoa.)

The first instance of spontaneous parthenogenesis can be found in the Bible. Biblical History asserts the doctrine of the virgin birth of Jesus from Mary,⁹ and, thus, presents this “audacious theological truth”¹⁰ as “a dogma of the church, i.e., an article of Faith.”¹¹ Accordingly, Mary is acknowledged as being the first woman to conceive through parthenogenesis without male sperm.¹²

Two American movies displayed the idea of a man becoming pregnant: *Junior*, in 1994, starring Arnold Schwarzenegger,¹³ and *Rabbit Test* in 1978, starring Billy Crystal.¹⁴ Both movies present comedic situations where the male leads became pregnant.¹⁵ Within literary context, Charlotte Perkins published a novel in 1915 entitled, *HERLAND*, where a Utopian society composed entirely of women who reproduce asexually through parthenogenesis flourishes.¹⁶

In 1955, Professor Helen Spurway, a eugenicist at University College London, concluded from her research that it was not only

Landrum B. Shettles, *Parthenogenetic Cleavage of Human Ovum*, BULLETIN OF SLOANE HOSPITAL, republished in 13 OBSTETRICAL & GYNECOLOGIC SURVEY 252 (1958).

⁹ Luke 1:34-35. See Melford E. Spiro, *Virgin Birth, Parthenogenesis and Physiological Paternity: An Essay in Cultural Interpretation*, 3 MAN 243, 251 (1968) (This journal is now titled as The Journal of The Royal Anthropological Institute of Great Britain and Ireland).

¹⁰ Spiro, *supra* note 9, at 252.

¹¹ *Id.* at 249. See Edmund Leach, *Virgin Birth*, PROC. OF THE ROYAL ANTHROPOLOGICAL INST. OF GREAT BRITAIN AND IRELAND 39, 39 *passim* (1966) (challenging this biblical record as little more than a “Christian myth” and examining the extent of speculative philosophy in explaining untrue beliefs held by Catholics and by Protestants).

¹² Spiro, *supra* note 9, at 252; See Matthew 1:1 (Accordingly, the relationship between Jesus and Joseph – the husband of Mary – is sociological rather than biological. Spiro, *supra* note 9, at 251.) See also BENJAMIN GALAN, JESUS’ FAMILY TREE: SEEING GOD’S FAITHFULNESS THROUGH THE GENEALOGY OF CHRIST (2014). RIVAL NATIONS, *The Many Virgin Births*, <https://www.rivalnations.org/many-virgin-births/> (last visited Apr. 11, 2022) (Interestingly, Alexander the Great, Plato, and Caesar Augustus are said to have been born by parthenogenesis).

¹³ JUNIOR (Universal Pictures 1994).

¹⁴ RABBIT TEST (AVCO Embassy Pictures 1978); See Janet Maslin, *Joan Rivers’ ‘Rabbit Test’ Film Depicts First Pregnant Man*, N.Y. TIMES (Apr. 9, 1978); see *A Slightly Pregnant Man* (20th Century Fox Film Corp. 1973) (also deals with male pregnancy).

¹⁵ JUNIOR, *supra* note 13; RABBIT TEST, *supra* note 14.

¹⁶ CHARLOTTE PERKINS, *HERLAND* (1915); Greta Rensenbrink, *Parthenogenesis and Lesbian Separatism: Regenerating Women’s Community Through Virgin Birth in the United States in the 1970s and 1980s*, 19 J. HISTORY OF SEXUALITY 228 (2010) (Interestingly, during the 1970s and 1980s in America, lesbian feminists embraced the Perkins notion of creating “a separate women’s world” could, indeed, be achieved by developing and perfecting techniques which would allow them to achieve spontaneous parthenogenesis and – thus attain “biological independence.” Although unable to succeed in reaching this goal, as a consequence of their work in this specific area, they become leaders in educating, advancing, and actual participation in other assisted reproductive technologies).

possible, but provable that virgin birth could be achieved among humans¹⁷ If, for example, the process of induced parthenogenesis with sea urchins achieved by Loeb in 1899¹⁸ is legitimized for, and then followed by, humans, a successful virgin birth might be accomplished.¹⁹ After producing an egg for conception by a woman, the egg is jolted “by pulling an electric switch or administering a necessary drug,” which then allows the egg to be split.²⁰ Subsequently, this split egg is implanted in a woman’s womb for gestation – with ultimate birth being achieved – “all without contact with sexually or with his sperm artificially.”²¹

Professor Robert Winston, Lord Winston, in 1999, acknowledged that advances in medical technology mean that even “men can now bear children” – especially since no uterus is “absolutely necessary” in certain ectopic pregnancies for child birth.²² The placenta, which “provides the necessary hormonal conditions,” only to be found “inside a woman” would also not be required.²³ Implanting a placenta into a male, however, “would carry with it the high risk of hemorrhage.”²⁴ The director of the London Fertility Clinic sees this procedure harshly—rather than viewing it as an opportunity for enhancing

¹⁷ Helen Spurway, *Virgin Births*, 50 NEW STATESMAN AND NATION 651 (Nov. 19, 1955); J.W. Nicholas & S. Balfour-Lynn, *Letters to the Editor: Parthenogenesis in Human Beings*, THE LANCET, July 21, 1956, at 1071-72. (Spurway’s research hypothesis was tested subsequently – at the request of the Editor of THE SUNDAY PICTORIAL – by S. Balfour-Lynn. Nineteen self-identified claimants came forward and were reduced to eight pairs of mothers and daughters whose blood-groups were tested. Further blood-group studies were undertaken on four of the pairs and one of them, although “rigorous proof” was not deduced, yet a statistical evaluation showed one mother’s claim was “well-founded and could not be unproven.”); See Gabriel Jose de Carli & Tiago Campos Pereira, *On Human Parthenogenesis*, 106 MED. HYPOTHESES 57 (2017); See also *Medicine: Parthenogenesis?*, 66 TIME 65 (Nov. 28, 1955).

¹⁸ Smith, *Manipulating the Genetic Code*, *supra* note 2, at 712. See LOEB, *supra* note 8.

¹⁹ DAVID M. RORVIK, BRAVE NEW BABY: PROMISE AND PERIL OF THE BIOLOGICAL REVOLUTION 94 (1971). See David M. Rorvik, *Making Men and Women Without Men and Women*, ESQUIRE MAG., Apr. 1, 1969, at 208.

²⁰ *Id.*; See George P. Elliott, *Femina Sapiens*, *infra* note 94 (relating a successful case of human parthenogenesis.); See also GORDON R. TAYLOR, THE BIOLOGICAL TIME BOMB 29 (1968).

²¹ *Id.*; See TAYLOR, *supra* note 20.

²² Steve Farrar & Karen Bayne, *Science Ready to Let Men Have Babies*, THE SUNDAY TIMES (Feb. 21, 1999); See generally ROBERT WINSTON, THE IVF REVOLUTION: DEFINITIVE GUIDE TO ASSISTED REPRODUCTIVE TECHNIQUES (1999).

²³ Farrar & Bayne, *supra* note 22.

²⁴ *Id.*

fecundity and extending artificial reproduction technology (ART)—as a violation of the natural order and should not be allowed.²⁵

A new report from the National Center for Health Statistics in 2019—based on 2017 data and provisional data on births from the Centers for Disease Control—shows “that the nationwide total fertility rate ‘has generally been below replacement since 1971.’”²⁶ If this fertility rate, over time, is neither reversed nor flattened, there will be a justified concern that present-day American society may not be able to perpetuate itself.²⁷

²⁵ *Id.* (quoting Ian Craft of the London Fertility Clinic); See Meryl Rothstein, *Male Pregnancy: A Dangerous Proposition*, POPULAR SCI. (July 31, 2005), popsci.com/scitech/article/2005-07/male-pregnancy-dangerous-proposition; See also David Warmflash, *Male Pregnancy May Be Closer Than You Think*, GENETIC LITERACY PROJECT (Jan. 5, 2018), <https://geneticliteracyproject.org/2018/01/05/male-pregnancy-may-closer-think/>. Julius Stone, *Knowledge, Survival, and the Duties of Science*, 23 AM. U. L. REV. 231 (1973). (Julius Stone cautioned that scientific experimentation which would result in “catastrophic” social consequences should not be allowed).

²⁶ Jacqueline Howard, *US Fertility Rate is Below Level Needed to Replace Population, Study Says*, CNN (updated Jan. 10, 2019, 3:13 PM), <https://www.cnn.com/2019/01/10/health/us-fertility-rate-replacement-cdc-study/index.html>. (In America, 4.5-6% of males are infertile); NAT’L INST. OF HEALTH, INFERTILITY AND FERTILITY, <https://www.nichd.nih.gov/health/topics/infertility> (last reviewed Jan. 31, 2017) (The statistics for 2018 show that some 9% of men in American and about 11% of some of reproductive age have experienced fertility problems); Census Bureau, *Population Growth Hits Record Low*, WASH. POST, Dec. 22, 2021, at A2 (For the year 2020, the U.S. Census Bureau found that the rate of population growth was but 0.3% – and recorded this as “the lowest rate since the Nation’s founding.”); See Rakesh Sharma et al., *Effects of Increased Paternal Age on Sperm Quality, Reproductive Outcome and Associated Epigenetic Risks to Offspring*, 13 REPRODUCTIVE BIOLOGY ENDOCRINOLOGY 37 (Apr. 19, 2015). (Some 6.1 million women from age 15 to age 44 have difficulty in not only becoming but also staying pregnant.); CTR. FOR DISEASE CONTROL AND PREVENTION, *Reproductive Health: Women’s Reproductive Health* (accessed Dec. 31, 2020), <https://www.cdc.gov/reproductivehealth/womensrh/index.htm>; Tara Bahrapour, *U.S. Population Growth Hits Record Low, Slowed by Pandemic*, WASH. POST, Dec. 21, 2021, at A21, <https://www.washingtonpost.com/dc-md-va/2021/12/21/census-population-growth-record-low/> (For the year 2020, the United States Census Bureau found that the rate of population. Growth was but 0.3% – and recorded it as “the lowest rate since the Nation’s founding” Census Bureau, “Population growth hits record low”).

²⁷ *Id.* (A recent report from the Danish Fertility Society found that Denmark’s fertility rate continue – as it has for decades – to fall below the replacement level required to maintain stability in the population.); Anna Louie Sussman, *The End of Babies*, N.Y. TIMES (Nov. 16, 2019) (Declining rates of fertility have been significant world-wide for a number of past decades.); Bill Chappell, *U.S. Birthrate Fell By 4% in 2020, Hitting Another Record Low*, NPR (May 5, 2021), <https://www.npr.org/2021/05/05/993817146/u-s-birth-rate-fell-by-4-in-2020-hitting-another-record-low>. (In 2020, babies in the U.S. dropped by 4% compared with previous years.); See generally GEORGE P. SMITH, II, *FAMILY VALUES AND THE NEW SOCIETY: DILEMMAS OF THE 21ST CENTURY* (1998) [hereinafter SMITH, II, *FAMILY VALUES*]. See George P. Smith, II, *Through A Test Tube Darkly: Artificial Insemination and the Law*, 67 MICH. L. REV. 127 (1968) [hereinafter Smith, II, *Through A Test Tube Darkly*]; See also Smith, *Manipulating the Genetic Code*, *supra* note 2.

The promises and the challenges which mark the continued research and hoped-for human use of parthenogenesis as a tool for expanding the boundaries of fecundity, also prompt a consideration of other processes which fit broadly under the classification of ART's.²⁸ In some fifteen states, legislation has been enacted requiring all or some of the costs of infertility treatment to be covered by private insurers.²⁹ This legislative activity demonstrates the breadth and the acceptance of ART.³⁰ These new options for enhancing opportunities for fertility need to be analyzed and tested as to their broad availability, ethicality, safety, and propriety of use, and the social consequences which might well result from unregulated oversight of these technologies.³¹ Such an exegesis of ART, however, is well beyond the scope of this essay. Rather, this essay analyzes the ramifications – legal, social, and medical – of examining parthenogenesis as a tool for enhancing fertility and as a research aid for expanding regenerative medicine.³²

²⁸ Glenn I. Cohen, Chair Lecture, *The Second Reproductive Revolution: From Gene Editing to Uterus Transplants, to Embryos Derived from Our Skin – How Technology is Changing Reproduction*, THE PETRIE-FLOM CTR. FOR HEALTH L. POL'Y, BIOTECHNOLOGY, AND BIOETHICS AT HARV. L. SCH. (Apr. 29, 2019), <https://petrieflom.law.harvard.edu/events/details/i-glenn-cohen-chair-lecture>; See HARV. L. TODAY, *The Second Reproductive Revolution: Glenn Cohen Delivers Chair Lecture* (May 21, 2019), <https://today.law.harvard.edu/the-second-reproductive-revolution-glenn-cohen-delivers-chair-lecture/>. See also George P. Smith, II, *Assisted Noncoital Reproduction: A Comparative Analysis*, 8 B.U. INT'L L. J. 2 (1990) [hereinafter Smith, II, *Assisted Noncoital Reproduction*]; George P. Smith, II & Roberto Iraola, *Sexuality, Privacy and The New Biology*, 64 MARQ. L. REV. 63 (1984) [hereinafter Smith, II & Iraola, *Sexuality*]; Jenna Casolo et al., *Assisted Reproductive Technologies*, 20 GEO. J. GENDER & L. 313, 315 (2019) (Included among the principal ART [procedures are: IVF (in vitro fertilization), gamete intrafallopian transfer (GIFT); zygote intrafallopian transfer (ZIFT) an intracytoplasmic sperm injection (ICSI). Technically, artificial insemination and surrogation are not with the ART classification).

²⁹ Raymond C. O'Brien, *The Immediacy of Genome Editing and Mitochondrial Replacement*, 9 WAKE FOREST J. L. & POL'Y 419, 434 (2019); See Meghan Boone, *Reproductive Due Process*, 88 GEO. WASH. L. REV. 511, 533 (2020) (referencing the laissez-faire approach of the United States in regulating ART).

³⁰ *Id.*

³¹ See generally George P. Smith, II, *Setting Limits: Medical Technology and The Law*, 23 SYDNEY L. REV. 283 (2001) [hereinafter Smith, II, *Setting Limits*]; George P. Smith, II, *Biotechnology and The Law: Social Responsibility or Freedom of Scientific Discovery*, 39 MERCER L. REV. 437 (1988) [hereinafter Smith, II, *Biotechnology and The Law*].

³² Heiner Fangerau, *Can Artificial Parthenogenesis Sidestep Ethical Pitfalls in Human Therapeutic Cloning? An Historical Perspective*, 31 J. MED. ETHICS 733 (2004); See Qing He et al., *Embryonic Stem Cells: New Possible Therapy for Degenerative Diseases That Affect Elderly People*, 58 GERONTOLOGY M. 79 (2003).

A major concern of today's dystopian society is the extent to which fecundity can be expanded and improved upon.³³ In 1944, the United States Supreme Court ruled in *Skinner v. Oklahoma, ex rel. Williamson*,³⁴ that procreation is a basic "civil right" and—in so doing—the Court laid the predicate for what later would give rise to an American obsession with reproduction.³⁵ Seen as the "apotheosis of womanhood," pregnancy, over time, morphed into the notion of reproductive self-determination.³⁶ The continued advancement and use of ART is undertaken in order to combat vexatious issues of infertility and genetic disease.³⁷ Interestingly, the Australian High Court in 2010 acknowledged that reproductive technology was held to be "a legitimate medical treatment for a legitimate condition."³⁸ Yet, presently in the United States, only one case has been reported where ART was held to be "essential" or "necessary."³⁹ The victory which went to this decision in the 1993 case of *Ralston v. Connecticut General Life Insurance* was short-lived because this case was summarily vacated and reversed.⁴⁰ Today, "the most politically divisive and domestic issue" in America is procreative liberty.⁴¹

³³ GEORGE P. SMITH, II, DISTRIBUTIVE JUSTICE AND THE NEW MEDICINE (2008) [hereinafter SMITH, II, DISTRIBUTIVE JUSTICE]; See Smith, II & Iraola, *Sexuality, supra* note 28; See also, George P. Smith, II, *The Razor's Edge of Human Bonding: Artificial Fathers and Surrogate Mothers*, 5 WES. NEW ENG. L. REV. 639 (1983) [hereinafter Smith, II, *The Razor's Edge*].

³⁴ *Skinner v. Oklahoma, ex rel. Williamson*, 316 U.S. 535, 541 (1942).

³⁵ DOV FOX, BIRTH RIGHTS AND WRONGS: HOW MEDICINE AND TECHNOLOGY ARE REMAKING REPRODUCTION AND LAW (2019); George P. Smith, II, *Policy Making and The New Medicine: Managing a Magnificent Obsession*, 3 J. HEALTH & BIOMEDICAL L. 303, 306 (2007) [hereinafter Smith, II, *Policy Making*]. (The complex ethical, philosophical, socio-legal and medical issues of today's New Medicine are in fact seen as biopolitical in character and inherently embryocentric); See *Sex and Science: Gene Editing, Clones and the Science of Making Babies*, THE ECONOMIST, Feb. 18, 2017, at 9.

³⁶ FOX, *supra* note 35, at 21.

³⁷ See generally GEORGE P. SMITH, II, BIOETHICS AND THE LAW: MEDICAL, SOCIO-LEGAL AND PHILOSOPHICAL DIRECTIONS FOR A BRAVE NEW WORLD (1993) [hereinafter SMITH, II, PHILOSOPHICAL DIRECTIONS].

³⁸ *Castles v. Sec'y to the Dept. of Justice* (2010) 28 VR 141, para. 123 (Austl.) (as cited in FOX, *supra* note 35, at 190, n. 85).

³⁹ FOX, *supra* note 35, at 36.

⁴⁰ *Ralston v. Conn. Gen. Life Ins.*, 617 So.2d 1379, 1382 (La. Ct. App. 1993), *rev'd and remanded* 25 So.2d 156.

⁴¹ *Webster v. Reproductive Health Services*, 109 S.Ct. 3020, 3079 (1981) (per Blackman, J); See Ronald Reagan, *Politics and Morality Are Inseparable*, 1 NOTRE DAME J. L. ETHICS PUB. POL'Y 7 (1985).

In 2019, the American Civil Liberties Union (ACLU) declared that the route to manhood could not be reduced to only one “standard” method.⁴² Although the criteria used by the ACLU to set standards for making this determination is vague, it is nonetheless “definitive” by acknowledging that those men who become pregnant and give birth are – unequivocally – men.⁴³ The ACLU also endorsed the continued use of Medicaid for gender reassignment, as well as an enhanced policy among the states for allowing birth certificates to be changed once sexual reassignments are completed.⁴⁴

Presently, a growing chasm exists in parts of contemporary society between those who accept the legal and socio-medical proposition that sexual orientation is determined biologically at birth, and those who embrace the notion that gender identity is determinative by individual self-perception and, thus, is an independent judgment removed from biological status at birth.⁴⁵ Thus, gender identity is a matter of choice and is not of definable objectively measurable criteria.⁴⁶ To explore the questions arising from this present binary dichotomy in depth between viewpoints is beyond the scope of this essay. Yet, there must be a “background” awareness – indeed, appreciation of this all-

⁴² Sam Dorman, *ACLU Claims ‘Men Who Get Pregnant and Give Birth are Men’*, FOX NEWS (Nov. 20, 2019, 2:03 PM), <https://www.foxnews.com/media/aclu-men-pregnant-periods>.

⁴³ *Id.*

⁴⁴ *Id.* (The Patient Protection Affordable Care Act of 2010 increased insurance coverage specifically for transgender people by prohibiting exclusions for treatment based on pre-existing conditions and allowance of gender affirming surgeries, 42 U. S. C. § 51557 (2010)); See Becky Sullivan & Selena Simmons-Duffin, *U.S. Will Protect Gay And Transgender People Against Discrimination In Health Care* (May 10, 2021, 2:33 PM), <https://www.npr.org/2021/05/10/995418963/u-s-will-protect-gay-and-transgender-people-against-discrimination-in-health-care> (discussing new policy initiatives at the Department of Health and Human Services regarding Section 1557 of the Affordable Care Act, which will broaden its base for protecting those who assent discriminating conduct has been shown to claim to the basis of their sexual orientation or gender identity in health care); See also Justin Gilliland, *Reversing a Trump-Era Policy, H.H.S. Prohibits Health Care Discrimination Against Transgender People*, N.Y. TIMES (May 10, 2021).

⁴⁵ Lawrence S. Mayer & Paul R. McHugh, *Sexuality and Gender: Findings from the Biological, Psychological, and Social Sciences*, 50 THE NEW ATLANTIS J. 116 (2016); *But see* Jocelyn Samuels & Mara Keisling, *The Anti-Trans Memo – Abandoning Doctors and Patients*, 380 N. ENG. J. MED. 111 (2019) (arguing that a new proposed rule by the U.S. Department of Health and Human Services defining gender as a “biological, immutable condition determined by a person’s genitalia at birth,” if finalized, would not only promote more confusion among health care providers regarding treatment options for members of the transgender-transsexual communities, but negatively influence hospital atmospheres by subjecting non-binary patients to news levels of harassment and humiliation).

⁴⁶ Mayer & McHugh, *supra* note 45, at 10.

encompassing or foundational issue which underlies the broader issue of expanding reproductive autonomy.⁴⁷ There is no defined formulaic course of action for widening social acceptance of gender identity and the realities that arise from transsexualism. With or without a full sexual reassignment, transgender individuals, be they biological female to transgender male or, birthed as a male and reassigned a female, or transgender female, are subject to significant and distressing levels of social and legal biases and discrimination as they search for social equality.⁴⁸ No polemic is propounded, although perhaps justified when consideration is given to the very real agonies of despair suffered by members of the LGBTQ and trans-gender communities. Rather, the analytical context of this essay—by virtue of the topic of physiological autonomy in assisted reproduction—is a critical examination of the almost insurmountable challenges which beset, primarily, transgender females who seek to assert their procreative liberty to undertake human parthenogenesis as but an option for establishing a family unit. From this analysis, a calculus, if not a construct for principled decision-making, will be developed and serve ideally as an interpretative guide for ART policy-making.

As seen, Part I of this essay introduces – and, indeed, considers comprehensively – the historical, medical, biological, and popular understanding of virgin births as they occur in nature through parthenogenesis. Part II proceeds to investigate and contextualize the potential uses of parthenogenesis – artificially, clinically, and therapeutically – by examining the feasibility of the reassignment of biological males to the female sex in order to become transgender women, or men assigned at birth as biological females but who identify as men,

⁴⁷ Samuels & Keisling, *supra* note 45, at 116; See generally Marisha Agana et al., *Caring for the Transgender Adolescent: It Takes a Village*, 40 J. DEVELOPMENTAL & BEHAVIORAL PEDIATRICS 397 (2019).

⁴⁸ JANICE G. RAYMOND, *THE TRANSSEXUAL EMPIRE: THE MAKING OF THE SHE-MALE* (1979); GENNY BEEMYN & SUSAN RANKIN, *THE LIVES OF TRANSGENDER PEOPLE* (Columbia Univ. Press 2011); See Kim D. Jaffee et al., *Discrimination and Delayed Health Care Among Transgender Women and Men: Implications for Improving Medical Education and Health Care Delivery*, 54 MED. CARE 1010 (2016); Jerry L. Dasti, *Advocating a Broader Understanding of the Necessity of Sex-Reassignment Surgery Under Medicaid*, 77 N.Y.U. L. REV. 1738, 1749 (2002); See also Douglas K. Smith, Comment, *Transsexualism, Sex Reassignment Surgery, and the Law*, 56 CORNELL L. REV. 963, 965-66 (1971) [hereinafter Smith, Comment, *Transsexualism*]; Sonya K. Katyal, *The Numerus Clausus of Sex*, 84 U. CHIC. L. REV. 389 (2017) (noting, specifically, the need to change a Social Security Administration Card).

to become trans-men as well as biological men – in their own right – without reassignment, to become pregnant through artificial parthenogenesis. Part III of this essay considers a plethora of issues which arise when sexual reassignments or gender affirming surgical procedures occur. Part IV concludes that efforts undertaken toward developing human parthenogenesis as a complement to ART and a ready tool for expanding the limits of fecundity, are nothing short of being audacious. Put simply, there is no rational reason for this to be advanced or to be allowed.⁴⁹ Yet, there is significant reason why clinical research in human artificial parthenogenesis to continue: namely, because it will provide sources of human tissue to be used in regenerative medicine.⁵⁰ Past ethical concerns over human embryonic research are resolved because this type of parthenogenetic research is tied to research and experimentation of embryos derived from unfertilized eggs – thus blunting reservations that research will be undertaken after fertilization of an ovum by gametes is achieved and personhood status is established.⁵¹

II. The Biological Provenance

An understanding of the evolutionary enigma of sex has been lacking. Yet, considerable research continues to be undertaken on the biology of parthenogenesis, all to attain a deeper knowledge of systems which allow for asexual parthenogenetic reproduction.⁵² It is through study of the “exceptions” to evolutionary biology, that the

⁴⁹ Farrar & Bayne, *supra* note 22.

⁵⁰ Fangerau, *supra* note 32; See PRINCIPLES OF REGENERATIVE MEDICINE (Anthony Atala et al., eds. 2007). See also Jason Hipp & Anthony Atala, *Tissue Engineering, Stem Cells, Cloning, and Parthenogenesis: New Paradigms for Therapy*, 1 J. EXPERIMENTAL & CLINICAL ASSISTED REPRODUCTION 3 (2004).

⁵¹ Fangerau, *supra* note 32; See CHARLES E. RICE, THE VANISHING RIGHT TO LIVE: AN APPEAL FOR A RENEWED REVERENCE FOR LIFE 29-31 (1969); see also Ronald Reagan, *supra* note 41 (If artificial parthenogenesis is seen as a way of creating a form or semblance of “life,” and thus playing God, religious feelings of concern might come into play for some); Fangerau, *supra* note 32; see generally GEORGE P. SMITH, II, THE CHRISTIAN RELIGION AND BIOTECHNOLOGY: A SEARCH FOR PRINCIPLED DECISION-MAKING (2005) [hereinafter SMITH, II, THE CHRISTIAN RELIGION]; See Adriana Bos-Mikich et al., *Parthenogenesis and Human Assisted Reproduction*, *infra* note 235. (Infertility treatments yield large numbers of oocytes – or, female germ cells, in a stage of maturation. Parthenogenetic activation is derived from oocytes rescued from infertility treatments with the purpose of this research being to create a source for clinical grade cells for use in clinical applications.)

⁵² GEORGE C. WILLIAMS, SEX AND EVOLUTION 117 (1975).

traditional rules of sexual reproduction can not only be illuminated, but re-evaluated in light of artificial reproductive technologies – this because the very purpose of evolutionary biology is but to explain diversity.⁵³

The standard classification of the modes of reproduction has five listings: (1) Primordial; (2) Euphrasic; (3) Degenerate, which consists of self-fertilization by hermaphrodites;⁵⁴ (4) Parthenogenesis; and (5) Asexual Reproduction under which are listed primitive and derived.⁵⁵ It has been suggested that reproduction could be more easily understood and studied if only two divisions are made; namely, uniparental and biparental.⁵⁶

Parthenogenesis is an adaptive strategy which is devolved to safeguard that organisms will be able to reproduce when, under prevailing circumstances, sexual reproduction is not favorable.⁵⁷ One position holds that “parthenogenetic lineages” are seen generally as “evolutionary dead”⁵⁸—this is because these lineages eventually end, and go extinct while species speciate.⁵⁹ If found in vertebrate populations, parthenogenesis—or its equivalent—always replaces sexual reproduction and serves as an evidentiary proof of not only the maladaptive nature of sexuality in these organisms but—as well—advances an explanation of the ubiquity of sex and how exactly the laws of genetics are suspended—if not overthrown.⁶⁰

⁵³ *Id.*; See generally JUDITH DAAR, REPRODUCTIVE TECHNOLOGIES AND THE LAW (2d ed. 2013); See LOST SEX: THE EVOLUTIONARY BIOLOGY OF PARTHENOGENESIS (Isa Schön et al. eds., 2009) [hereinafter LOST SEX].

⁵⁴ R. C. Vrijenhoek & E. Davis Parker, *Geographical Parthenogenesis: General Purpose Genotypes and Frozen Niche Variations*, in LOST SEX 121 (Isa Schön et al. eds., 2009).

⁵⁵ WILLIAMS, *supra* note 52, at 116-17; DORLAND'S ILLUSTRATED MEDICAL DICTIONARY, at 670, 907, 1109, 1115, respectively (24th ed. 1965) (Dorland lists the five methods of sexual reproduction as being: biparental; paedogenesis; metagenesis; parthenogenesis; and hermaphroditism).

⁵⁶ WILLIAMS, *supra* note 52, at 116; See Bengt O. Bengtsson, *Asex and Evolution: A Very Large-Scale Overview*, in LOST SEX 1, 4 (Isa Schön et al. eds., 2009).

⁵⁷ See Haley A. Lovett, *Parthenogenesis: When Animals Reproduce Without A Mate* 9 (2010).

⁵⁸ Stephanie Meirmans, *The Evolution of the Problem of Sex*, in LOST SEX 41 (Isa Schön et al. eds., 2009) (quoting MAYNARD SMITH, *THE EVOLUTION OF SEX* (1978)).

⁵⁹ See James H. Asher, Jr., *Parthenogenesis and Genetic Variability. II. One-Locus Models for Various Diploid Populations*, 66 GENETICS 369, 369 (1970).

⁶⁰ WILLIAMS, *supra* note 52, at 106-07; See Ursula Mittwoch, *Parthenogenesis*, 15 J. MED. GENETICS 165, 178 (1978).

The provenance of parthenogenesis is multi-dimensional and arises from the sciences of Assisted Reproduction, Evolutionary and Molecular Biology, Genetics, Botany, Fundamental Embryology and of Zoology.⁶¹ Very often considered synonymous with “clonal reproduction,” parthenogenesis is nonetheless distinct from cloning.⁶² Parthenogens are the offspring of parthenogenesis; while clones from cloning.⁶³ Rather than being an identical genetic duplicate of the parent, parthenogens carry but a doubled half of the host’s DNA.⁶⁴ Only female offspring can be reproduced by natural parthenogenesis.⁶⁵ With cloning, the clone carries a full set of the host’s DNA.⁶⁶

The appearance of sexual reproduction was perhaps the most important advance in the evolution of life.⁶⁷ This advance has made other evolutionary advances more easily accessible.⁶⁸ However, this sexuality has, in some phylogenetic lives, both in animal and plant kingdoms, appeared to regress.⁶⁹ The simplest form of regression of sexuality is self-fertilization.⁷⁰ The outward appearance of sexual reproduction is retained, the gametes and chromosome cycle are normal, but a union of gametes of a single hermaphrodite, instead of the fusion of gametes produced by different organisms, takes place.⁷¹

⁶¹ LOST SEX, *supra* note 53.

⁶² Benjamin B. Normak & Laurence R. Kirkendall, *Parthenogenesis in Insects and Mites*, in ENCYCLOPEDIA OF INSECTS 753, 757 (Vincent H. Resh & Ring T. Caide eds., 2d 2009).

⁶³ Bengtsson, *supra* note 56, at 1; Koen Martens et al., *The Elusive Clone – In Search of Its True Nature and Identity*, in LOST SEX 187 (Isa Schön et al. eds., 2009).

⁶⁴ Bengtsson, *supra* note 56.

⁶⁵ *Id.*

⁶⁶ *Id.*

⁶⁷ See generally GRAHAM BELL, THE MASTERPIECE OF NATURE: THE EVOLUTION AND GENETICS OF SEXUALITY (1982); MAYNARD J. SMITH, THE EVOLUTION OF SEX (1978); Sarah P. Otto, *Sexual Reproduction and The Evolution of Sex*, 1 NAT. EDUC. 182 (2008).

⁶⁸ *Id.*

⁶⁹ THEODOSIUS DOBZHANSKY, GENETICS AND THE ORIGIN OF THE SPECIES 300 (3rd ed. 1964); See BELL, *supra* note 67, at 374-75 (contains a set of Tables Comparing Modes of Reproduction Within and Between Growing Habits of Heterogenic Animals Having a Dormant Stage).

⁷⁰ DOBZHANSKY, *supra* note 69, at 301-02; See Karen Hopkin, *Hermaphrodites Avoid Self-Fertilization*, SCI. AM. (2008).

⁷¹ DOBZHANSKY, *supra* note 69, at 300-01; See Dasti, *supra* note 48, at 1746 (a hermaphrodite organism or an intersexed person, is one whose external genitalia contains evidence of both sexes and may also carry reproductive organs misaligned with the composition of their chromosomes or externally with their reproductive organs).

Apomixis is a common term applied to several methods of procreation in which the sexual structures may be retained, but in which development is initiated without fertilization.⁷² Where the specialized reproductive cells, eggs in animals, and macrospores in plants, give rise to the embryo, this phenomenon is known as parthenogenesis.⁷³ Regrettably, the study of parthenogenesis is mired in obscure terminology and complex genetic processes which are difficult to assess and measure.⁷⁴ The point most blatantly revealed in parthenogenesis is that the meiotic chromosome pairing in most apomicts—or, the process of reproducing parthenogenetically for plants, and for animals capable of—is suppressed; the eggs possess the same chromosome complement which is present in the mother, and, therefore, the genotype of the entire progeny resembles that of the progenitor.⁷⁵

a. The Scope of Asexual Reproduction

When asexual reproduction by fission occurs—e.g., buds, bulbs, tubers, or runners—sex cells and sex organs are dispensed with altogether.⁷⁶ Potatoes, sugar cane, bananas, strawberries, and pineapples are examples of cultivated plants propagated chiefly or exclusively asexually.⁷⁷ “Crops like paddy, wheat, pea, cotton, roselle, etc., are self-fertilized and reproduction occurs in varying proportions by natural cross fertilization.”⁷⁸

A majority of vertebrates, being gonochoristic—or, in other words, relying on the fertilization of female ova by male sperm in

⁷² DOBZHANSKY, *supra* note 69, at 301; See Regina Bailey, *What is Parthenogenesis?*, THOUGHTCO. (Nov. 27, 2019), <http://www.thought.com/parthenogenesis-373474> (The other principal method for parthenogenesis to occur is automixis – a process where, in addition to the asexual reproduction, sexual reproduction occurs often through a process termed facultative parthenogenesis).

⁷³ DOBZHANSKY, *supra* note 69, at 301; Leah Lefler, *Parthenogenesis: Virgin Births in Nature*, OWLCATION (Aug. 19, 2012), <https://owlcation.com/stem/Parthenogenesis-Virgin-Births-in-Nature> (The opposite reproductive process to parthenogenesis is androgenesis. In this reproductive process, an organism – developed fully only from the male gamete – produces offspring which are clones only of the father).

⁷⁴ John M. Logsdon, Jr., *No Sex, Please*, 328 SCI. 310 (2010).

⁷⁵ DOBZHANSKY, *supra* note 69, at 302.

⁷⁶ EDMUND W. SINNOTT ET AL., *PRINCIPLES OF GENETICS* 267 (5th ed. 1958).

⁷⁷ *Id.*

⁷⁸ S. N. Sen, *Complete Selection with Partial Self-Fertilization*, 57 J. GENETICS 339 (1961); See WILLIAMS, *supra* note 52, at 161 (weeds and dandelions are also self-fertilized).

order to reproduce—nonetheless include some twenty-seven species of squamate reptiles, mostly of females.⁷⁹ These females, in turn, produce all female offspring⁸⁰ In 2014, the world's first reticulated python named Thelma, who inhabited the Louisville, Kentucky, zoo alone for four years, laid some 61 eggs, with six healthy progeny being produced.⁸¹ Thelma's offspring were half-clones of herself because half of her chromosomes were in each of the offspring.⁸²

The pollution of the Nation's waters by man-made pollutants such as caffeine, hormones excreted by humans and by livestock, prescription drugs, and more traditional sources deriving from nitrogen and phosphorus seen commonly from metals and mine run off, "... appear to be interfering with the chemical signals that male fish grow and reproduce."⁸³ The consequence of this interference has been revealed in a 2002 study of the Potomac River and its tributaries.⁸⁴ Some forty-two percent of the male bass were found to be developing abnormally, in that, inside their sex organs were found immature eggs.⁸⁵ There was uncertainty, however, whether these male fish remained able to reproduce.⁸⁶ Scientists concluded that "this inversion of nature" is being caused by the polluted waters of the Potomac and expressed concern that this finding may well have the effect of the proverbial "canary in the mine shaft's" fate.⁸⁷

⁷⁹ David Crews, *On the Origin of Sexual Behavior*, 7 COMPREHENSIVE PSYCHONEUROENDOCRINOLOGY 259 (1982).

⁸⁰ *Id.*; See generally Robert A. Beatty, *Parthenogenesis in Vertebrates*, in 1 FERTILIZATION: COMPARATIVE MORPHOLOGY, BIOCHEMISTRY, AND IMMUNOLOGY 413 (Charles B. Metz & Alberto Monroy eds., 1967).

⁸¹ Melissa Hogenboom, *Strange and Beautiful: Spectacular Real Virgin Births*, MUSLIM TIMES (Aug. 27, 2015).

⁸² *Id.*

⁸³ David A. Fahrenthold, *Male Bass in Potomac Producing Eggs*, WASH. POST, Oct. 15, 2004, at 1.

⁸⁴ *Id.* at 2; See David A. Fahrenthold, *Male Bass in Potomac Producing Eggs*, WASH. POST, Sept. 6, 2006, at 1 (intersex fish were first found in the Potomac waters in 2003).

⁸⁵ Fahrenthold, *supra* note 83.

⁸⁶ *Id.*

⁸⁷ *Id.*; But see S. T. H. Chan, *Spontaneous Sex Reversal Fishes*, in HANDBOOK OF SEXOLOGY 91, 91-105 (J. Money & H. Musaph eds., 1975) (reporting on the sexual duality of a number of diecious species of fish where an individual fish may spend a part of its lifetime breeding as a male and part as a female or *vice versa*); See Juliet Eilperin, *Female Sharks Can Reproduce Alone, Researchers Find*, WASH. POST, May 23, 2007, at A2.

b. Non-Natural Parthenogenesis

While natural parthenogenesis has never been found as a phenomenon in mammals,⁸⁸ on-going efforts continue in creating non-natural parthenogenesis – this, after the success in creating Kaguya, a fatherless mouse.⁸⁹ Previously, although plants, some fish, frogs, insects, and occasionally chickens, could self-procreate without a partner,⁹⁰ it was not until Kaguya's birth that it was established that mammalian embryos created by non-natural parthenogenesis could attain viability and actually survive.⁹¹ However, such successes were limited and resulted in the embryos dying halfway through pregnancy.⁹²

There are a number of activation agents which have been shown effective in the induction of non-natural parthenogenesis.⁹³ These agents are identified commonly as including: hypo and hypertonic salt solutions; chemical such as ethanol, strontium chloride; ionomyacin calcium salt; ultra-violet radiation; radium emanations; acids; bases, such as soaps and hydroxides; alkaloids; fat solvents; and mechanical agitation and electric currents.⁹⁴ While parthenogenesis may be induced in mammals, none of the embryos formed have succeeded in surviving the embryonic period⁹⁵ – with the exception of Kaguya, the mouse, in 2004.⁹⁶

Kaguya made history in 2004 by being the first viable parthenogenesis mammal to be the daughter of two female parents and be able

⁸⁸ H. Tournaye, *Is There Any Reproductive Future Left For Men?*, 4 FACTS, VIEWS AND VISION IN OBSTETRICS AND GYNAECOLOGY 225 (2012).

⁸⁹ Tomohiro Kono et al., *Birth of Parthenogenetic Mice That Can Develop to Adulthood*, 428 NAT. 860 (2004).

⁹⁰ Helen Pearson, *Mouse Created Without Father: Scientists Turn Egg Cell into Surrogate Sperm*, NATURE 4 (2004).

⁹¹ *Id.*

⁹² *Id.*

⁹³ 11 MARSHALL'S PHYSIOLOGY OF REPRODUCTION 388 (A.S. Parkes ed., 3rd ed. 1960).

⁹⁴ *Id.*; See Rougier & Werb, *supra* note 1; see also RORVIK, *supra* note 19 (describing how a woman could be induced parthenogenetically); George P. Elliott, *Femina Sapiens*, ESQ. MAG., Mar. 1, 1970, at 126 (relating the process of her parthenogenetic birth from a “never fathered egg,” but rather an ova from her mother which was animated by injections of the drug hexylresorcinol into it).

⁹⁵ Rougier & Werb, *supra* note 1.

⁹⁶ See Pearson, *supra* note 90, at 2.

to reproduce in a natural way.⁹⁷ The embryo was formed only from female eggs – without sperm or a male cell.⁹⁸ The effect of combining the nucleus of the egg from one female with that of another was to essentially metamorphose a female egg into a surrogate sperm.⁹⁹ Before this history could be made, it took some 460 attempts at growing embryos and having only one of ten live pups survive to adulthood before paternity would be proven superfluous and, in turn, Kaguya would be heralded as a “first” of its kind.¹⁰⁰

The impact of Kaguya’s birth—much in the way that the birth of Dolly the sheep did in establishing the efficacy of cloning¹⁰¹—was to disprove the scientific “fact” that a new individual, here, parthenogenetic, could not be reprogrammed to create a new individual.¹⁰² This success has also had the effect of emboldening what has been termed “synthetic biology”¹⁰³ and broadening the very boundaries of fecundity. As well, it is important to appreciate that it is ethically unacceptable to genetically “engineer” a human egg. Thus, the sustained success achieved with Kaguya cannot be used validly as a workable process for enhanced human fertility.¹⁰⁴

Interestingly, even if—through unnatural human parthenogenesis—eggs of a female developed without being fertilized by sperm, the parthenogenetic offspring would be “biologically fatherless,” but not recognized as a clone.¹⁰⁵ This situation would result as such because “each egg a woman makes has a unique mix of her genes” –

⁹⁷ *Id.* at 3; See also Tom Moore & Melanie Ball, *Kaguya, the First Parthenogenic Mammal – Engineering Triumph or Lottery Winner?*, 128 J. REPROD. 1 (2004).

⁹⁸ Moore & Ball, *supra* note 97.

⁹⁹ Pearson, *supra* note 90, at 4; See Kono et al., *supra* note 89 (Inasmuch as paternal genes were lacking in the mice, they were born as females. They were not – however – designated as clones, but rather recognized as unique genetic animals each of which developed from individual eggs).

¹⁰⁰ Pearson, *supra* note 90, at 3.

¹⁰¹ *Id.*

¹⁰² Sylvia Pagán Westphal, ‘Virgin Birth’ Mammal Rewrites Rules of Biology, *NEW SCIENTIST* (Apr. 21, 2004), <https://www.newscientist.com/article/dn4909-virgin-birth-mammal-rewrites-rules-of-biology>.

¹⁰³ *Id.*; See *Liberation Biology*, in *THE ECONOMIST* TECH. Q. 11 (Apr. 6, 2019) (discussing the challenges and opportunities for synthetic life).

¹⁰⁴ Frank A. Beach, *Animal Models for Human Sexuality*, in 62 CIBA FOUNDATION SYMPOSIUM: SEX, HORMONES AND BEHAVIOUR 113 (Ruth Porter & Julie Whelan eds., 1979).

¹⁰⁵ Rick Weiss, *In a First, Mice Are Made Without Fathers*, *WASH. POST* (Apr. 22, 2004), <https://www.washingtonpost.com/archive/politics/2004/04/22/in-a-first-mice-are-made-without-fathers/d05b6fa4-4891-4b85-b8b9-602203e18a51/>.

including some that are inactive.¹⁰⁶ Thus, reproductive biology directs that the offspring would not be an exact duplicate of the host mother, but acknowledged as being “unique.”¹⁰⁷

c. Creating Human Embryos Through Parthenogenesis?

In 2005, the lead scientist on a team of South Korean scientists, Hwang Woo-Suk, announced a landmark achievement: a human embryo had been cloned and adult embryonic stem cells extracted from it.¹⁰⁸ In 2005, a second scientific discovery was reported, claiming Woo-Suk and his associates had created human embryonic stem cells matched to specific needs.¹⁰⁹ This second achievement purportedly held great promise of being used as a way to develop and regulate regenerative issues for diseases such as Alzheimer’s and/or Parkinson’s disease.¹¹⁰ In 2009, Science Magazine withdrew the reports of these achievements which had been made and retracted both of these research findings.¹¹¹ Although these research achievements were discredited as to their claim of being able to extract embryonic cells from the first ever cloned human embryo, Woo-Suk and his associates unknowingly became the first scientists to successfully achieve parthenogenesis as a means to create a human embryo and, ultimately, to have a human parthenogenetic stem cell line fertilized without sperm.¹¹²

Real hope for personalized stem cell treatment repairing damaged organs through restorative medicine has come from research scientists in China who succeeded in taking two embryonic stem cells

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ Woo Suk Hwang et al., *Evidence of a Pluripotent Human Embryonic Stem Cell Line Derived From A Cloned Blastocyst*, 303 SCI. 1669, 1669 (2004).

¹⁰⁹ Woo Suk Hwang et al., *Patient-Specific Embryonic Stem Cells Derived From Human SCNT Blastocysts*, 308 SCI. 1777, 1777 (2005).

¹¹⁰ *Id.*

¹¹¹ Choe Sang-Hun, *Disgraced Cloning Expert Convicted in South Korea*, N.Y. TIMES (Oct. 26, 2009), <https://www.nytimes.com/2009/10/27/world/asia/27clone.html>.

¹¹² J.R. Minkel, *Korean Cloned Human Cells Were Product of “Virgin’ Birth”*, SCI. AM. (Aug. 2, 2007), <https://www.scientificamerican.com/article/korean-cloned-human-cells/>; See Niels Geijsen et al., *Derivation of Embryonic Germ Cells and Male Gametes from Embryonic Stem Cells*, 427 NATURE 148 (2004) (In 2003, George Daley was the first scientist to achieve derivation of male gametes from embryonic stem cells in a mouse model).

retrieved from parthenogenetically achieved embryos *in vitro*.¹¹³ Replacement of lost or damaged cells by cell therapy is, as well, proving to be a transformative approach in transplantation medicine.¹¹⁴

d. Primordial Germ Cell Opportunities for Parthenogenesis

In 2005, a group of British scientists used embryonic stem cells in order to grow primordial germ cells (PGC), which may develop, over time, into sperm or into eggs.¹¹⁵ This achievement holds great promise for the use of synthetic sex cells which, theoretically, might be used in medical research and in therapeutic cloning and assisted reproduction.¹¹⁶ Thus, both infertile and homosexual couples would be enabled to have genetic offspring.¹¹⁷ As well, it is thought there is even the possibility that an egg could “be generated from a man’s own stem cells and even a child could be created from sperm engineered egg from the same man.”¹¹⁸ Assisted conception could be aided significantly if sperm and eggs could be generated in a laboratory independent of human, biological development.¹¹⁹

e. Whole Gene Sequencing: Identifying a Pathway to Human Parthenogenesis?

Two medical researchers in Brazil,¹²⁰ reported and analyzed previous research done on a baby, named F.D.,¹²¹ that found in this baby,

¹¹³ Qingyun Mai et al., *Derivation of Human Embryonic Stem Cell Lines From Parthenogenetic Blastocysts*, 17 CELL RSCH. 1008, 1009 (2007).

¹¹⁴ See E. S. Revazova et al., *Patient-Specific Stem Cell Lines Derived From Human Parthenogenetic Blastocysts*, 9 CLONING & STEM CELLS 1 (2007).

¹¹⁵ Nic Fleming, *Stem Cell ‘Building Blocks’ Hold Baby Hopes for Gays*, THE TEL. (June 20, 2005), <https://www.telegraph.co.uk/news/uknews/1492421/Stem-cell-building-blocks-hold-baby-hopes-for-gays.html>.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Id.*; See generally Tae Sub Park et al., *Derivation of Primordial Germ Cells From Human Embryonic and Induced Pluripotent Stem Cells is Significantly Improved by Culture with Human Fetal Gonadal Cells*, 27 STEM CELLS 783 (2009); See Geijsen et al., *supra* note 112.

¹²⁰ De Carli & Pereira, *supra* note 17.

¹²¹ See M. Azim Surani, *Parthenogenesis in Man*, 11 NATURE GENETICS 111 (1995); See also Lisa Strain et al., *A Human Parthenogenetic Chimaera*, 11 NATURE GENETICS 164 (1995); See generally de Carli & Pereira, *supra* note 17.

a parthenogenetic chimera which consisted of two cell lines: one that developed from a normal process (involving haploid sperm and haploid oocyte) and the second one found to be parthenogenetic – or, in other words, duplicated its own genetic material.¹²² Through a procedure termed whole genome sequencing—done potentially on over 130 million babies born each year, but which is not presently done at birth—it is postulated that this practice would prove – conclusively – whether the hypothesis of the regular recurrence of human parthenogenesis is sound.¹²³ And, if found to be valid, this conclusion would, in turn, have the effect of eventually rendering the human species capable of sustaining parthenogenesis in the future.¹²⁴

III. Sexual Reassignments for Transgender Men and Transgender Females

a. *A Historical Gloss*

What may have been the first recorded historical event of a male—actually a hermaphrodite,¹²⁵ becoming pregnant and giving birth—occurred in Pasadena, Italy, *circa* 1601.¹²⁶ Although raised as a male, Daniel Burghammer “was a half man and half woman.”¹²⁷ He was a soldier in the Austrian army and had been married eight years without any children being born.¹²⁸ Upon the birth of his child, he admitted to having sex with a Spaniard when he was stationed in The

¹²² *Id.* at 57.

¹²³ *Id.* at 59.

¹²⁴ *Id.* at 59-60.

¹²⁵ LEWIS I. HELD, JR., *QUIRKS OF HUMAN ANATOMY: AN EVO-DEVO LOOK AT THE HUMAN BODY* 83 (Cambridge Univ. Press 2009); See CURT STERN, *GENETIC MOSAICS AND OTHER ESSAYS* 28 (1968) (Artistic fantasies prompted the historical development of a model “in which male and female traits united in imaginary human hermaphrodites.” In Greek sculpture, attempts were made to portray harmonious bodies having the attributes of both sexes); *Id.* at 29 (In reality, human hermaphrodites body parts are in no way harmonious. Indeed, incongruous compositions may reveal “incomplete ducts but male gonads,” or “. . . mostly male ducts but a testis on only one side, an ovary on the other.” And, yet another association may present as “one normal ovary or testis plus a compound oötestis or, alternatively, one “may have two oötestes.”); Spurway, *supra* note 17; (Human hermaphrodites are not self-fertilized); See Karen Hopkin, *Hermaphrodites Avoid Self-Fertilization*, *SCI. AM.* (Mar. 21, 2008).

¹²⁶ HELD, JR., *supra* note 125.

¹²⁷ *Id.*

¹²⁸ *Id.*

Netherlands.¹²⁹ On his right pubic side, Burghammer had a scrotal enclosed testis and male organs for urinating, while on his left side, had a hemiuterus oviduct and an internal ovary. Upon the birth of his baby, the infant could only suckle from his right breast.¹³⁰

In contemporary society, various claims have been made by transgender men that they have conceived and delivered a live fetus.¹³¹ Yet, only one has been established publicly.¹³² From between 2008 and 2010, Thomas Beatie, at age 34, gave birth to three children, thereby becoming the first transgender man—female to reassigned male—to achieve this status.¹³³ Born Tracy Lehuanani Gondino, before the birth of these children, underwent a surgical sexual reassignment and was recognized both medically and legally as a man.¹³⁴ Even with this new sexuality, Thomas was still biologically a woman because this surgical procedure did not include removal of his ovaries and uterus.¹³⁵ Upon closer examination, it is seen that Beatie's acts

¹²⁹ *Id.*

¹³⁰ STERN, *supra* note 125.

¹³¹ Mayer & McHugh, *supra* note 45, at 4; See Benjamin Radford, *Pregnant Man: Real or Hoax?*, LIVE SCIENCE (Mar. 27, 2008), <http://www.live.science.com/2409-pregnantman-real-hoax.html>; See also *The First Male Pregnancy*, MALE PREGNANCY.COM, <https://malepregnancy.com/archives/2001/movie/index.shtml> (Sept. 20, 2006, video of Lee Mingwei who has claimed to be the first male to conceive); See generally *A Gender Variance Who's Who*, ZAGRIA (Sept. 30, 2016), <https://zagria.blogspot.com/2016/09/a-short-history-of-male-pregnancy.html#.w7zOeGhKiUm>.

¹³² Judith Halberstam, *The Pregnant Man*, 65 THE VELVET LIGHT TRAP 77 (2010); See Patrick Califia-Rice, *Family Values*, THE VILLAGE VOICE (June 20, 2000), <https://www.villagevoice.com/2000/06/20/family-values/> (In 2000, Patrick Calega and his partner, Matt Rice, both transgender men, were reported to be the first to conceive and birth a child). See also Alley Hector, *Thomas Beatie's Not the First Pregnant Man . . .*, OREGON LIVE (Apr. 4, 2008), https://www.oregonlive.com/qpd/2008/04/thomas_beaties_not_the_first_p.html.

¹³³ See generally THOMAS BEATIE, *LABOR OF LOVE: THE STORY OF ONE MAN'S EXTRAORDINARY PREGNANCY* (2008). *But see* Unity Blott & Hannah Parry, *'Pregnant Man' Who Carried Three Children Throughout His Sex Change is Having a Hysterectomy (and Hopes His New Wife Will Carry Baby Number Four)*, DAILY MAIL (Aug. 9, 2016), <https://www.dailymail.co.uk/femail/article-3731240/Pregnant-man-Thomas-Beatie-having-hysterectomy.html>; See Chris Baynes, *Britain's First Pregnant Man Gives Birth to Girl*, THE INDEP. (July 8, 2017), <http://www.independent.co.uk/news/uk/home-news/britains-first-pregnant-man-gives-birth-to-girl-hayden-cross-a7830346.html>. (Interestingly, Britain's first documented transgender male to give birth was Hayden Cross.) See also Tom Payne, *Britain's First Pregnant Man Gives Birth to a Baby Girl After Conceiving Using a Sperm Donor he Met on Facebook*, DAILY MAIL (July 7, 2017), <https://www.dailymail.co.uk/news/article-4676182/Britain-s-pregnant-man-gives-birth-baby-girl.html>. *Id.* (Gender reassignment costs the National Health Services 29,000 British pounds per patient and some 3,000 a year are treated.)

¹³⁴ BEATIE, *supra* note 133. See Mayer & McHugh, *supra* note 45.

¹³⁵ *Id.*

of birthing – in point of fact – do not qualify him to hold the claim of being the first biological member of the male sex to achieve pregnancy.¹³⁶ Interestingly, Beatie does, nonetheless, hold the dubious distinction in America of being recognized, legally, as the father of these three children and is still, biologically, their mother.¹³⁷ As well, Beatie has observed that—over the course of his life—he has “been a daughter and a son, a sister and a brother, a boyfriend and a girlfriend, a beauty queen and a stepfather, a Girl Scout and a groom. But today I am just an ordinary human being in a whole lot of pain.”¹³⁸

b. The Taxonomy of Transsexualism and Transgenderism

A person “who identifies psychologically as a gender/sex other than the one assigned at birth . . .” is transgender.¹³⁹ Transgender, as an adjective, describes one “who has transitioned from one gender/sex to a differing one or, alternatively, is undertaking a transition.”¹⁴⁰ In 2016, it was estimated that 0.6%, or some 1.4 million, of

¹³⁶ *Id.*; See Halberstam, *supra* note 132; See also Hector, *supra* note 132.

¹³⁷ *Id.* See generally Julian N. Larry, *The Transgender Marriage Dilemma*, 33 U. WISC. J. L., GENDER & SOC’Y 23 (2018).

¹³⁸ Halberstam, *supra* note 132 (Thomas Beatie disclaimed the notion that he was the “first pregnant transman.” Rather, he considered himself “the first post-transition transgender male to go public with his decision to keep his reproductive organs and then to use them.”); Laura Wexler, *(Re) Creation Story*, 73 *JOHNS HOPKINS MAG.* 37, 39 (2021) (Genetic identity is very problematic for Thomas Beatie. Interestingly, it was not until 2017, however, that the Center for Transgender Health (called the Gender Identity Clinic), at Johns Hopkins University in Baltimore, Maryland, became the very first hospital in the Nation to perform sex reassignment – termed subsequently gender affirmation – surgeries including hysterectomy, mastectomy or augmentation, facial feminization and masculinization procedures, together with vaginoplasty and phalloplasty); See Derek Hawkins, *Transgender Man Gives Birth to Baby Boy. ‘Love is possible,’ he says. So is ‘being a loving family.’*, WASH. POST (Aug. 2, 2017). (Recently, Trystan Reese, living in Oregon as a transgender man (who began transitioning in 2003) retained her uterus after sex-reassignment, gave birth to a baby boy); Paul Mann, *The Man Who Became a Woman*, *NEW IDEA*, Mar. 22, 1986, at 8. (In New Zealand, Estelle Croot was the first transgender male who had a sexual reassignment performed in Sydney, Australia); Douglas NeJaime, *Marriage Equality and the New Parenthood*, 129 *HARV. L. REV.* 1185 (2016).

¹³⁹ Sam Killermann, *Comprehensive List of LGBTQ Vocabulary Definitions*, IT’S PRONOUNCED METROSEXUAL, <https://www.itspronouncedmetrosexual.com/2013/01/a-comprehensive-list-of-lgbtq-term-definitions/> (The Oxford English Dictionary defines, as a noun – transsexual – as being “a person who feels emotionally that they want to live, dress . . . as a member of the opposite sex, especially one who has a medical operation to change their sexual organs.”)

¹⁴⁰ *Id.* (The Oxford English Dictionary defines a transgender as “a person whose sense of personal identity and gender does not correspond to that person’s sex at birth, or which does not otherwise conform to conventional notions of sexual gender.”); Daphna Stroumsa, *The State of Transgender Health Care: Policy, Law, and Medical Frameworks*, 104 *AM. J. PUB. HEALTH* e31

adults in the United States identify as transgender.¹⁴¹ In 2011, the estimates of the U.S. adult transgender population was set at 0.3% (roughly 700,000).¹⁴² Parthenogenetic assertions of success in

(2014) [hereinafter Stroumsa, *The State of Transgender Health Care*] (Stated otherwise, as an adjective, transgender describes “people whose gender identity, gender expression, or behavior does not conform to what is socioculturally accepted as, and typically associated with, the legal and medical sex to which they were assigned at birth.”); See Anagha Srikanth, *House Introduces Gender-Neutral Language in New Rules for Congress* (Jan. 4, 2021), <https://thehill.com/changing-america/respect/diversity-inclusion/532518-house-introduces-gender-neutral-language-in-new/> (In order to not only promote social inclusivity and equality for transsexuals and transgenders and – more broadly – promote LGBTQ rights – gender inclusive language and the rules of grammar are changing.); Preventing and Combating Discrimination on the Basis of Gender Identity or Sexual Orientation, 86 Fed. Reg. 7023 (Jan. 25, 2021); See also Farhad Manjoo, *Call Me ‘They’: The Singular ‘They’ is Inclusive and Flexible*, N.Y. TIMES (July 13, 2019). But see Peggy Noonan, *What Were Robespierre’s Pronouns?*, WALL ST. J. (July 25, 2019, 6:58 PM) (arguing against changing pronouns); Ezra Marcus, *A Guide to Neopronouns*, N.Y. TIMES (Apr. 8, 2021, updated Sept. 21, 2021), <https://www.nytimes.com/2021/04/08/style/neopronouns-nonbinary-explainer.html> (discussing new type pronouns used without expressing gender (e.g., “ze or zir)).

¹⁴¹ Andrew R. Flores et al., *How Many Adults Identify as Transgender in the United States?*, UCLA THE WILLIAMS INST. (2016), <https://williamsinstitute.law.ucla.edu/publications/trans-adults-united-states/>; Samantha Schmidt, *1 in 6 Gen Z Adults are LGBT. And This Number Could Continue to Grow*, WASH. POST (Feb. 24, 2021), <https://www.washingtonpost.com/dc-md-va/2021/02/24/gen-z-lgbt/> (A Gallup poll conducted in 2020, consisting of 15,000 interviews with Americans aged 18 or older, found 5.6% of those polled identified as lesbian, gay, bisexual or transgender – which found from an earlier 2017 poll that this percentage was 4.5%. From research undertaken at the Williams Institute, it was found that 1 in 10 U.S. high schoolers identify as lesbian, gay, or bisexual.); Marcus, *supra* note 140. (Interestingly, a 2019 Pew Research Study found 1 in 5 Americans know someone who uses non-binary pronouns.) See Alex Williams, *Move Over Millennials, Here Comes Generation Z*, N.Y. TIMES (Sept. 20, 2015), <https://www.nytimes.com/2015/09/20/fashion/move-over-millennials-here-comes-generation-z.html> (defining Gen Z as those born from the early 1990s through mid-2000’s). Marcus, *supra* note 140. (In 2015, Harvard University began allowing students to choose their preferred programs from a list of gender-neutral terms.)

¹⁴² Flores, *supra* note 141; Schmidt, *supra* note 141; WORLD HEALTH ORGANIZATION [WHO], *Transgender No Longer Recognized as ‘Disorder’*, BBC NEWS (May 29, 2019), <https://www.bbc.com/news/health-48448804>. (In 2019, the World Health Organization declassified transgenderism as a mental condition.); Int’l Stat. Classification of Diseases and Related Health Probs, 10th Revision (ICD-10), WORLD HEALTH ORGANIZATION [WHO] (2019). (Yet, it retains the term, gender incongruence, in describing transgender people. This term is defined “as a marked and persistent incongruence between a person’s experimental gender and assigned text.”) See Heino F. L. Meyer-Bahlburg, *From Mental Disorder to Iatrogenic Hypogonadism: Dilemmas in Conceptualizing Gender Identity Variants as Psychiatric Conditions*, 39 ARCHIVE SEX BEHAV. 461 (2010). (The American Bar Association has committed itself to developing educational policies at the state and the federal levels regarding “the scientific nature of a person’s sex.” Presently, the ABA favors what is termed a “non-judgmental recognition” of an individual’s sexual behavior and gender identity.) *AMA Adopts New Policies at 2018 Interim Meeting*, AM. MED. ASS’N (Nov. 13, 2018), <https://www.ama-assn.org/press-center/press-releases/ama-adopts-new-policies-2018-interim-meeting>. In May 2014, Medicare coverage was given for sex reassignment surgeries (or, transition-related health care) made on an individual basis of medical need. *Know Your Rights: What Does Medicare Cover for Transgender People?*, NAT’L CTR. FOR TRANSGENDER EQUAL., <https://transequality.org/know-your-rights/medicare> (last visited Apr.

contemporary society are found among transgender women who have, by sexual reassignment, legally become men – even though their sexual reproductive organs (i.e., functioning ovaries and a uterus) are retained.¹⁴³ In 1994, it was estimated that from twenty-five to fifty percent of sex reassignments were female to male.¹⁴⁴

By retaining the female genital reproductive tract—the external genitalia and the internal genitalia with vagina, uterus, fallopian tubes and ovaries—the female-to-reassigned male may well be recognized, biologically, as still a female, or even seen as an anatomically constructed hermaphrodite.¹⁴⁵ Biologically, the chromosomal sex of a transgender person is not changed by reassignment even though psychologically there is, indeed, a “change.”¹⁴⁶ Yet, the terms – “conversion,” or “change,” – are seen as less preferable to the primary term, “reassignment.”¹⁴⁷ For those choosing to accept the cultural rigidities

11, 2022). As of August 2016, eighteen states continued to refuse coverage for transsexual reassignments. *Id.* In 2019, despite federal law Medicaid insurance coverage for transgender medical needs and surgeries, 7 states have policies not in compliance with this federal law. Sam McQuillan, *Transgender Medicaid Patients Face Coverage Barriers Despite Law*, BLOOMBERG L. (Sept. 10, 2019, 5:26 AM), <https://news.bloomberglaw.com/health-law-and-business/transgender-medic-aid-patients-face-coverage-barriers-despite-law>; *See generally*, THE PATIENT PROTECTION AFFORDABLE CARE ACT OF 2010, 42 U.S.C.A. § 18116 (West).

¹⁴³ *See* RAYMOND, *supra* note 48, at 31.

¹⁴⁴ Amy Bloom, *The Body Lies*, NEW YORKER, July 18, 1994, at 38; RAYMOND, *supra* note 48, at 31 (Contrariwise, the fact that there are male-to-reassigned-females is attributed to the fact that “men are socialized to fetishize women” which results in their usurpation of the female biology.); Alyssa Jackson, *The High Cost of Being Transgender*, CNN (updated July 31, 2015, 11:40 AM), <https://www.cnn.com/2015/07/31/health/transgender-costs-irpt/index.html>. (Today, the approximate cost of surgery for a male to female transsexual is \$140,450.00 and approximately \$124,400.00 for female to male assignment.) Dasti, *supra* note 48, at 1742, 1769. (In 2006, the costs were set at \$37,000.00 and \$77,000.00, respectively); Lifetime costs of life-long hormone treatments and psychoanalytic treatment following sexual reassignment may exceed \$100,000.00. *Id.*; Daphna Stroumsa et al., *Insurance Coverage and Use of Hormones Among Transgender Respondents to a National Survey*, 18 ANNALS FAM. MED. 528 (2020). (Presently, there is a lack of full insurance coverage for gender affirming hormones); *See generally Gender Medicine: Doubts Are Growing About Therapy for Gender-Dysphoric Children*, THE ECONOMIST (May 13, 2021), <https://www.economist.com/science-and-technology/2021/05/13/doubts-are-growing-about-therapy-for-gender-dysphoric-children> (discussing national and international practices to forbid the use of puberty blockers and cross hormone therapies for children under the age of 18 who seek gender transitioning); *See* Jack L. Turban et al., *Legislation to Criminalize Gender-Affirming Medical Care for Transgender Youth*, 325 JAMA 2251 (2021).

¹⁴⁵ *See* STERN, *supra* note 125. (A hermaphrodite is either a person or an animal having both male and female organs.)

¹⁴⁶ SMITH, II, THE CHRISTIAN RELIGION, *supra* note 51, at 970 n.37.

¹⁴⁷ *Id.*; *See Gender Affirmation (Confirmation) or Sex Reassignment Surgery*, CLEVELAND CLINIC, <https://my.clevelandclinic.org/health/treatments/21526-gender-affirmation-confirmation-or-sex-reassignment-surgery> (last reviewed May 3, 2021).

of the 21st century –and remain steadfast to a binary biological definition of sex rather than accept gender affirming surgeries – sexual reassignment simply does not make a man into a female, it merely castrates a male.¹⁴⁸

c. Uterine Womb Transfers

Successful uterine womb transfers would enhance the opportunities for transgender women to experience childbirth – this seen as the same basic “right” that women born as females have.¹⁴⁹ Others assert that this position is a basic “misperception”¹⁵⁰ and is simply too progressive and unappreciative of the traditional approach to the process of natural birthing.¹⁵¹ In keeping with this view, the United Kingdom classifies gender reassignment as an experimental surgery and imposes a ten-year sentence of imprisonment for performing it.¹⁵²

In the United States, the first attempt at a successful uterine transplant was met with failure¹⁵³; within hours of the surgery, the recipient experienced a life threatening infection and required the transplant

¹⁴⁸ *Id.* (referencing John Randell, *Indications for Sex Reassignment Surgery* (July 26, 1969) (unpublished paper presented at the First International Symposium on Gender Identity, London) (on file the Cornell Law Review)); *But see* Noa Ben-Asher, *The Necessity of Sex Change*, *infra* note 206; William N. Eskridge, Jr., *infra* note 243 (analyzing the new positive changes in 21st century society accepting the value of sexual reassignment.); *See also* *Gender Affirmation (Confirmation)*, *supra* note 147.

¹⁴⁹ *See* Dina Fine Maron, *How a Transgender Woman Could Get Pregnant*, *SCI. AM.* (June 15, 2016), <https://www.scientificamerican.com/article/how-a-transgender-woman-could-get-pregnant>. (Without insurance, uterine transplants would cost around \$24,000.00, risky, and are considered experimental); Benjamin P. Jones et al., *Perceptions and Motivations for Uterus Transplant in Transgender Women*, *JAMA NETWORK* (Jan. 20, 2021) (Some transgender women hold to the view that the benefits deriving from uterus transplants outweigh the significant risks associated with them. Specifically, some see this surgery as not only improving quality of life and happiness by enhancing feelings of femininity and eliminating frustrated reproductive aspirations but also assist in alleviating gender dysphoria, a discomfort, found commonly among some transwomen.)

¹⁵⁰ Sam Wollaston, *Transformation Street Review – Three Eloquent Case Studies Discuss Changing Gender*, *THE GUARDIAN* (Jan. 12, 2018), <https://www.theguardian.com/tv-and-radio/2018/jan/12/transformation-street-review-three-eloquent-case-studies-discuss-changing-gender>.

¹⁵¹ *Id.*

¹⁵² *Id.*; *See* Penney Lewis, *The Lawfulness of Gender Reassignment Surgery*, 58 *AM. J. LEGAL ETHICS* 56 (2018).

¹⁵³ Lenny Bernstein, *Behind the Failure of First U.S. Uterine Transplant*, *WASH. POST*, Feb. 13, 2019, at A1;

to be removed.¹⁵⁴ However, as the Cleveland Clinic continues to develop an effective program for uterus transplants, this procedure has already¹⁵⁵ met successful clinical trials as a therapeutic option for women in Sweden, resulting in eight live births.¹⁵⁶ Some forty-two procedures of this nature have been provided globally.¹⁵⁷

It has been predicted that within the next twenty-five years, artificial womb technology will advance to the point where a fetus will be viable throughout pregnancy.¹⁵⁸ Termed ectogenesis, this process will provide a means for ectogenesis births and, thus, allow for the complete development without a mother's womb.¹⁵⁹ Partial ectogenesis will involve a fetal transfer – and not an embryo – from a maternal womb to an artificial one.¹⁶⁰ It has been suggested that with the development and use of artificial wombs, the abortion debate will be changed dramatically, if not ended – simply because, with ectogenesis, a woman would be enabled, if not required in some jurisdictions, to expel or evacuate a non-viable fetus without death resulting, by placing it in an artificial womb.¹⁶¹

¹⁵⁴ *Id.*; CNNwire, *Baby is First to be Born in US After Uterus Transplant, Hospital Says*, FOX8 (Dec 4, 2017, 6:29 AM), <http://fox8.com/2017/12/04/baby-is-first-to-be-born-in-us-after-uterus-transplant-hospital-says/>. (Baylor University Medical Center at Dallas, Texas, announced on December 4, 2017, that – for the first time – a baby was born in the U.S. after a uterus transplant.)

¹⁵⁵ See Cohen, Chair Lecture, *supra* note 28; See also Karen Weintraub, *First Successful Uterus Transplant from Deceased Donor Leads to Healthy Baby* (Dec. 5, 2018), <https://www.scientificamerican.com/article/first-successful-uterus-transplant-from-deceased-donor-leads-to-healthy-baby/>.

¹⁵⁶ Benjamin P. Jones et al., *Uterine Transplantation in Transgender Women*, 126 INT'L J. OBSTETRICS & GYNAECOLOGY 152 (2018).

¹⁵⁷ *Id.* See also *Leading Doctors in Reproductive Medicine and Transgender Clinics Open the Door to Trans Women to Get Womb Transplant*, BIOETHICS OBSERVATORY – INST. OF LIFE SCI. UCV (Mar. 8, 2018), <https://bioethicsobservatory.org/2019/03/womb-transplantation-trans-women/29654/>.

¹⁵⁸ CHRISTOPHER KACZOR, *THE EDGE OF LIFE: HUMAN DIGNITY AND CONTEMPORARY BIOETHICS* 105-06 (2005); Hannah Devlin, *Artificial Womb for Premature Babies Successful in Animal Trials*, THE GUARDIAN (Apr. 25, 2017), <https://www.theguardian.com/science/2017/apr/25/artificial-womb-for-premature-babies-successful-in-animal-trials-biobag> (Similar to ART, the constructed artificial womb could be seen as the successor of the incubator – albeit filled with amniotic fluid); See generally SCOTT GELFAND & JOHN R. SHOOK, *ECTOGENESIS: ARTIFICIAL WOMB TECHNOLOGY AND THE FUTURE OF HUMAN REPRODUCTION* (2006).

¹⁵⁹ KACZOR, *supra* note 158.

¹⁶⁰ *Id.* at 118.

¹⁶¹ *Id.* at 105; Kate Greasley, *Will Artificial Wombs End the Debate Over Abortion Rights?* (May 11, 2017), <https://www.newstatesman.com/science-tech/2017/05/will-artificial-wombs->

d. Lactating Males

Until verified by a peer-reviewed case in 2018 in New York, the lactating ability of male mammals were speculative at best.¹⁶² Previously, over history, unverifiable reports have been made that such occurrences have happened.¹⁶³ Indeed, Aristotle (c. 384 B.C. – 322 B.C.) observed reportedly the ability of some men, by squeezing their breasts, could produce milk.¹⁶⁴ And, in the King James translation of the Bible in 1611, Job's breasts were said to have been filled with milk for nourishment.¹⁶⁵

Dr.'s Tamar C. Reisman and Zil Goldstein, of the Mount Siani Center for Transgender Medicine and Surgery, released a case study in 2018 which showed a man – biologically determined as such at birth – and who later defined his gender as female – was able to breastfeed her adopted infant after birth.¹⁶⁶ Regarded as the first formal report in medical literature of induced lactation to a trans woman, the case found no gender affirming surgeries, such as breast augmentation, nor an orchiectomy (where one or both testicles are removed), or vaginoplasty (a constructed vagina), had been performed.¹⁶⁷ As a consequence of a six-year period of time where feminizing hormones

end-debate-over-abortion-rights (updated Sept. 9, 2021, 5:28 PM) (Additionally, if medical communities refuse to perform terminal abortions, this enhances greatly acceptance of artificial womb policies); I. Glenn Cohen, *Artificial Wombs Are Coming. They Could Completely Change the Debate Over Abortion*, VOX MEDIA (Aug. 23, 2017, 8:40 AM), <https://www.vox.com/the-big-idea/2017/8/23/16186468/artificial-wombs-radically-transform-abortion-debate>.

(Anti-abortion laws might well be strengthened by requiring evacuation – rather than allow a legal abortion itself, which would have the effect of re-configuring the blanket right to abortion and the three penumbra rights under it: a right not to be a gestational parent, a genetic parent, and a legal parent. Required use of artificial wombs, in lieu of obtaining abortions, would preserve the right not to be a gestational parent and put into question the extent to what the other two rights would be guaranteed or compromised); 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).

¹⁶² Carl Cederstrom, *Are We Ready for the Breastfeeding Father?*, N.Y. TIMES, Oct. 20, 2019, at SR5.

¹⁶³ *Id.*; But see GEORGE M. GOULD & WALTER L. PYLE, ANOMALIES AND CURIOSITIES OF MEDICINE 397 (1896).

¹⁶⁴ PATRICIA SIMONS, THE SEX OF MEN IN PREMODERN EUROPE: A CULTURAL HISTORY 154 (Margot C. Finn & Colin Jones eds., 2011) (citing ARISTOTELIS, HISTORIA DE ANIMALIBUS [ARISTOTLE, THE HISTORY OF ANIMALS] (350 B.C.E.)).

¹⁶⁵ Job 21:24.

¹⁶⁶ Tamar Reisman & Zil Goldstein, *Case Report: Induced Lactation in a Transgender Woman*, 3 TRANSGENDER HEALTH 24 (2018).

¹⁶⁷ *Id.*

were received, the patient studied was able to nurse her child for some six weeks following birth and to produce up to eight ounces of milk on a daily basis.¹⁶⁸

e. Transgender Male Reassignments

The initial step undertaken for sexual reassignment of a biological female, or trans man to a male, begins with hormone treatments similar to that taken by males in their initial preparation for reassignment.¹⁶⁹ In order to arrest menstruation and to stimulate hair growth, both on the face and the whole body, lower the voice, and reduce breast tissue, androgen is injected.¹⁷⁰ This hormone also has the effect of causing muscles and body appearance to become more masculine by, for example, widening shoulders.¹⁷¹ Since hormone treatment, alone, which may take years, does not always suppress menstruation, radiation may also be used.¹⁷²

Oftentimes, there is only a moderate reduction in breasts as a consequence of hormone treatments or of radiation; consequently, mastectomies are often needed.¹⁷³ Then, what follows, is a hysterectomy,

¹⁶⁸ *Id.*; See Cederstrom, *supra* note 162; Andrea Downey, *Boob Job: Could DADS Breast-feed Too? New Hormone Kit 'Makes Men Lactate – But You Might Grow Moobs First'*, THE SUN (Oct. 24, 2018), <https://www.thesun.co.uk/fabulous/7572471/hormone-kids-dads-breastfeed-men-lactate/> (Efforts to allow men to lactate in England are also being studied).

¹⁶⁹ RAYMOND, *supra* note 48, at 36; *Id.* (Rather than use references to “re-construction,” it has been suggested that – more appropriately – a trans male who was assigned biologically as being a male at birth but self-identifies his gender to be female, be referred to as “affirmed female.” Contrariwise, a trans woman, assigned a female at birth but who self-identifies as a male, should be referenced to as “affirmed male.”) Hanna Rosin, *A Boy's Life*, THE ATL (2008), <https://www.theatlantic.com/magazine/archive/2008/11/a-boys-life/307059/> (studying a transgender child's struggle for social acceptance). See Jesse Singal, *Your Child Says She's Tran. She Wants Hormones and Surgery. She's 13.*, THE ATL 88 (2018) (discussing the plight of a fourteen-year-old transsexual girl); Agana et al., *supra* note 47; See also Bloom, *supra* note 144 (noting the percentage of sex change operations for female to males. More current statistics from 2016-2017 reveal the number of gender surgeries on girls and women in the U.S. quadrupled during these years with biological females accounting for 70% of all gender surgeries. Among teenage girls, gender surgeries are becoming “an epidemic.”); Abigail Shrier, *Amazon Enforces 'Trans' Orthodoxy*, WALL ST. J., June 23, 2020, at A15. Until a trans youth attains majority, no gender confirming surgery should be performed. *Developments in Law, Outlawing Trans Youth: State Legislatures and the Battle Over Gender-Affirming Healthcare for Minors*, 134 HARV. L. REV. 2163 (2021). See Turban et al., *supra* note 144.

¹⁷⁰ RAYMOND, *supra* note 48.

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ *Id.*

and an oophorectomy is performed to remove ovaries. This last procedure is known as female castration and is routinely requested by transgender individuals¹⁷⁴ Not all of these steps are taken as a part of sexual reassignment, and oftentimes the vagina remains.¹⁷⁵ When a phallus is, however, constructed, it is undertaken *in tandem* with a hysterectomy.¹⁷⁶ Many female-to-constructed-male transgender individuals do not elect to proceed with multi-staged procedures necessary for the construction of an artificial penis – this, simply because a new penis is not sexually operative and is incapable of tumescence.¹⁷⁷

It is well to remember that inasmuch as chromosomal sex cannot be changed by sexual reassignment, a transgender person's sex is not

¹⁷⁴ *Id.* at 36; *FGM Legislation by State*, AHA FOUND., <https://www.theahafoundation.org/female-genital-mutilation/fgm-legislation-by-state/> (Sept. 2020); (Sexual reassignments are prevented under the common law crime of mayhem – which has been codified by statutes in 40 states – and which forbid female genital mutilations. Eleven states have no legislative protection. Tresa Baldas, *Judge Dismisses Female Genital Mutilation Charges in Historic Case*, DETROIT FREE PRESS (Nov. 20, 2018). (The federal law against maiming of females under the age of 18 – 18 U.S. Code § 16 (1966) – was held unconstitutional by a federal district court in Michigan in 2018). See Lewis, *supra* note 152.

¹⁷⁵ RAYMOND, *supra* note 48, at 36.

¹⁷⁶ *Id.* at 37. (Internationally, sterilization is required before a new sexual identity may be recognized legally); M.H., *Why Transgender People are Being Sterilised in Some European Countries*, THE ECONOMIST (Sept. 1, 2017), <https://www.economist.com/the-economist-explains/2017/09/01/why-transgender-people-are-being-sterilised-in-some-european-countries> (reporting that Switzerland, Greece and 18 other mostly European countries require sterilization before new legal identities will be recognized); See Mari Yamoguchi, *Japan Court Upholds Sterilization to Register Gender Change*, ASSOC. PRESS NEWS (Jan. 25, 2014), <https://ap-news.com/article/japan-ap-top-news-supreme-courts-laws-international-news-9ef16f52e9b94b9a838b17a63c6c1e8d>; But see Liam Stack, *European Court Strikes Down Required Sterilization for Transgender People*, N.Y. TIMES (Apr. 12, 2017), <https://www.nytimes.com/2017/04/12/world/europe/european-court-strikes-down-required-sterilization-for-transgender-people.html>; Katyal, *supra* note 48, at 407. (In America, the states have always asserted a primary power to establish gender classification with some requiring people of change of gender and/or a court order recognizing this change and other states requiring an amended birth certificate).

¹⁷⁷ RAYMOND, *supra* note 48, at 37. (Some 23 states require proof of surgery before a change is state issued documents as a birth certificate) *State-by-State Overview: Changing Gender Markers on Birth Certificates*, TRANSGENDER L. CTR., <https://transgenderlawcenter.org/resources/id/state-by-state-overview-changing-gender-markers-on-birth-certificates> (updated Apr. 2017); Christopher O. Tollefsen, *Sex Identity*, PUB. DISCOURSE – J. WITHERSPOON INST. (July 13, 2015), <https://www.thepublicdiscourse.com/2015/07/15306/>. (Neither a vagina nor a penis can be created by simply creating an orifice. Rather, what results from the sexual reassignment is but a simulacrum); See WILLIAM H. MASTERS & VIRGINIA E. JOHNSON, HUMAN SEXUAL RESPONSE 101-10 (1966).

altered by this surgery.¹⁷⁸ And, interestingly, there is no substantive evidence supporting the notion that gender reassignment “cures” what is seen by some as “a problem of transcendence” – this, simply because a sense of self that transgender individuals’ covet cannot be conferred from sexual reassignment.¹⁷⁹ Indeed, the transgender individuals’ process of integration is actually constrained in that “he can become no more than what the society has determined as masculine or feminine.”¹⁸⁰

f. Transgender Female Reassignments

As noted, before sexual reassignments, men must go through what is referred to as “hormonal castration.”¹⁸¹ This process requires the administration of two female hormones: estrogen and progesterone.¹⁸² Generally, the hormones are given orally or sub-lingually, injected intramuscularly, applied topically, or as alcoholic solutions, or even by suppositories.¹⁸³ These hormones are often supplemented by facial feminization surgery, reducing body hair, and suppressing production of testicular androgen. Many transgender individuals fortify this process of change by also engaging in speech therapy.¹⁸⁴ The total reassignment procedure not only requires surgery, but also urological, and various levels of rhinoplasty or plastic accommodations.¹⁸⁵

Four steps are necessary for completing the process of changing sexual identity.¹⁸⁶ The first step is a penectomy—the full, or partial, removal of a penis—followed by orchidectomy—or castration—plastic reconstruction, and the formation of an artificial vagina

¹⁷⁸ Smith, Comment, *Transsexualism*, *supra* note 48, at 970 n.37.

¹⁷⁹ RAYMOND, *supra* note 48, at 140; Long Doan et al., *Americans’ Perceptions of Transgender People’s Sex: Evidence From a National Survey Experiment*, SAGE J. (2019), <https://journals.sagepub.com/doi/full/10.1177/2378023119852015>. (The first national survey of the attitudes of 3,922 Americans on their perceptions of transgenders found that public perceptions of sex are tied to “the transgender person’s level of gender conformity not self-identified gender or age.”)

¹⁸⁰ RAYMOND, *supra* note 48, at 171. See generally Joshua D. Safer & Vin Tangpricha, *Care of Transgender Persons*, 381 N. ENG. J. MED. 2451 (2019).

¹⁸¹ RAYMOND, *supra* note 48, at 32.

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ *Id.* at 33.

through vaginoplasty.¹⁸⁷ The first two steps are generally undertaken routinely.¹⁸⁸¹⁸⁹ Subsequent steps require construction of a vagina through plastic surgery and are performed by “creating a cavity between the prostate and the rectum.¹⁹⁰ An artificial vagina, often referred to as a penile inversion,¹⁹¹ is “formed from a skin graft from the thigh and lined with penile and/or scrotal skin.”¹⁹² This allows for the possibility of “organic sensation”¹⁹³ and is done by using “a composite graft of the tip of the penile glans” but not removing the prostate itself.¹⁹⁴ After the surgery, the vagina is then shaped and maintained “by a model that is worn continuously for several weeks”¹⁹⁵ When healing is completed, either “manual dilation or penile insertion”¹⁹⁶ through use of a dilator (e.g., dildo) which fits comfortably in the vagina, must be done.¹⁹⁷ In some particular cases, dilation may be required two or three times weekly.¹⁹⁸

What generally follows post-operatively from the reassignment surgery is that an enlargement of the breasts is undertaken with implants.¹⁹⁹ Increased oral estrogen therapy is then administered while the patient is medically supervised.²⁰⁰ It is common for the recipient to undergo further surgeries for aesthetic or cosmetic reasons in order

¹⁸⁷ *Id.*; Dasti, *supra* note 48, at 1767. (The very validity of sex reassignment surgery as efficacious therapy for gender disorders – let alone being a medical necessity – is problematic and leads to significant medical disagreements on this issue). See Stroumsa, *The State of Transgender Healthcare*, *supra* note 140.

¹⁸⁸ RAYMOND, *supra* note 48, at 33.

¹⁸⁹ *Id.*

¹⁹⁰ *Id.*

¹⁹¹ Chris Spargo, *Caitlyn Jenner Reveals She HAS Now Undergone Gender Reassignment Surgery Because She Was ‘Tired of Tucking the Damn Thing In All the Time’*, THE DAILY MAIL (Apr. 10, 2017), <https://www.dailymail.co.uk/news/article-4398858/Caitlyn-Jenner-underwent-gender-reassignment-surgery.html> (updated Apr. 22, 2017); See CAITLYN JENNER, THE SECRETS OF MY LIFE (2017).

¹⁹² RAYMOND, *supra* note 48, at 33.

¹⁹³ *Id.*

¹⁹⁴ Spargo, *supra* note 191.

¹⁹⁵ RAYMOND, *supra* note 48.

¹⁹⁶ *Id.*

¹⁹⁷ Spargo, *supra* note 191 (Initially, the vaginoplasty is treated by the body as a wound which requires dilation by the patient.)

¹⁹⁸ *Id.*

¹⁹⁹ RAYMOND, *supra* note 48, at 33-34.

²⁰⁰ *Id.* at 3.

“to correct real or psychologically felt complications,”²⁰¹ such as a tracheal shave for reduction of the “Adam’s apple,” together with eye and limb adjustments.²⁰² These procedures are administered by the recipient with the hope of “conforming more to be fashionable, stereotypical feminine body image” which has the “prescribed body measurement of a man-made woman.”²⁰³

Mixed emotions often arise for the individual after reassignment. These concerns are inevitably tied to having “achieved a true female state” to – contrariwise – feelings that they are but “castrated females.”²⁰⁴ While there may be no societal force that directs a transgender individual to commence hormone therapy to seek sexual reassignment, or – for that matter – “assume opposite-sex roles and behavior,” in reality, the present patriarchal society does limit variant, nonconforming conduct by maintaining the very notion that “masculinity and femininity [only] accompany a male or female body” and “thereby recognize that “anatomy is destiny.”²⁰⁵ Consequently, free choice is, today, largely aspirational.²⁰⁶

g. The Biological Male and Parthenogenesis: The Process

A physician would perform a standard *in vitro* procedure – with a fertilized egg drawn from a woman’s ovary and then fertilized with semen from a man and placed in a petri dish before implantation. Approximately thirty to fifty hours after the egg has matured to the two-to-eight cell stage, it would then be placed in a flexible catheter and implanted by way of a woman’s vagina into her uterus. Subsequently, a laparoscopy would be used to make a small incision into a man’s abdominal cavity, with a gynecologist placing the embryo into the man’s “lower abdominal cavity against the omentum which is a fatty

²⁰¹ *Id.* at 34.

²⁰² *Id.*

²⁰³ *Id.* at 34, 35.

²⁰⁴ *Id.* at 138.

²⁰⁵ *Id.* at 86.

²⁰⁶ *Id.* at 135; See Doan et al., *supra* note 179. (Americans are “more likely to classify a transgender person’s sex as consistent with that sex assigned at birth rather than their gender identity.”); See generally Noa Ben-Asher, *The Necessity of Sex Change: A Struggle for Intersex and Transsex Liberties*, 29 HARV. J. L. & GENDER 51 (2006).

blood rich tissue in the front of the intestines.”²⁰⁷ Subsequently, “the fertilized egg would implant in the omentum with a placenta developing from the embryo and drawing nutrients.”²⁰⁸

Villi – hair-like projections which contain blood vessels – are extended from the placenta during pregnancy.²⁰⁹ The sole purpose of the villi is to provide the baby with a blood supply.²¹⁰ The abdomen, during delivery, unlike the uterus, “is not designed to separate from the placenta.”²¹¹ A man’s body could well become so bonded with the placenta that surgical removal of it without severe injury to “abdominal organs, such as the bowels,” could not be undertaken.²¹² Such an effort at removal could well result in a gaping wound in the abdominal wall and “heavy uncontrolled bleeding.”²¹³

In order to accommodate a growing fetus, the abdominal cavity would proceed to expand. When this occurs, most likely, hormones would be administered to the expectant “male mother” – with the hope being that his hormonal status would serve to “mimic” that of a pregnant woman.²¹⁴ Delivery would be by a laparotomy—similar to a Caesarean section—from the man’s abdomen.²¹⁵

h. The Dangers of Ectopic Pregnancies

While in a natural pregnancy the maturing pre-embryo implants in the inner surface of the uterus, in an ectopic pregnancy, the

²⁰⁷ Dick Teresi & Kathleen McAuliffe, *Male Pregnancy*, 8 OMNI 52 (1985); Dick Teresi, *How to Get a Man Pregnant*, N.Y. TIMES MAG. (Nov. 27, 1994).

²⁰⁸ Teresi & McAuliffe, *supra* note 207, at 56. See Robyn Roland, *Crumbling Motherhood: Reproductive Technology Creating Women’s Procreative Alienation* 15, presented to La Maternité au Laboratoire [Maternity in the Laboratory], an International Forum on New Reproductive Technologies, Concordia Univ., Montreal (1987) (suggesting that a fertilized egg could be flushed from a woman’s womb and subsequently implanted to a sexually transgender man after female-to-male gender transitioning).

²⁰⁹ Rothstein, *supra* note 25, at 1. See William Leith, *Pregnant Men: Hard to Stomach?*, THE DAILY TEL. (last updated Nov. 11, 2008), https://web.archive.org/web/20081205063656/http://www.telegraph.co.uk/health/men_health/3354220/Pregnant-men-hard-to-stomach.html.

²¹⁰ *Id.*

²¹¹ *Id.*

²¹² *Id.*

²¹³ *Id.*

²¹⁴ Teresi & McAuliffe, *supra* note 207.

²¹⁵ *Id.*; See also Teresi, *supra* note 207.

fertilized egg does not reach the uterine cavity and implants, instead, outside the endometrial cavity in either the fallopian tubes, the ovaries, or in the abdomen.²¹⁶ Some ninety-five percent of ectopic pregnancies implant in “various segments of the fallopian tubes,”²¹⁷ with almost one out of every eight hundred pregnancies, or 1.4% of ectopic pregnancies, being abdominal.²¹⁸ The ectopic pregnancies are potentially life-threatening conditions and occur in approximately 1.5 to 2.0 per cent of pregnancies,²¹⁹ with six per cent of all ruptured ectopic pregnancies resulting in maternal death.²²⁰ Abdominal ectopic pregnancy has been seen as a *modus operandi* for human male pregnancies or for females who lack a uterus.²²¹ Yet, other statistics show the very real danger abdominal pregnancies carry: namely, up to twenty percent of all cases of this nature result in fetal malformations and deformities which indicate termination is in order.²²²

The vexatious issue of allowing termination of an ectopic pregnancy is fraught with complex and differing moral issues.²²³ The

²¹⁶ F. Gary Cunningham et al., WILLIAMS OBSTETRICS 371 (F. Gary Cunningham et al. eds., 25th ed. 2018).

²¹⁷ *Id.*

²¹⁸ RONALD S. GIBBS ET AL., DANFORTH’S OBSTETRICS AND GYNECOLOGY 156 (Ronald S. Gibbs et al. eds., 10th ed. 2008); David J. B. Ashley, *Are Ovarian Pregnancies Parthenogenetic?*, 11 AM. J. HUM. GENETICS 305, 309 (1959). (In 1959, it was determined that – contrary to early hypothesis of Landrum B. Shettles of Columbia University suggesting human ovarian pregnancies “might” be considered parthenogenetic – these pregnancies are, in fact, not).

²¹⁹ Kurt T. Barnhart, *Clinical Practice. Ectopic Pregnancy*, 361 N. ENG. J. MED. 379 (2009).

²²⁰ Cunningham et al., *supra* note 216, at 371. (Ectopic pregnancies account for 0.5 to 1.5% of “all first-trimester pregnancies in the United States” and amounts to 3% of pregnancy related deaths). See Hani K. Atrash et al., *Abdominal Pregnancy in the United States: Frequency and Maternal Mortality*, 69 OBSTETRICS & GYNECOLOGY 333 (1987); See also Jessica Salter, ‘Miracle Baby’ Who Grew Outside the Womb, THE TELE., (Aug 31, 2008, 11:50 PM), https://www.telegraph.co.uk/news/uknews/2658086/Miracle-baby-who-grew-outside-the-womb.html?DCMP=EMC-new_01092008.

²²¹ See Rothstein, *supra* note 25. See also Warmflash, *supra* note 25. (Reporting that since transgender women cannot have babies *without* a functional womb, a transplanted womb would be safer than attempting an ectopic pregnancy. There is speculation that since, in 2016, a uterus transplant had been achieved onto an infertile woman, that it is possible one could be done for a transgender woman in five to ten years).

²²² Cunningham et al., *supra* note 216, at 383-4. See Daphna Stroumsa et al., *The Power and Limits of Classification — A 32-Year-Old Man With Abdominal Pain*, 380 N. ENG. J. MED. 1885 (2019) (documenting a medical emergency department error in misclassifying a transgender man as a male and not transgender).

²²³ GERALD KELLY, MEDICO-MORAL PROBLEMS 105, 111 (1958). See T. LINCOLN BOUSCAREN, ETHICS OF ECTOPIC OPERATIONS (1944) (reviewing three theological positions on ectopic pregnancies: one holding under the Principle of Double Effect that it is valid to remove an ectopic fetus; another view holds such an operation is a direct killing and could not be permitted;

position of the United States Conference of Catholic Bishops in 2009 brought clarity to this issue by recognizing – and thereby validating – recognition of the Principle of Double Effect.²²⁴ In this directive for Catholic Health Care Services, the Bishops held that: “Operations, treatments, and medications that have as their direct purpose the cure of a proportionately serious pathological condition of a pregnant woman are permitted when they cannot be safely postponed until the unborn is viable, even if they will result in the death of the unborn child.”²²⁵

IV. Conclusions

Law “reacts to social needs and demand.”²²⁶ Indeed, both moral and political theories together—with the “felt necessities of time”—have not only shaped the law, but have been its very life.²²⁷ There is neither a “need” nor an honest “demand” for continued exploration of human parthenogenesis. Today’s society creates an atmosphere which gives rise to an “infinity of needs.”²²⁸ A wish becomes a want, then a need, an entitlement, and subsequently, a right. “The felt necessities” of contemporary society do not prompt a rational, efficacious reason to enhance fecundity by use of this method of assisted reproductive technology.²²⁹ As has been observed, this process,

and a third that even though the removal of an inviable fetus was death dealing, it would be licit when there is certainty that the ectopic pregnancy is presently or would become a deadly danger to the mother).

²²⁴ KEVIN D. O’ROURKE & PHILIP J. BOYLE, *MEDICAL ETHICS: SOURCES OF CATHOLIC TEACHINGS* 133 (4th ed. 2011).

²²⁵ *Id.* UNITED STATES CONFERENCE OF CATHOLIC BISHOPS, *ETHICAL AND RELIGIOUS DIRECTIVES FOR CATHOLIC HEALTH CARE SERVICES* 23 (5th ed. 2009). See Samantha Schmidt, *Transgender Man Sues University of Maryland Hospital After It Canceled His Hysterectomy*, WASH. POST (July 17, 2020), <https://www.washingtonpost.com/dc-md-va/2020/07/17/transgender-hysterectomy-lawsuit-maryland/> [hereinafter Schmidt, *Transgender Man*] (reporting how a Catholic hospital – that had merged with the University of Maryland hospital – refused a transgender surgery for hysterectomy).

²²⁶ Warren E. Burger, *Reflections on Law and Experimental Medicine*, in 1 *ETHICAL, LEGAL AND SOCIAL CHANGES TO A BRAVE NEW WORLD* 211, 211 (George P. Smith, II, ed., 1982).

²²⁷ OLIVER WENDELL HOLMES, *THE COMMON LAW* 55 (Mark DeWolfé Howe ed., 1963).

²²⁸ DANIEL J. BOORSTIN, *CLEOPATRA’S NOSE: ESSAYS ON THE UNEXPECTED* 167 (1994). See MARY ANN GLENDON, *RIGHTS TALK: THE IMPOVERISHMENT OF POLITICAL DISCOURSE* (1993).

²²⁹ HOLMES, *supra* note 227; See generally MUZAFER SHERIF, *THE PSYCHOLOGY OF SOCIAL NORMS* (1936).

adapted to human “needs,” is seen by some as running counter to the laws of nature.²³⁰ Rather than serving as another new—and in this case, dangerous—process of reproduction, human parthenogenesis would prompt a “total cultural revision.”²³¹ The effect of such efforts would be a complete depersonalization of the procreative process.²³² Indeed, the core of society – the traditional family, and its sanctity – would be totally realigned, as would the very “machinery of adaptive evolution.”²³³ Subsequent parthenogenetic populations would have the effect of curtailing variability.²³⁴ For some enthusiasts, using parthenogenesis could be seen as a means of playing God and would be of concern.²³⁵

There are, however, two valid scientific reasons for continuing to explore human artificial parthenogenesis as a valid and ethical research method for retrieving human embryos from unfertilized eggs — designed as such to advance regenerative medicine and provide a rich source for producing stem cells which, in turn, could be used to facilitate growth of tissues and possibly organ transplants.²³⁶ Used as such, parthenogenesis can be seen rightly as a source for “tailored medical treatments for women.”²³⁷ Additionally, artificial

²³⁰ Farrar & Bayne, *supra* note 22 (quoting Ian Craft).

²³¹ Smith, II, *Manipulating the Genetic Code*, *supra* note 2, at 720.

²³² *Id.* at 731.

²³³ *Id.* See also Michael Goldberg, *What Is a Woman? Dispute Between Radical Feminism and Transgenderism*, NEW YORKER (July 28, 2014).

²³⁴ Jeroen Gerritsen, *Sex and Parthenogenesis in Sparse Populations*, 115 THE AM. NATURALIST 718 (1980). See O’Brien, *supra* note 29, at 476 (where it is observed that the metaphor – playing God – is “too vague and indeterminable to grade” reproduction judgments of this character.)

²³⁵ Fangerau, *supra* note 32, at 54-57. See Robert Sparrow, *Is It “Every Man’s Right to Have Babies?” Male Pregnancy and The Limits of Reproductive Liberty*, 18 KENNEDY INST. ETHICS J. 275, 279, 283-85 (2008) (observing—and accepting—the notion that since reproductive liberty is both a normal and central part of human life, it is but logical to understand why homosexuals may wish to have a child asexually).

²³⁶ Fangerau, *supra* note 32; See generally Winston, *supra* note 22; Joanna Schaffhausen, *Mouse Created From All-Female DNA*, ABC NEWS (April 21, 2004), <https://abcnews.go.com/Health/Technology/story?id=118237&page=1>. (The power and success of creating embryos without fertilization by seeking to isolate stem cells from embryos would have the effect of meeting the present ethical concerns that surround embryonic stem cells being harvested from only fertilized human eggs.); See Hipp & Atala, *supra* note 50; See also Adriana Bos-Mikich et al., *Parthenogenesis and Human Assisted Reproduction*, 2016 STEM CELLS INT’L (2016); Michael Didié et al., *Parthenogenetic Stem Cells for Tissue-Engineered Heart Repair*, 123 J. CLINICAL INVESTIGATION 1285 (2013).

²³⁷ Weiss, *supra* note 105.

parthenogenesis holds the hope of providing homosexual men seeking to establish a “biological connection” to parenthood become a reality; although, this opportunity is costly and presents serious medical risks if pursued.²³⁸

Today, an almost insurmountable challenge exists for society to accept and understand the root causes of gender dysphoria and thus recognize the harsh and discriminating effect this condition has upon assisted reproductive options for the transgender communities.²³⁹ Inasmuch as the law must concern itself with “social practicalities” and the consequences deriving therefrom,²⁴⁰ a goal of accommodation, when reasonably possible—rather than abnegation—should be sought when considering the central issue of sexual equality.²⁴¹ Securing a standard which is equitable and capable of being administered, yet preserves the traditional sexual dichotomy, is admittedly problematic.²⁴² Society is not yet at a stage of full understanding or of acceptance, and, thus, there is no social equilibrium for this issue.²⁴³ Adding to the ambiguity of this is a study done in 2013 which found approximately 54% of Americans do not accept the notion of a gender identity varying from the sex assigned at birth.²⁴⁴ Confounding this finding is the fact that presently, there are some fifty-six options available for use in defining gender.²⁴⁵

²³⁸ Shelia Johnson, *What Are the Benefits of Parthenogenesis*, SCIENCING (Apr. 25, 2017), <https://sciencing.com/benefits-parthenogenesis-13770.html>. *But see* Robert Sparrow, *Is It “Every Man’s Right to Have Babies If He Wants Them?” Male Pregnancy and The Limits of Reproductive Liberty*, 18 Kennedy Inst. Ethics J. 275, 279, 283-85 (2008) (observing—and accepting—the notion that since reproductive liberty is a both a normal and central part of human life, it is but logical to understand why homosexuals may wish to have a child asexually).

²³⁹ Mayer & McHugh, *supra* note 45, at 4.; *See* Meyer-Bahlburg, *supra* note 142; *See also* Stroumsa, *The State of Transgender Healthcare*, *supra* note 140.

²⁴⁰ Smith, Comment, *Transsexualism*, *supra* note 48, at 965.

²⁴¹ *See generally* Symposium, *Gender Equality and the First Amendment*, 87 FORDHAM L. REV. 2313 (2019); *See generally* Agana et al., *supra* note 47.

²⁴² Smith, Comment, *Transsexualism*, *supra* note 48, at 965.

²⁴³ *See generally* MARK NATHAN COHEN, *CULTURE OF INTOLERANCE* (1999); *See* Sari L. Reisner et al., *Legal Protections in Public Accommodations Settings: A Critical Public Health Issue for Transgender and Gender-Nonconforming People*, 93 MILBANK Q. 484 (2015); *But see* William N. Eskridge, Jr., *Sexual and Gender Variation in American Public Law: From Malignant to Benign to Productive*, 57 UCLA L. REV. 1333 (2010) (analyzing a growing socio-legal acceptance of variations in sexual and gender identification and practice).

²⁴⁴ Walter O. Bockting et al., *Stigma, Mental Health, and Resilience in an Online Sample of the US Transgender Population*, 103 AM. J. PUB. HEALTH 943 (2013).

²⁴⁵ Mayer & McHugh, *supra* note 45, at 88. *See* Manjoo, *supra* note 140; *see* Marcus, *supra* note 140; *see* Noonan, *supra* note 140.

Discrimination on the basis of gender nonconformity is a continuing socio-legal point of considerable dimension and of concern.²⁴⁶ After the United States Supreme court case of *Obergefell v. Hodges*, however, there are limited contexts where the law today even relies on binary classifications.²⁴⁷ Yet, the question remains an open one regarding the extent to which Title VII, the Civil Rights Act, protects workplace discrimination on the basis of sex and thus protects gay and transgender workers.²⁴⁸ Traditionally, courts rarely extend protections to transgender people as a class.²⁴⁹ The extent to which sex stereotyping is a prohibited form of discrimination in employment was settled by the United States Supreme Court case of *Price Waterhouse v. Hopkins* in 1989.²⁵⁰ Accordingly, the Civil Rights Act of 1964 has been interpreted as applicable to not only discrimination based on sex, but also discrimination based on an expression of gender stereotyping.²⁵¹

In the event that the congressional proposals of the Equality Act—first introduced in the 116th Congress²⁵² and supported strongly by President Joseph Biden’s Administration²⁵³—were to be enacted,

²⁴⁶ *Id.* See Lisa R. Miller & Eric Anthony Grollman, *The Social Cost of Gender Nonconformity for Transgender Adults: Implications for Discrimination and Health*, 30 SOCIO. F. 809 (2015). See Jessica A. Clarke, *They, Them, and Theirs*, 132 HARV. L. REV. 894, 946 (2019).

²⁴⁷ *Obergefell v. Hodges*, 576 U.S. 644, 135 S. Ct. 2584 (2015). See Jessica A. Clarke, *supra* note 246

²⁴⁸ Dasti, *supra* note 48, at 1741; see Clarke, *supra* note 246; Mark Sherman & Matthew Barakat, *Supreme Court Weighs LGBT People’s Rights*, ASSOCIATED PRESS (2019), <https://thedepauw.com/supreme-court-weighs-lgbt-peoples-rights/>; *Altitude Express, Inc. v. Zarda*, 140 S. Ct. 34, 204 L. Ed. 2d 1191 (2019); *Bostock v. Clayton Cty., Georgia*, 140 S. Ct. 1731, 207 L. Ed. 2d 218 (2020); *Equal Emp. Opportunity Comm’n v. R.G. & G.R. Harris Funeral Homes, Inc.*, 884 F.3d 560 (6th Cir. 2018) (In October 2019, the U.S. Supreme Court heard two cases on this very point of interpreting the extent to which Title VII of the Civil Rights Act of 1964 applies as a protection of LGBTs and transgenders in the workplace); See also Ali Szemanski, *When Trans Rights Are Disability Rights: The Promises and Perils of Seeking Gender Dysphoria Coverage Under the Americans with Disabilities Act*, 43 HARV. J. L. & GENDER 138, 141 (2020).

²⁴⁹ Dasti, *supra* note 48, at 1741.

²⁵⁰ *Price Waterhouse v. Hopkins*, 490 U.S. 228, 109 S. Ct. 1775, 104 L. Ed. 2d 268 (1989).

²⁵¹ *Id.*; See Clarke, *supra* note 246, at 990; See generally KIMBERLY A. YURACKO, GENDER NONCONFORMITY AND THE LAW (2011).

²⁵² H. R. 5, 116th Cong. (2019-2020) (The House of Representatives passed this bill on Feb. 25, 2021).

²⁵³ Elizabeth Bibi, *Human Rights Campaign: The 117th Congress Will Prioritize LGBTQ Equality*, HUM. RTS. CAMPAIGN (Jan. 3, 2021), <https://www.hrc.org/press-releases/human-rights-campaign-the-117th-congress-will-prioritize-lgbtq-equality>. Leo Shane, III, *VA to Offer Gender Surgery to Transgender Vets for the First Time*, MIL. TIMES (June 19, 2021),

the word, “sex,” as used in the amendments to the Civil Rights Acts,²⁵⁴ would include “gender identity” and – consequently – protect and validate preferred self-identifying characterization of one’s “sexual identity” regardless of whether cross-sex hormone therapy or re-assignment surgeries were to be completed or undertaken.²⁵⁵ On January 20, 2021, President Biden signed Executive Order 13988, prohibiting discrimination based on gender identity and sexual orientation and directed federal agencies to undertake such actions as needed to safeguard those rights, specifically for members of the LGBTQ community.²⁵⁶

The aspirational goal of contemporary society should be to work toward a better, more balanced, and humane, socio-cultural understanding of “why and how bodily sex matters,” yet strive to “celebrate individuality of the rich variety of ways to be male or female.”²⁵⁷ Central to such a quest would be an appreciation that in decision-making, “common sense makes a good law”²⁵⁸ and, further, “decisions drawn from common sense yield sensible results.”²⁵⁹ This, then,

<https://www.militarytimes.com/veterans/2021/06/19/va-to-offer-gender-surgery-to-transgender-vets-for-the-first-time/>. (In June 2021, The Birth Administration announced that the Veterans Health Administration within the U.S. Department of Veteran Affairs will offer gender reassignment surgery to veterans who are said to number some 4,000. It is thought to take 2 years before it will be available.); See also Amy Sokolow, *The VA Doesn't Cover Fertility Treatments for Unmarried Veterans of Same Sex-Couples. Some Want to Change That.*, USA TODAY. (Aug. 21, 2020), <https://www.usatoday.com/story/news/nation/2020/08/21/veterans-groups-say-va-should-offer-ivf-unmarried-same-sex-couples/3371635001/>.

²⁵⁴ 42 U.S.C.A. § Ch. 21 (1964).

²⁵⁵ *Prisoner's Dilemma: Putting Trans Women in Female prisons Sets Up a Clash of Rights*, THE ECONOMIST (Jan. 30, 2021), <https://www.economist.com/united-states/2021/01/30/putting-trans-women-in-female-prisons-sets-up-a-clash-of-rights>.

²⁵⁶ Preventing and Combating Discrimination on the Basis of Gender Identity or Sexual Orientation, Exec. Order No. 13988 (Jan. 20, 2021). Laura Ahrens et al., *Biden's EO Expands Title IX to Prohibit LGBTQ Discrimination*, JD SUPRA (Feb. 5, 2021), <https://www.jdsupra.com/legal-news/biden-s-eo-expands-title-ix-to-prohibit-3602629/>. Schmidt, *Transgender Man*, supra note 225. (One significant step taken as a consequence of this Order is the direction that all executive orders, administrative regulations, countless federal forms and government-on-line portals, be more tolerant of various “gender dispositions and gender presentations.” To this end, more supported rhetoric is being adopted throughout all government operations in order to advance understanding of LGBTQ communities, promote civility, and establish harmony. In order to advance these goals, for example, references to “illegal aliens” are to be recognized as “non-citizens” and “undocumented” as opposed to “illegal.”).

²⁵⁷ RYAN T. ANDERSON, WHEN HARRY BECAME SALLY: RESPONDING TO THE TRANSGENDER MOMENT 198-212 (2018).

²⁵⁸ BENJAMIN N. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS 23 (1921). *But see* PHILIP K. HOWARD, THE DEATH OF COMMON SENSE (1994).

²⁵⁹ *Id.*

becomes a calculus, if not perhaps a construct, for reasoning and for tackling the vexatious issues of law and policy-making arising from the development, and the equitable and humane application of ART. Central to any analysis, of course, requires an acceptance of the right of scientific investigation and the basic realization that every “right” is not boundless – but is shaped by legal and social norms, and, particularly, by the standard of reasonableness²⁶⁰ and the ultimate goal of social equality.²⁶¹

²⁶⁰ See Reagan, *supra* note 41; See also Smith, II, *Setting Limits*, *supra* note 31.

²⁶¹ See generally SMITH, II, DISTRIBUTIVE JUSTICE, *supra* note 33; George P. Smith, II, *Social Justice and Health Care Management: An Elusive Quest?*, 9 HOUS. J. HEALTH L. & POL'Y 1 (2008).