
An Analytical Framework for Resolving the Issues Raised by the Interaction between Reproductive Technology and the Law of Inheritance

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**AN ANALYTICAL FRAMEWORK FOR RESOLVING
THE ISSUES RAISED BY THE INTERACTION
BETWEEN REPRODUCTIVE TECHNOLOGY
AND THE LAW OF INHERITANCE**

*James E. Bailey**

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Imagine a man fathering a child or 100 children a century after his death. Sound preposterous? Think again.¹

INTRODUCTION

A. *The Challenge of Technology*

Perhaps the most important area of legal inquiry today is the interaction between law and technology, for it is at this point that law either becomes a tool for shaping the future or an obsolete inconvenience circumvented by increasing technological innovation. The need to address the many aspects of that interaction is made all the more urgent when one considers the nature of that technological development as an autocatalytic process in which the rate of advance increases because the process stimulates itself.² The speed of that technological change impels increasingly rapid social change and thereby pressures social institutions to change just as rapidly. By nature and design, though, law is the social institution most resistant to rapid change; yet, the pressure of technologically driven social change can be seen in many areas of law. One area in which the impact of technological change on the law demonstrates the potential of both adaptation and obsolescence is in the effect of advances in reproduc-

1. Michael D. Lemonick, *The Sperm that Never Dies*, TIME, June 10, 1996, at 69 (discussing the successes of scientific teams at the University of Pennsylvania and the University of Texas Southwestern Medical Center in freezing and thawing spermatological stem cells).

2. JARED DIAMOND, GUNS, GERMS, AND STEEL 258-59 (1997).

tive technology on the law of inheritance. The 50,000 year-long era³ in which one could safely assume that a person's heirs could be numbered ended in 1953 when the technology for freezing sperm first permitted the possibility of the conception of biological offspring long after the death of the biological father.⁴ Current reproductive technology however has moved far beyond the ability to freeze gametes; today the fertilized egg, a zygote, can be frozen, stored, thawed, implanted and brought to term years, perhaps decades, after *both* biological parents have died.⁵ Beyond this, a single zygote can be divided numerous times, creating a theoretically unlimited number of identical offspring. Indeed, scientists at the University of Pennsylvania and the University of Texas Southwestern Medical Center recently discovered a method for freezing spermatological stem cells, thereby raising the possibility of thawing, duplicating and implanting sperm cells for a century or more.⁶ Where once the law of inheritance could rationally account for posthumously born children by allowing a presumption of paternity of children born to the decedent's wife within approximately 10 months of the decedent's death,⁷ that acknowledgment of an occasionally occurring biological possibility has been rendered almost quaint and disturbingly arbitrary in an age in which children may be born decades after both genetic parents have died. The development of modern reproductive technology and its widespread availability present an important challenge to the law of inheritance: change with technology or pass into obsolescence.

Though law has traditionally and typically been a reactive social institution, the rapid social changes brought about by new technology are pressing the social institution of law to be more proactive.⁸ The application of that technology makes clear that a useful method for

3. The length of the era suggested here is based on the origins of modern humans and modern human society as evidenced in Cro-Magnon settlements in Europe. It is generally accepted that Cro-Magnon humans understood the connection between sex and reproduction as well as the finality of death. Therefore, an understanding that an individual's offspring could, at some point, be definitively ascertained had to have arisen at least as late as the origins of Cro-Magnon humans, approximately 30,000 to 40,000 years ago. See *THE COLUMBIA HISTORY OF THE WORLD* 36-45 (John A. Garraty & Peter Gay eds., 1972).

4. Jeffrey Kluger, *Eggs on the Rocks*, *TIME*, Oct. 27, 1997, at 105 (discussing advances in cryopreservation technology that, in addition to freezing zygotes, now allow eggs to be frozen for later union with sperm).

5. See generally *id.* (discussing scientists' ability to freeze eggs for future implantation into a woman's uterus).

6. Lemonick, *supra* note 1, at 69.

7. See *infra* notes 210-218 and accompanying text.

8. Harvesting sperm from dead men is merely the latest twist on a century-old practice with which law and regulation have yet to grapple fully. It is often said that law and ethics, like some kind of wayward children, lag behind stunning advances in biomedical technology. Jeff Stryker,

considering the questions of the inheritance status of children born from frozen gametes and zygotes is already overdue.

B. Threshold Issues

Though lacking widespread application, the use of technology to extend reproductive capabilities is not a recent phenomenon. Arab tribesmen purportedly used artificial insemination as early as the fourteenth century, clandestinely diluting the gene pool of their enemies' horses.⁹ The earliest reported successful¹⁰ use of the technology on humans occurred in 1884 in the United States when a female medical student was artificially inseminated with sperm from the best-looking male in the class.¹¹ Modern, widespread application of technological advances in human reproduction, though, probably began during the early days of the United States space program. In 1962, Mercury astronauts had their sperm frozen for future use in case exposure to cosmic radiation while in orbit rendered them sterile.¹² As this Article explains, reproductive technology has progressed considerably since the days of the Mercury space program.

While the legal rights of *children* have developed over millennia, advances in reproductive technology now require examination of the issues surrounding every stage of reproduction *prior to birth*. The genetic material that eventually develops into a child can be divided into

Conceiving Justice: From Which Dead Men and for Which Survivors Should Sperm Be Harvested?, RECORDER, March 31, 1995 at 6.

In one sense, the capacity of the technology has simply outstripped society's ability and willingness to examine the ethical and legal ramifications of all this. Scott Armstrong, *Baby-Making in the Lab: Ethics and Law Need to Catch Up with Science*, CHRISTIAN SCI. MONITOR, June 26, 1984, at 21-22 (quoting Arthur Caplan, an associate at the Hastings Center, a New York institute dealing with ethical problems in healthcare).

9. RUSSELL SCOTT, *THE BODY AS PROPERTY* 198 (1981). The alleged practice involved secretly depositing into the vaginas of enemy mares cloths soaked with semen from inferior stallions. *Id.* As intriguing as this example may seem, the logistics of such an operation raise serious doubts as to its frequency if not its likelihood. Nonetheless, similar accounts are found elsewhere. See, e.g., Carolyn Sappideen, *Life After Death Sperm Banks, Wills and Perpetuities*, 53 AUSTRALIAN L.J. 311, 311 (1979) (referring to 15th century Arab tribes).

10. SCOTT, *supra*, note 9, at 198. Reportedly John Hunter, a Scottish surgeon, unsuccessfully attempted to artificially inseminate women in the late 18th century. *Id.*

11. Peggy Orenstein, *Looking for a Donor to Call Dad*, N.Y. TIMES, June 18, 1995, § 6 (Magazine), at 28, 31. Purportedly the artificial insemination involved a couple in Philadelphia in 1884. *Id.* After the couple consulted a physician about their infertility, the woman was anesthetized and unknowingly inseminated with above-described donor's sperm. *Id.* Other accounts report that the eyewitness to this procedure was later disputed, thereby raising the possibility that the story is a fabrication. See Daniel Wikler & Norma J. Wikler, *Turkey-Baster Babies: The Demedicalization of Artificial Insemination*, 69 MILBANK Q. 5, 5 (1991).

12. Andrea Mitchell Siegel, *Legal Resolution to the Frozen Embryo Dilemma*, 4 J. PHARMACY & LAW 43, 46 (1994).

five types based on the characteristics of development: gametes (eggs and sperm), zygotes (single-cell, fertilized eggs), preembryos (four-to-eight cell zygotes), embryos (the stage at which cell differentiation develops) and fetuses.¹³ Immediately, a significant threshold along this continuum can be discerned. Gametes by themselves are not capable of developing into human beings; zygotes, preembryos, embryos and fetuses are. Whether this biological distinction should lead to a legal distinction is discussed below.¹⁴ Unless otherwise specifically noted, however, this Article does not distinguish between zygotes, preembryos or embryos—while all of these phases have the inherent biological potential to develop into a child, none have yet been judicially recognized as legally equivalent to a fetus, the phase which has already been the subject of considerable legal analysis. Also, rather than covering the well-traveled territory of legal issues involving fetuses, this Article addresses only those legal issues involving gametes, zygotes, preembryos and embryos which remain legally as well as biologically distinct from fetuses.¹⁵

C. *The Approach of This Analysis*

This Article attempts to provide an analytical framework for resolving the issues resulting from the interaction between advances in reproductive technology and the law of inheritance. In providing that framework this Article critically examines several judicial efforts to address the issues while presenting the foundation for effective analysis of the numerous issues raised by this particular confluence of law and technology. Further, in an effort to be immediately useful, the analysis focuses on existing jurisprudence and legal theory rather than proposing legislation, the eventual applicability of which would depend on the vagaries of the political processes of future state legislatures. By grounding the analysis in established legal principles rather than potential legislation, it is hoped that this analytical framework will be directly useful to courts called on to examine these issues.

13. *Id.*; Cynthia Reilly, *Constitutional Limits on New Mexico's In Vitro Fertilization Law*, 24 N.M. L. REV. 125, 125 (1994). This list includes only the stages which technology currently affects. Consideration of how the law will treat future technological developments that would enable such things as cloning (*i.e.*, developing humans from a single cell), while deserving of consideration in its own right, is outside the scope of this article.

14. See *infra* notes 317-319 and accompanying text.

15. A technical description of the process of cryopreservation is contained in the Appendix to this Article. While the technical process itself raises no legal issues, the Appendix is provided for the sake of demonstrating the juxtaposition of cutting-edge medical techniques and an area of law that has remained free of radical change since feudal times.

The analysis that follows is divided into two main sections. The first of these examines the threshold question of whether gametes, zygotes, preembryos and embryos may be bequeathed. Answering that question requires an examination of existing jurisprudence, the fundamental nature of these items and federal constitutional issues. The second major section examines the effects of allowing these items to be bequeathed and describes how the attendant issues of filiation, pretermission, testate and intestate succession, and the Rule Against Perpetuities should be analyzed. The Article concludes with a brief consideration of the difficulties inherent in attempting legislative solutions.

I. MAY GAMETES, ZYGOTES, PREEMBRYOS AND EMBRYOS BE BEQUEATHED?

A. *The Flawed Analysis in Hecht*

Before one can address the issue of inheritance rights of children born as a result of reproductive technology, one must first determine the immediate legal ramifications of bequeathing gametes, zygotes, preembryos and embryos. Indeed, the first question is whether these items may be bequeathed at all. *Hecht v. Superior Court of Los Angeles County*,¹⁶ is the first and, so far, only case which has addressed the question of whether *gametes* may be bequeathed and inherited.¹⁷ The essential facts of the case can be stated concisely. William E. Kane's will stated: "I bequeath all right, title, and interest that I may have in any specimens of my sperm stored with any sperm bank or similar facility for storage to Deborah Ellen Hecht."¹⁸ Subsequent provisions in Kane's will made it clear that he hoped Hecht would use the sperm to impregnate herself.¹⁹ Kane's two adult children each filed separate

16. 20 Cal. Rptr. 2d 275 (Ct. App. 1993).

17. *Id.* at 283-84. Because the *Hecht* case involved a bequest of sperm, it is logical that its reasoning would also apply to eggs, there being no logical or scientific reason to distinguish between the two types of gametes. However, in 1995, Scottish scientists announced that they had found the first known human to develop from an unfertilized egg. *First Human from Unfertilized Egg is Found*, USA TODAY, Sept. 29, 1995, at D11. Normally, a fertilized egg, containing genes from mom and dad, splits into two, then four, then eight and so on. The egg in question was fertilized eventually by a tardy sperm, but apparently it began the process of splitting and multiplying before dad showed up. *Id.* "[T]he delay [in fertilization] was enough to keep the father's genes from reaching all the baby's cells." *Id.* Nonetheless, the rarity of this occurrence militates against a legal distinction between the two types of gametes.

The *Hecht* opinion does not address inheritance of zygotes or embryos. Given the significant biological differences between gametes and fertilized eggs, the *Hecht* rationale is not necessarily applicable to bequests of either zygotes or embryos.

18. *Hecht*, 20 Cal. Rptr. 2d at 276.

19. *Id.* at 277.

will contests.²⁰ Shortly thereafter the parties concluded a settlement agreement²¹ which later gave rise to a second disputed settlement agreement.²² Litigation over the second settlement agreement raised the issue of whether Kane's sperm was legally subject to the probate court's jurisdiction (*i.e.*, whether it was actually part of his estate and therefore covered by the settlement agreements which referred to the division of that estate).²³

After considering arguments from each side, the trial court ordered the sperm destroyed as requested by Kane's children.²⁴ The California Court of Appeals reversed, ruling that the trial court abused its discretion in ordering destruction of the sperm.²⁵ Before it could make such a ruling though, the court first had to decide whether the probate court had jurisdiction over the sperm, given the probate court's limited jurisdiction.²⁶ In concluding that the sperm was subject to the jurisdiction of the trial court, the court of appeals held that the sperm was part of Kane's probate estate.²⁷ An analysis of the court of appeals' reasoning leading to that conclusion reveals how difficult resolving the legal problems created by new technology can be. The court of appeals first noted that probate court jurisdiction is limited to property of the decedent.²⁸ Thus, for the trial court to have authority over Kane's sperm, the sperm had to be the property of Kane's estate.²⁹ After stating that probate jurisdiction is based on "property,"³⁰ the court found itself confronting one of the most vexing questions in

20. *Id.*

21. *Id.* The agreement stated, *inter alia*, after payment of all specific bequests, debts and obligations that sums in excess of \$190,000 net available for distribution be distributed 20% to Hecht and 40% each to Kane's two children. *Id.*

22. *Id.* at 278.

23. *Id.* at 278-83.

24. *Id.* at 279. The trial court made this ruling without offering any rationale and apparently did so merely to put the question squarely before the court of appeals. When Hecht's counsel asked for the legal basis of the ruling the trial court stated, "It really does not matter, does it? If I am right, I am right and if I am wrong, I am wrong. As you know, I am persuaded by the arguments in the moving papers. This is something that is going to have to be decided by the appellate courts. Let's get a decision." *Id.* Before ruling, the court also stated, "Obviously we are all agreed that we are forging new frontiers because science has run ahead of common law. And we have got to have some sort of appellate decision telling us what rights are in these uncharted territories." *Id.* at 279 n.3.

25. *Id.* at 291.

26. *Id.* at 280-81.

27. *Id.* at 281. The court of appeals explicitly stated that it was not ruling on the validity of Kane's will or the settlement agreements. *Id.* at 284.

28. *Id.* at 280.

29. *Id.* The court noted that the argument of Kane's children that Kane had no ownership or possessory interest in his sperm once it left his body was self-defeating "because the sperm would not constitute part of Kane's estate and the probate court would not have jurisdiction over its disposition." *Id.* at 280-81.

all of law—what is property? The court of appeals avoided answering this question itself by relying on section 62 of the California Probate Code which provides a redundant and circular definition that property is: “[A]nything that may be the subject of ownership and includes both real and personal property and any interest therein.”³¹ Unfortunately, though the court acknowledged this to be a “broad definition of property,”³² that definition fails to help the larger analysis since it provides no guidance as to whether gametic material can be personal property. In fact, as discussed below, this definition actually led the court into a flawed analysis.

Undeterred by the circular definition of property in the California Probate Code, the *Hecht* court then began an analysis into the nature of rights in semen.³³ First, the court reasoned that the California Supreme Court holding in *Moore v. Regents of University of California*³⁴ did not mandate a holding that Kane had no property interest in his sperm.³⁵ In fact, the court noted that *Moore* actually supported a holding that “the Legislature did not intend Health and Safety Code section 7054.4 to resolve the issue of the ‘property’ rights retained by the donor of sperm, let alone the issue of insemination with the sperm of a deceased donor.”³⁶ The court then provided a lengthy recitation of the discussion in *Davis v. Davis*³⁷ (a Tennessee divorce case which involved a dispute over possession of frozen preembryos),³⁸ before abruptly concluding that Kane had “an interest, in the nature of ownership, . . . [in his sperm] sufficient to constitute ‘property’ within the meaning of Probate Code section 62.”³⁹

While it is true that accepting this argument would result in a reversal of the trial court’s ruling on the basis of lack of subject matter jurisdiction, it is not at all true that it would ultimately be self-defeating for Kane’s children’s position. However, accepting their argument would present the court with a very difficult question: if Kane did not retain an ownership or possessory interest in the sperm once it left his body, then who, if anyone, has that interest?

Resolution of that question though is not necessary if one concludes, as the court ultimately did in *Hecht*, that Kane did retain an ownership or possessory interest in his sperm when he deposited it with California Cryobank. *Id.* at 283.

30. *Id.* at 281.

31. *Id.* Thus, the definition relied on by the probate code and the court of appeal can be stated more concisely: “property is property.”

32. *Id.*

33. *Id.* at 281-84.

34. 793 P.2d 479 (Cal. 1990).

35. *Hecht*, 20 Cal. Rptr. 2d at 281 (citing *Moore v. Regents of University of California*, 793 P.2d 479 (Cal. 1990)).

36. *Id.*

37. 842 S.W.2d 588, 589 (Tenn. 1992), *cert. denied sub nom.* *Stowe v. Davis*, 507 U.S. 911 (1993).

38. *Id.* at 588-97; see *infra* text accompanying notes 112-137.

39. *Hecht*, 20 Cal. Rptr. 2d at 283.

Unfortunately, the reasoning of the *Hecht* court is seriously flawed. First, the *Davis* case is not relevant to the issue of whether *sperm* should be considered property. *Davis* involved litigation over which spouse should be awarded custody of several frozen preembryos.⁴⁰ Mrs. Davis wanted them for future implantation;⁴¹ Mr. Davis wanted them in order to prevent future unwanted fatherhood.⁴² In fact, the *Davis* court refused to classify the preembryos as property.⁴³ Thus, the *Hecht* court's summary of the *Davis* case was nothing more than an interesting but irrelevant aside that served only to obscure the fact that the *Hecht* court did not provide any reason why Kane's sperm should be considered property of his estate. The court noted that "at the time of his death, decedent had an interest, in the nature of ownership, to the extent that he had decision making authority as to the sperm within the scope of policy set by law."⁴⁴ The court did not explain what it meant by the phrase "within the scope of policy set by law" but simply cited the *Davis* case as authority for the statement.⁴⁵ The *Hecht* court then concluded that Kane's interest was "in the nature of ownership . . . [which was] sufficient to constitute 'property.'"⁴⁶

Despite basing its entire rationale on Kane's decision making authority regarding the sperm, the *Hecht* court did not discuss the source of that authority. Perhaps worse, the court's reasoning that Kane's authority was "in the nature of ownership," and that this was sufficient to constitute "property" under the Probate Code was a non-sequitur. The California Probate Code states that property is "anything that may be the subject of ownership"⁴⁷; it does not state that property is anything that can be subject to an interest *in the nature* of ownership. Thus, the *Hecht* court based its rationale on decision making authority that the decedent was not shown to possess which was then elliptically declared to be equivalent to a circular definition of property.

In approaching the issue this way, the court avoided the difficult task of defining "property." The California Probate Code's definition, even if one ignores its improper use of the term to be defined in the

40. *Davis*, 842 S.W.2d at 589.

41. *Id.*

42. *Id.*

43. *Id.* at 597.

44. *Hecht*, 20 Cal. Rptr. 2d at 281.

45. *Id.* This cryptic phrase, used by the court in *Hecht*, is almost identical to language used by the *Davis* court. *Davis*, 842 S.W.2d at 597. Unfortunately, the *Davis* court did not explain this phrase either.

46. *Hecht*, 20 Cal. Rptr. 2d at 283.

47. CAL. PROB. CODE § 62 (West 1996).

definition, is not helpful because it amounts to a tautology: property is anything that can be owned. The next logical question is of course: "what can be owned?" Answer: property.⁴⁸

The difficulty in adequately defining the fundamental concept of property is no doubt why the *Hecht* court relied on the inadequate definition of "property" in the California Probate Code; however, the *Hecht* court grossly erred in the way it applied that definition. By examining whether sperm can be property (*i.e.*, something that can be owned), the court improperly conflated the concept of *property* and the concept of *ownership*. This explains why, in attempting to answer whether sperm can be property, the *Hecht* court relied heavily on the *Davis* court's effort to answer the same question regarding preembryos. As a result, the court set itself the Herculean tasks of answering two questions of near-metaphysical proportions: "What is property?" and "Can sperm be property?" Neither question is appropriate and answering them in both the *Davis* and *Hecht* cases was unnecessary.⁴⁹

The *Hecht* court's proper task was to decide whether the sperm was property of (*i.e.*, owned by) Kane's estate. By posing the issue in that manner, one keeps in mind that "property" and "ownership" are often equivalent terms and are applied as conclusions based on an individual's demonstration of control over the item in question. As one commentator has pointed out:

[U]sing terms such as "ownership" or "property" [to describe embryos] risks misunderstanding. Ownership does not signify that embryos may be treated *in all respects* like other property. Rather, the term merely designates who decides which legally available options will occur, such as creation, freezing, discard, donation, use in research, and placement in a uterus. Although the bundle of property rights attached to one's ownership of an embryo may be more cir-

48. While this begins to sound like the Abbott and Costello "Who's on first?" routine, defining property without being circular or resorting to tautology has proven to be very difficult. Property has been called "one of the broadest terms known in the law" and is usually described in terms of various rights of control. *Wells Labberton v. General Cas. Co. of America*, 332 P.2d 250, 255 (Wash. 1958) (quoting *Thorrez S. Maes Mfg. Co. v. American Cent. Ins. Co.*, 32 F. Supp. 110, 114 (E.D. Mich. 1939)); see also STEPHEN R. MUNZER, *A THEORY OF PROPERTY* 22-27 (1990) (characterizing property as the relation between things and rights); Bonnie Steinbock, *Sperm as Property*, 62 *STAN. L. & POL'Y REV.* 57, 60-62 (1995) (discussing commentators who define property as stemming from dispositional rights to interests in reference to the interests of others).

49. The question of "what is property?" is considered *infra* in the text accompanying footnotes 72-77.

cumscripted than for other things, it is an ownership or property interest nonetheless.⁵⁰

Asking the question of whether sperm is a "thing that can be owned" actually requires the court to determine if sperm has a legally recognized *existence*. While appropriate for rights that have no physical existence, asking this question in relation to something with physical existence is absurd.⁵¹ There is no question that sperm, having physical existence, is susceptible of ownership and therefore can be property; the appropriate question is "*whose* property is it?" Thus, the proper starting place for the analysis regarding Kane's sperm is: did he have a legal right of authority over it such that it was *his* property?

The correct analysis should proceed as follows: (1) Does the object in question exist? (2) If so, then is it susceptible of ownership? (*i.e.*, can it be reduced to someone's control or possession?); (3) Who has possession of the object? (whoever has possession is presumed to own the object unless there is contrary evidence); (4) If a conflicting claim of control exists beyond that arising from the fact of possession, then what is the nature or degree of that claim of control? In every analysis of ownership, at some point a level of control is recognized such that the object is declared the property of an individual. Applying the foregoing analysis to the *Hecht* case, the first two questions are answered in the affirmative. The third question is also easily answered: "California Cryobank, Inc. possessed the sperm." Failing to answer the fourth question is where the *Hecht* court faltered. Although the *Hecht* court implicitly recognized some conflicting claims of control between Kane's estate and California Cryobank, Inc., the court did not explore the strength of those conflicting claims.

Without a conflicting claim of control, California Cryobank's possession of the sperm would give rise to a presumption of ownership (*i.e.*, California Cryobank alone would have the right to decide what to do with the sperm). However, the court ruled that at the time of his death Kane retained some decision making authority regarding his sperm stored at Cryobank.⁵² Presumably the court found this authority in the contractual relationship he had with California Cryobank.⁵³ The Specimen Storage Agreement signed by Kane stated that in the

50. JOHN A. ROBERTSON, CHILDREN OF CHOICE: FREEDOM AND THE NEW REPRODUCTIVE TECHNOLOGIES 104 (1994) (emphasis added.).

51. "The concept of 'property' in the law is extremely broad and abstract. The legal definition of 'property' most often refers not to a particular physical object, but rather to the legal bundle of rights recognized in that object." *Brotherton v. Cleveland*, 923 F.2d 477, 481 (6th Cir. 1991).

52. *Hecht v. Kane*, 20 Cal. Rptr. 2d 275, 281 (1993).

53. This must be presumed because the court does not explicitly state this.

event of his death, California Cryobank was to follow the instructions of the executor of Kane's estate regarding continued storage or release of the sperm.⁵⁴ What is important to note here is that by giving decision making authority to the executor of Kane's estate, the executor *as an individual* was given decision making authority over the sperm. A subsequent provision in the agreement authorized Cryobank to release the sperm to Hecht and Kane's physician, but this provision did not *require* Cryobank to make such a release.⁵⁵ Kane's will stated that he bequeathed "all right, title and interest that I may have in any specimens of my sperm stored with any sperm bank or similar facility for storage to Deborah Ellen Hecht."⁵⁶ These facts indicate three potential claimants to ownership of the sperm: Cryobank (by virtue of possession), the executor of Kane's estate (by virtue of the Specimen Storage Agreement), and Kane's estate (by virtue of Kane's decision making authority over the sperm when he died). An examination of the strengths of those claims is necessary to determine whether the sperm was property of Kane's estate and therefore subject to the probate court's jurisdiction.

According to the terms of the Specimen Storage Agreement, Cryobank ceded all control over the sperm following Kane's death to the executor of Kane's estate.⁵⁷ By relinquishing this control, Cryobank relinquished any possible claim of ownership to the sperm upon Kane's death. Therefore, only two possible claimants to ownership of the sperm remained: the executor of Kane's estate and Kane's estate itself. In comparing the strengths of these claims it is important to note that the Specimen Storage Agreement did not purport to retain any decision making control in favor of Kane himself—the Agreement expressly gave that authority to the executor of Kane's estate. Further, no facts indicating that Kane himself retained personal decision making authority over the sperm are mentioned in the court's decision. If Kane did not have such authority at the time of his death, then his estate had no such right. Therefore, even though Kane's will stated that he bequeathed whatever interest in the specimens he had to Hecht, Kane was apparently not bequeathing any interest in the sperm because he did not have any interest to bequeath. Based on the

54. *Hecht*, 20 Cal. Rptr. 2d at 276. "In the event of the death of the client [William E. Kane], the client instructs the Cryobank to . . . [c]ontinue to store [the specimens] upon request of the executor of the estate [or] [r]elease the specimens to the executor of the estate." *Id.*

55. *Id.* "I, William Everett Kane, . . . authorize the [sperm bank] to release my semen specimens (vials) to Deborah Ellen Hecht. I am also authorizing specimens to be released to recipient's physician Dr. Kathryn Moyer." *Id.*

56. *Id.*

57. *Id.*

facts described in the court of appeals' opinion, the only party with any claim to ownership of the sperm was the executor of Kane's estate.⁵⁸ This means that the probate court did *not* have jurisdiction over the vials of sperm because they were neither part of nor controlled by Kane's estate.⁵⁹

Since the proper analysis of the situation in *Hecht* leads to the conclusion that Kane's sperm was not part of his estate, the question of whether gametes may be bequeathed has still not been properly addressed by any court. Therefore, before the issues surrounding inheritance rights of children born as a result of advances in reproductive technology can be examined, it is necessary to determine whether the gametes, zygotes, preembryos, and embryos may be bequeathed and inherited.

B. What May Be Bequeathed

To answer the question of whether gametes, zygotes, preembryos and embryos may be bequeathed we must first examine the existing general structure of probate law regarding what may be bequeathed.

58. As the court noted, it is unclear whether Kane was referring to Hecht when he used the term "executor" in the agreement with Cryobank even though he named Hecht as executor of his estate. The complicating fact is that, for reasons not in the record on appeal, Hecht did not become the executor of the estate. *Id.* n.1.

Ultimately, perhaps the correct resolution would have been that Hecht was entitled to possession of the sperm by virtue of her being named the executor or by virtue of the settlement agreements signed while the estate was in probate, but that analysis is irrelevant to the issue of whether the sperm was part of Kane's estate.

59. Thus, the probate court did not have jurisdiction to order the sperm destroyed. However, because the court of appeals ruled that the probate court *did* have jurisdiction but abused its discretion in ordering the sperm destroyed, *id.*, the immediate practical effect is the same.

Yet, the ultimate effect may have been quite different. A ruling by the court of appeals that the executor as an individual owned the sperm would have required an inquiry into to whom the Specimen Agreement was referring by the term "executor." Without exploring in depth what is now a tangential issue, it appears that Kane was referring to Hecht by this term. If this is so, then the general references to Kane's estate used in the settlement agreements signed by Hecht and Kane's children would not have included the vials of sperm because these would not have been part of Kane's estate because they would have already been given to Hecht before Kane's death via the Specimen Agreement. In short, the proper analysis would have resulted in Hecht receiving all 15 vials of sperm rather than the five she received when the probate court applied the terms of the settlement agreements. Because Hecht's goal (and Kane's wish) was that she be impregnated with Kane's sperm, the practical difference between her having 15 vials as opposed to five could be considerable.

1. *Are Gametes, Zygotes, Preembryos and Embryos "Property"?*

Since modern probate law allows property to be bequeathed,⁶⁰ the first question to be answered is whether gametes, zygotes, preembryos and embryos are "property." Only one court has based a decision on the assumption that any of these items is property;⁶¹ however, as the following analysis demonstrates, the opinion is more interesting for what it avoided than for what it considered.

In *York v. Jones*,⁶² the plaintiffs, "the progenitors of the cryopreserved human pre-zygote,"⁶³ sought the release of their frozen zygote from the facility where the zygote was stored, the Howard and Georgeanna Jones Institute for Reproductive Medicine (the "Jones Institute").⁶⁴ The Yorks wanted the zygote transferred to a similar facility in California.⁶⁵ The Jones Institute refused, citing the contract signed by the Yorks.⁶⁶ Although the *York* court never specifically held that the zygote was property, that the court assumed this to be the case is clear from the related legal conclusions in the opinion. First, the court held that the contract between the Yorks and the Jones Institute was a contract of bailment with regard to the zygote.⁶⁷ In reaching this conclusion, the court stated, "The obligation to return *the property* is implied from the fact of lawful possession of the personal property of another."⁶⁸ The court rested its conclusion of a contract of bailment in part on the Jones Institute's consistent reference to the zygote as "property."⁶⁹ The court rejected the Jones Institute's

60. *Hodel v. Irving*, 481 U.S. 704 (1987). While the authority of the state and federal governments to control the laws of testamentary disposition and inheritance is clear, the United States Supreme Court in *Hodel v. Irving* observed that, "[i]n one form or another, the right to pass on property . . . has been part of the Anglo-American legal system since feudal times. . . . Even the United States [defendant herein] concedes that total abrogation of the right to pass property is unprecedented and likely unconstitutional." *Id.* at 716.

61. *York v. Jones*, 717 F. Supp. 421 (E.D. Va. 1989).

62. 717 F. Supp. 421 (E.D. Va. 1989).

63. *Id.* at 422. The court's opinion uses the term "pre-zygote" apparently because the Yorks signed a document entitled "Informed Consent: Human Pre-Zygotes Cryopreservation." *Id.* at 424. Later in the opinion the court refers to the item as an embryo. *Id.* In fact neither term is correct. As explained earlier, a fertilized egg (as in the *York* case) is a zygote. An embryo is the term applied to the collection of cells which have begun to demonstrate cell differentiation. The term "pre-zygote" may have been intended to distinguish between implanted zygotes and pre-implanted zygotes, but in any event still refers to a fertilized egg and therefore a zygote.

For the sake of consistent use of correct medical terminology, the term "zygote" will be used in the following discussion of the *York* case.

64. *Id.*

65. *Id.*

66. *Id.* at 425.

67. *Id.*

68. *Id.* (emphasis added.)

69. *Id.*

argument that the Yorks' property interest in the zygote was limited by Virginia's Human Research statute,⁷⁰ but the court did not reject the Jones Institute's characterization of the zygote as property. Indeed, the court later recognized the Yorks' claim of detinue, holding that the requisite elements of detinue had been established under Virginia law: "(1) plaintiff must have a *property* interest in the thing sought to be recovered; . . . (3) the *property* is capable of identification; (4) the *property* must be of some value."⁷¹ The court then added "if the *property* is in the possession of a bailee, an action in detinue accrues upon demand and refusal to return the *property*."⁷²

Although the assumption that the York zygote was property is interesting, perhaps the most interesting aspect of the *York* case is what the court did not address. First, as noted above, the court did not directly address the issue of whether the zygote was properly classified as property, opting instead to accept that this was the correct approach without examination of it. Second, the court did not question the validity of the contract between the Yorks and the Jones Institute, but simply applied the terms of the contract as written rather than examine whether the contract was enforceable in the first place. Yet consideration of both of these issues is critical to the proper analysis, for if the zygotes are not property, then obviously they cannot be the subject of a contract. Thus, as was true in the *Hecht* case, the proper analysis must begin with a determination of what is property.

While defining "property" has often proven to be a difficult task for judges and commentators alike, the most accurate considerations of the question have recognized that the term "property" does not refer to things, but the relationship between those things and people.⁷³ For example, the definition of property found in Black's Law Dictionary, "The word [property] is . . . commonly used to denote everything which is the subject of ownership,"⁷⁴ is of little utility because it does not describe the relationship implicit in the term "ownership." The term "ownership" refers to the degree of control one has over something. When an individual demonstrates a sufficient degree of control over something, the law deems the individual to "own" that thing; it is deemed to be the individual's "property." Thus, consideration of "what is property?" starts with a simple answer: everything with physi-

70. *Id.* at 426.

71. *Id.* at 427 (emphasis added).

72. *Id.* (emphasis added).

73. See *supra* note 51.

74. BLACK'S LAW DICTIONARY 1216 (6th ed. 1990) (citing discussion in *Wells Labberton v. General Casualty Co. of America*, 332 P.2d 250, 252, 254 (Wash. 1958)).

cal existence is property.⁷⁵ At this point, there is no legal aspect to the inquiry since the fact of existence is at issue. The next question though is purely legal: "what is susceptible of ownership?" Here society has placed restrictions. For example, while the sun has physical existence, and therefore is property, no one may own it. The reason is simple: the law does not recognize ownership in any item that cannot be placed under anyone's physical control or custody. Thus, the sun is property which is not susceptible of ownership.

The category of things which are susceptible of ownership is itself divided into two categories. The first category is comprised of those things which are susceptible of ownership (*i.e.*, can be placed under one's control) but which the law says *may not* be owned, as is the case with the prohibition against ownership of human beings.⁷⁶ The complementary category is comprised of things susceptible of ownership which *may* be owned. This category contains all things not specifically removed from it by law (see Chart 1).⁷⁷ Thus human genetic material initially appears to be property that may be owned because no law prohibits its ownership.⁷⁸ Nonetheless, the questions presented by the analysis at hand (whether gametes, zygotes, preembryos and embryos may be owned, and if owned, may they be bequeathed) must be considered in greater depth.

There is no question that gametes, zygotes, preembryos and embryos are "property" because they have physical existence. Similarly, there is no question that they are susceptible of ownership because someone always exercises control over them either by possession or by the authority to decide what is to be done with them. Indeed, no

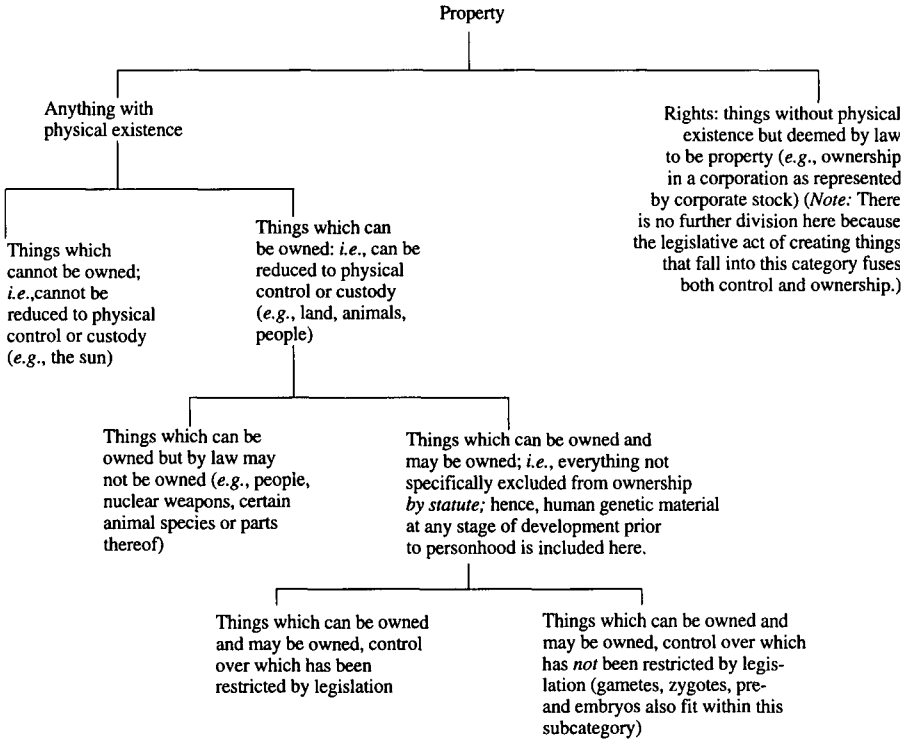
75. Many commentators have spent considerable time describing what constitutes *ownership* as though ownership is equivalent to the concept of property. See, e.g., Bonnie Steinbock, *Sperm as Property*, 62 STAN. L. & POL'Y REV., 57, 60-62 (1995). However, while it is not possible to have ownership without property, it is possible for property to exist without ownership. *Id.*

76. It is probably more accurate to say that a living human being cannot be sold. Presumably, everyone "owns" his or her own body (the extent of control one has over it is indistinguishable from that control one has over other objects), but one is not permitted to transfer that ownership while alive. The fact of being alive is critical, because transfer of body ownership after death results whenever the deceased has left instructions donating his or her body for research or educational purposes.

77. See *infra* Tables 1(A), 1(B). For the sake of completeness, this category can be further sub-divided into categories of property which may be owned but which are regulated by limiting the amount of control the owner may exercise over the property. However, aside from very general jurisprudential rules such as those prohibiting creation of a nuisance, restricting an owner's degree of control is a *legislative* act.

78. Whether human genetic material (regardless of its developmental stage) should be removed from the "may be owned" category is a philosophical and theological issue. Neither medically nor legally are gametes, zygotes, preembryos, or embryos equivalent to "people." Whether society should define them as "people" or place them in the "may not own" category is beside the point—they are currently *not* in that category.

CHART 1
ILLUSTRATION OF THE FRAMEWORK FOR
ANALYZING THE NATURE OF HUMAN
GENETIC MATERIAL



one has questioned whether the donation of sperm or eggs to various facilities by a living donor is a transfer of ownership of property, and currently, there is no legal prohibition to ownership of these items.

In fact, when the issue of ownership has been raised, courts have consistently recognized property rights involving individual parts of one's body. For example, in *United States v. Garber*,⁷⁹ the Internal Revenue Service sought a ruling that the defendant owed taxes on income received from the sale of her blood.⁸⁰ The Fifth Circuit rejected the defendant's argument that sale of her blood plasma was merely a conversion of a capital asset into cash and therefore generated no income: "[B]lood plasma, like a chicken's eggs, a sheep's wool, or like any salable part of the human body, is tangible property

79. 607 F.2d 92 (5th Cir. 1979).

80. *Id.* at 93-94.

which in this case commanded a selling price dependent on its value.”⁸¹ The most widely discussed case regarding property interest in body tissue is *Moore v. Regents of University of California*,⁸² in which the California Supreme Court held that the plaintiff did not retain a property interest in tissue removed from his body.⁸³ However, the crucial fact in the California Supreme Court’s analysis was that Moore’s expectation of *continued* ownership interest in his cells was specifically restricted by statute.⁸⁴ Obviously, the court’s discussion of whether Moore *retained* an ownership interest in the removed tissue implied that Moore did have a property interest in that tissue *before* it was removed. The implication of such cases is that all human biological products, including genetic material, must first be assumed to be susceptible of ownership.

The correctness of this assumption is evidenced by the fact that the practice of harvesting reproductive material from the deceased is evidently occurring without legal restraint. For instance, in December 1994 in New York, twenty-nine-year old Anthony Baez died.⁸⁵ At the request of Baez’ wife, within twenty-four hours of Baez’ death, Dr. Peter Schlegel, an infertility specialist, harvested sperm from the dead body and placed them in liquid nitrogen storage.⁸⁶ One week after the Baez procedure, a widow in Chicago asked doctors to remove and preserve some of her late husband’s sperm, which they did.⁸⁷ Currently, no statutory or common law impediment to harvesting of sperm exists, and there is little doubt that such acts will increase in frequency.⁸⁸

81. *Id.* at 97. Unfortunately, the court did not elaborate on its reasoning. Moreover, this statement is dictum because the court of appeals reversed Garber’s conviction on other grounds: [B]ecause the district court refused to permit Bierman, the expert for the government, and Nall, the expert for the defense, to testify and because it reserved to itself the job of unriddling the tax law, thus completely obscuring from the jury the most important theory of Garber’s defense—that she could not have willfully evaded a tax if there existed a reasonable doubt in the law that a tax was due—her trial was rendered fundamentally unfair.

Id.

82. 793 P.2d 479 (Cal. 1990).

83. *Id.* at 488.

84. *Id.* at 489.

85. Maggie Gallagher, *About Sperm: The Ultimate Deadbeat Dads*, NEWSDAY, Feb. 1, 1995, at A28, available in LEXIS, News Library, Newsdy File.

86. *Id.*; see also Stryker, *supra* note 8, at 6 (discussing legal and ethical issues associated with the removal of sperm from deceased men).

87. Stryker, *supra* note 8, at 6. For a detailed account of a similar case in Florida, see Laura Muha, *She Lost Her Husband but Saved Their Dream*, REDBOOK, May 1995, at 79.

88. See Myung Oak Kim, *More Women Seek Insemination with Sperm of Dead, Study Finds*, PORTLAND OREGONIAN, May 30, 1997, at A25, available in 1997 WL 4177308. A study by the University of Pennsylvania conducted in 1995 discovered that of 273 fertility clinics surveyed, 82

However, while it is proper to conclude that these items are property susceptible of ownership, this does not mean that they may be bequeathed. While the state may not totally abrogate the ability of an individual to pass property,⁸⁹ the state may restrict how and what may be bequeathed.⁹⁰ Therefore, the next issue is whether gametes, zygotes, preembryos or embryos are or should be restricted or excluded either individually or entirely from the category of things that may be bequeathed. An examination of the law of property and the law of wills reveals that such a restriction would be both unprecedented and contrary to the trend of legal development in these areas.

2. *Restrictions on Bequeathing One's Biological Material*

Consideration of whether there currently exists any theoretical basis for prohibiting the bequeathing of one's own biological material requires examination of possible restrictions regarding bequeathing parts or products of one's body. Other than the English common law rule that no one could own a dead body,⁹¹ there does not appear to be any restriction on the bequeathing of *any* physical thing. Indeed, sev-

reported "requests for postmortem extraction without the man's prior consent between 1980 and 1995. More than half the requests were between June 1994 and July 1995." *Id.*; see also Sue Reid, *Over a Husband's Dead Body*, LONDON TIMES, Oct. 20, 1996, available in LEXIS, Europe Library, Ltimes File (describing several instances of requests and attempts at harvesting and artificial insemination in the United States and Great Britain); cf. Edith M. Lederer, *British Court Denies Woman Use of Late Spouse's Sperm*, PORTLAND OREGONIAN, Oct. 18, 1996, at A6, available in 1996 WL 11395327 (noting that Diane Blood was denied use of her late husband's sperm by the High Court because she did not have his written permission as required by the statutorily authorized Human Fertilization and Embryology Authority).

89. See *United States v. Perkins*, 163 U.S. 625, 627-28 (1895) (holding that the state has the power to impose limitations upon property passed by will—i.e., inheritance tax—but the right to dispose of property by will stands); see also *Hodel v. Irving*, 481 U.S. 704, 715-18 (1987) (discussing escheat statutes as a permissible interference with the laws of devise and descent, but finding that the statute in question "went too far").

90. *Perkins*, 163 U.S. at 628.

91. See, e.g., *Williams v. Williams*, 20 Ch. D. 659, 665 (Ch. 1882) (holding that executors have no property interest in a dead body). Such holdings were consistent with the 18th and 19th century practice in Britain of allowing people to dig up corpses (often within hours of interment) and to sell them to local medical schools for educational dissection. SCOTT, *supra* note 9, at 5. Such actions were not illegal and did not violate any property rights of any party. *Id.* at 6-7. However, the public eventually became sufficiently outraged at the excesses to which this practice gave rise when three men were arrested for befriending lonely or delict people, luring them to their rooms for whiskey, then killing them and selling their bodies to local medical schools. *Id.* at 8-10. Of the three only William Burke was convicted of the murders. *Id.* at 9. He was sentenced to be hanged by the neck until dead and then, fittingly, publicly dissected. *Id.* at 10. Mr. Burke's lasting legacy is to have introduced into the English language the verb "burke": "1. To kill by suffocation or strangulation so as to leave the body intact and suitable for dissection. 2. To suppress quietly." *Id.* A detailed discussion of this and other episodes involving "resurrectionists," as they were called, can be found in *THE BODY AS PROPERTY*. SCOTT, *supra* note 9, at 5-10.

eral courts have recognized various interests associated with the deceased's body that amount to either property rights or their equivalent.⁹² The result is that so many inroads have been made into the common law rule against ownership of a dead body that it is more accurate to say that one *does* inherit a property interest in the deceased's body, subject to certain restrictions.⁹³ The Utah Supreme Court in *Smart v. Moyer*,⁹⁴ in deciding whether a body could be exhumed ten months following burial in order to be cremated as instructed in the deceased's will, concisely summarized the state of the law:

It is our view that the laws relating to wills and the descent of property were not intended to relate to the body of a deceased; and that it forms no part of the "property" of one's estate in the usual sense. . . . Nevertheless, we agree with petitioner's contention that a person has some interest in his body, and the organs thereof, of such a nature that he should be able to make a disposition thereof, which should be recognized and held to be binding after his death, so long as that is done within the limits of reason and decency as related to the accepted customs of mankind.⁹⁵

The court also observed, "It appears that the modern view adopted by a majority of courts that have considered the matter recognize that

The common law rule that a body cannot be owned resulted from ecclesiastical jurisdiction over dead bodies:

[F]rom and after the time of the Norman Conquest and until the nineteenth century, the right of possession and disposition of a dead body was solely the subject of ecclesiastical cognizance The church took the body to itself. It held that a corpse was appropriated by it, by divine service and consecrated burial. The spirit departed to the realms of the supernatural; the body was held by the divine agent to await resurrection [The common law courts were primarily concerned with material considerations surrounding property rights, but] were powerless respecting the body itself, which was solely the subject of ecclesiastic control.

PERCIVAL E. JACKSON, *THE LAW OF CADAVERS AND OF BURIAL AND BURIAL PLACES* 125-27 (2d ed. 1950).

92. See, e.g., *Brotherton v. Cleveland*, 923 F.2d 477, 482 (6th Cir. 1991) (noting that a decision as to whether a widow had a "property interest" in her husband's corneas was unnecessary, because "the aggregate of rights granted by the state of Ohio to Deborah Brotherton rises to the level of a 'legitimate claim of entitlement' in Steven Brotherton's body . . . protected by the due process clause of the Fourteenth Amendment").

93. For example, the deceased's relatives can decide how the body will be disposed of and whether to have an autopsy. E.g., *Everman v. Davis*, 561 N.E.2d 547, 550 (Ohio Ct. App. 1989) (holding family members have a right to the body for purposes of preparation, mourning, and burial; however, they may not have the right to refuse an autopsy if the person died in an unusual manner). Further, the deceased's relatives have the right to sue for wrongful autopsies and mishandling of the body. E.g., *Carney v. Knollwood Cemetery Ass'n*, 514 N.E.2d 430, 436 (Ohio Ct. App. 1986) (holding that descendants of decedent have a cause of action when remains are disturbed).

94. 577 P.2d 108 (Utah 1978).

95. *Id.* at 110 (citations omitted).

there is a property right of some nature [in one's dead body], sometimes referred to as a quasi-property right."⁹⁶ In fact, while courts have refused to recognize a traditional property interest in the deceased's body,⁹⁷ several courts have recognized that relatives of the deceased also have some kind of property interest in the deceased's body.⁹⁸ As the court in *Brotherton v. Cleveland*⁹⁹ correctly pointed out, the common law has been steadily moving toward a recognition of the next of kin's quasi-property rights in the deceased's body.¹⁰⁰ Absent issues of public interest,¹⁰¹ there would appear to be no reason against following the deceased's wishes regarding the deceased's remains.

Ultimately, deciding issues of control does not properly turn on whether the deceased's body or its products are *labeled* "property" or whether one's rights are *labeled* "property rights"; what matters is that courts examine the substance of a party's right.¹⁰² As the above discussion demonstrates, modern jurisprudence recognizes the rights of the deceased and the deceased's relatives which include the right of control. That jurisprudence also indicates that the deceased's wishes concerning the posthumous disposition of gametes, zygotes, preembryos or embryos should be respected and carried out. Interestingly, research has failed to uncover any court decision or statute which has prevented cryogenic preservation of either the deceased's body or brain. Since presumably those individuals who have had their bodies or brains placed in cryogenic storage left such instructions in their wills (cryogenic storage cannot occur until after death), it appears that storage of the body and its parts by cryogenic methods is no more

96. *Id.* n.5.

97. See, for example, *State v. Powell*, 497 So. 2d 1188 (Fla. 1986), in which the Florida Supreme Court considered the constitutionality under Florida's Constitution of a law which allowed the removal of corneal tissue from decedent without notice to or consent from the decedent's next of kin. *Id.* at 1189. "The view that the next of kin has no property right but merely a limited right to possess the body for burial purposes is universally accepted by courts and commentators." *Id.* at 1192.

98. See, e.g., *Arnaud v. Odom*, 870 F.2d 304, 308 (5th Cir. 1989) (concluding that Louisiana statutes have established a quasi-property right of survivors in the remains of their deceased relatives); *Fuller v. Marx*, 724 F.2d 717, 719 (8th Cir. 1984) ("Under Arkansas law, the next of kin does have a quasi-property right in a dead body.").

99. 923 F.2d 477 (6th Cir. 1991).

100. *Id.* at 481.

101. For example, a California Court of Appeals upheld a district court's refusal to issue an injunction that would have prevented an autopsy so that the plaintiff's body could be cryonically preserved. *Donaldson v. Van de Kamp*, 4 Cal. Rptr. 2d 59, 61 (Ct. App. 1992). The plaintiff also unsuccessfully sought an order preventing criminal prosecution of the cryonics laboratory or staff who participated in the "premortem cryogenic suspension" of the plaintiff's body (i.e., assisted suicide in preparation for cryogenic preservation). *Id.*

102. *Brotherton*, 923 F.2d at 481-82.

objectionable than disposal by burial or cremation, and that conditional bequests to that effect will be upheld if reasonable.¹⁰³ Thus it appears that the deceased's estate has a recognized right regarding disposition of the deceased's body that equates to a property interest.

What is discernable from the preceding discussion is that the list of what may be bequeathed, at least with regard to things with physical existence, has rarely been restricted and has actually been expanded over the centuries. There does not appear to be any precedent for denying the right of someone to bequeath sperm, zygotes, preembryos and embryos. In essence, one's body, its tissue and its parts have repeatedly been treated as analogous to, if not actually, property. As the following section establishes, not even the argument that these items are analogous to human beings is sufficient to support a prohibition of the right to pass them at death.

3. *The Fallacy of Analogizing Genetic Material to Human Beings*

Perhaps the most controversial argument in favor of prohibiting the right to bequeath gametes, zygotes, preembryos and embryos is that they are not analogous to human tissue or body parts but are more properly considered analogous to human beings.¹⁰⁴ Thus, goes the reasoning, if human beings may not be bequeathed, then gametes, zygotes, preembryos and embryos may not be bequeathed. However, several legal and scientific arguments against this conclusion exist. First, as one commentator has pointed out, the proper scientific classification is against an analogy to persons:

In . . . [the Anglo- American legal] tradition, legal personhood does not exist until live birth and separation from the mother. Common law prohibitions on abortion protected fetuses only after quickening (roughly sixteen weeks of gestation). While many American states did pass restrictive abortion laws in the nineteenth and twentieth centuries, those laws applied only to termination of pregnancy, and thus did not address the status of preimplantation embryos outside the body. Wrongful death statutes did not compensate for the

103. See, e.g., *Estate of Walker*, 476 N.E.2d 298, 301 (N.Y. Ct. App. 1985) (“[A] testator may dispose of his own body or direct the method or place of its burial, but he may not require that he be buried in an unauthorized place.”); see also *Smart v. Moyer*, 577 P.2d 108, 110 & n. 5 (Utah 1978) (stating in a footnote that the deceased had a sufficient “property interest” or “quasi-property interest” such that instructions for disposal of the deceased's body should normally be carried out).

104. That this premise is most accurately characterized as religious or philosophical rather than legal does not necessarily detract from its force; however, as the text demonstrates, the legitimacy of the assertion that these gametes, zygotes, pre-embryos, or embryos either are human or should be treated identically to humans is immaterial to the analysis of whether they may be bequeathed.

wrongful death of a fetus until the late 1940s, and then only if the fetus was viable at the time of the injury.

At the present time, then, the law does not regard embryos as rights-bearing entities, although it has recognized that prenatal actions could affect the postnatal well-being of persons. In most states the embryo is not a legal subject in its own right and is not protected by laws against homicide or wrongful death, nor is embryo discard prohibited. . . .

The biology of early human development supports this legal status. Since the embryo does not have differentiated organs, much less the developed brain, nervous system, and capacity for sentience that legal subjects ordinarily have, it cannot easily be regarded as a legal subject. Indeed, the embryo is not yet individual, because twinning or mosaicism can still occur.¹⁰⁵

Second, while it is technically correct to say that one may not bequeath human beings, the practical equivalent of that is actually encouraged by the law. In addition to jurisdiction over property in the deceased's estate, probate courts also have jurisdiction over decisions involving people when a will contains instructions regarding guardianship of minors.¹⁰⁶ Giving effect to a testator's guardianship instructions can be seen as a vestige of ancient law which allowed the bequeathing of minors because they were treated as property.¹⁰⁷ The modern result is that the law effectively allows both property and minors to be bequeathed and inherited.¹⁰⁸ Therefore, even if gametes, zygotes, preembryos and embryos were treated as people instead of property, the established legal principles dictate that a court attempt to follow the testamentary wishes of the deceased regarding who is given control over them.¹⁰⁹

105. ROBERTSON, *supra* note 50, at 103-04.

106. *See, e.g.*, CAL. PROB. CODE § 2200 (West 1996) ("The superior court has jurisdiction of guardianship and conservatorship proceedings.").

107. Under Roman law a man's children belonged to him as chattel. *See* Francis Bowes Sayre, *Inducing Breach of Contract*, 36 HARV. L. REV. 663, 664 (1923). A Roman father even had the legal right to kill his child. IRA MARK ELLMAN ET AL., *FAMILY LAW: CASES, TEXT, PROBLEMS* 491 (2d ed. 1991); *see also* FRANCES & JOSEPH GIES, *MARRIAGE AND FAMILY IN THE MIDDLE AGES* 27 (1987) (noting that infanticide was common during the Roman era); *Child = Chattel?*, NAT'L L.J., Feb. 6, 1995, at A22 (recounting recent cases in which courts essentially relied on the traditional notion of children as property).

108. It is not my intention to downplay the importance of the distinction in terminology between bequeathing property and the appointment of a guardian for minors. The philosophical values reflected in the use of different terms regarding ownership of property and the guardianship of minors are of the utmost importance. However, the *effect* of the laws of inheritance and the laws of guardianship are the same: the transfer of possession, control and responsibility from one individual to another.

109. Obviously, courts apply different standards in evaluating whether to follow the wishes of the deceased regarding children rather than property, but this is only relevant regarding who should be given custody, not whether custody should be awarded at all.

4. *Considering Gametes, Zygotes, Preembryos and Embryos as Sui Generis*

Another initially attractive argument is that some or all of these reproductive items are *sui generis*,¹¹⁰ and therefore new rules governing them, possibly including a ban on bequeathing them, are necessary. An important distinction must be made at this point between recognizing that these items are *sui generis* and declaring them to be *sui generis*. This distinction is critical because while courts may recognize that something does not fit into established legal categories, only a legislature may create a new legal category. Further, for a court to reach a conclusion that something is *sui generis*, the court must follow a specific sequential analysis. It is in this context that the flawed rationale of the court in *Davis v. Davis*,¹¹¹ that preembryos are *sui generis*, provides an excellent opportunity for demonstrating the importance of proper *sui generis* analysis.

Davis involved a couple seeking a divorce.¹¹² The parties agreed to all terms of the dissolution except who was to have custody of seven cryogenically preserved preembryos which were grown from Mrs. Davis' eggs fertilized by Mr. Davis' sperm.¹¹³ The trial court held that the preembryos were human beings from the moment of conception and awarded them to Mrs. Davis so that she would have "the opportunity to bring these children to term through implantation."¹¹⁴ The court of appeals reversed, ordering the trial court to award joint control to the Davises so that they would have an equal voice in the disposition of the preembryos.¹¹⁵ The court of appeals did not address the legal nature of the preembryos but based its order on a holding that Mr. Davis had a "constitutionally protected right not to beget a child where no pregnancy has taken place."¹¹⁶ By the time the case reached the Tennessee Supreme Court, Mrs. Davis no longer wanted to have the preembryos implanted in her uterus, but wished possession so that she could donate them to a childless couple.¹¹⁷ Mr. Davis continued to press for possession in order to have the preembryos destroyed.¹¹⁸

110. This was the ruling in the *Davis* case which discussed the issue in the context of divorce rather than the context of wills. See *infra* notes 113-135 and accompanying text.

111. 842 S.W.2d 588 (Tenn. 1992), *cert. denied sub nom.* Stowe v. Davis, 507 U.S. 911 (1993).

112. *Id.* at 589.

113. *Id.*

114. *Id.*

115. *Id.*

116. *Id.*

117. *Id.* at 590.

118. *Id.*

After summarizing in less than one page what the court itself described as “extensive comment and analysis [of the issue] in the legal journals,”¹¹⁹ the Tennessee Supreme Court listed seven possible approaches, rejected them all without discussion, and concluded that the only “fair and responsible manner . . . [to resolve the dispute was to] . . . weigh the interests of each party to the dispute.”¹²⁰ The court then recited the facts of the Davis’ marriage and their unsuccessful efforts at in vitro fertilization and the cryogenic storage of the preembryos produced thereby.¹²¹ In the subsequent section labeled “Scientific Testimony” the court evaluated the testimony concerning the biological nature of preembryos.¹²² In evaluating the testimony the court rejected as scientifically unfounded the testimony that a preembryo is a human being¹²³ and accepted the biologic distinction between an embryo and a preembryo.¹²⁴ However, while the court noted that the distinction was not dispositive of the case,¹²⁵ it rejected the trial court’s reasoning that if there is no distinction between embryos and preembryos, then the preembryos must be “children *in vitro*.”¹²⁶ Despite admitting that deciding the issue of whether “human life begins at the moment of conception”¹²⁷ was neither necessary to the case nor urged by either party, the court decided to address this issue “because of its far-reaching implications in other cases of this kind.”¹²⁸ Since the nature of the preembryos was not an issue in the case, the court’s discussion of this matter is dictum.

Nonetheless, in section IV of the opinion the court addressed “The ‘Person’ vs. ‘Property’ Dichotomy.”¹²⁹ The court first observed that preembryos are not “persons” under either Tennessee¹³⁰ or federal law.¹³¹ The court then noted that while the appellate court recognized

119. *Id.*

120. *Id.* at 591.

121. *Id.* at 591-92.

122. *Id.* at 592-94.

123. *Id.* at 593.

124. *Id.* at 594.

125. *Id.*

126. *Id.*

127. *Id.*

128. *Id.* Other than this vague reference to “other cases of this kind,” the court did not identify the cases it hoped to influence. In apparent self-contradiction later in the opinion, the court referred to “the minuscule number of legal opinions that have involved ‘frozen embryos’” but these cases were not identified. *Id.* at 596. Thus, it is unclear why the court felt compelled to write what, by its own admission, amounts to a mere advisory opinion on the legal status of preembryos.

129. *Id.* at 594-97.

130. *Id.* at 594-95.

131. *Id.* at 595.

that Mr. and Mrs. Davis both had "an interest" in the preembryos, the lower court failed to define that interest precisely.¹³² "For purposes of clarity in future cases," the Tennessee Supreme Court stated, "we conclude that this point must be further addressed."¹³³ At this point the court dismissed without citing or discussing what it called the "minuscule number of legal opinions that have involved 'frozen embryos'"¹³⁴ and instead quoted from three pages of the Report of the Ethics Committee of the American Fertility Society.¹³⁵ That report called on the operators of in vitro fertilization facilities to establish policies which recognized in their implementation the view that a "preembryo deserves respect greater than that accorded to human tissue but not the respect accorded to actual persons."¹³⁶

Evidently relying solely on the recommendation from the American Fertility Society to in vitro fertilization facility operators, the court concluded that preembryos were neither persons nor property but "occupy an interim category that entitles them to special respect because of their potential for human life."¹³⁷ With that, the court in effect concluded that preembryos were *sui generis*.¹³⁸ The court then stated that while this conclusion meant that the Davises could not have a true property interest in the preembryos, they did have "an interest *in the nature of ownership* to the extent that they have deci-

132. *Id.*

133. *Id.* at 596.

134. *Id.*

135. *Id.*

136. *Id.* A section of the Report of the Ethics Committee of the American Fertility Society quoted by the *Davis* court stated:

Three major ethical positions have been articulated in the debate over preembryo status. At one extreme is the view of the preembryo as a human subject after fertilization, which requires that it be accorded the rights of a person. This position entails an obligation to provide an opportunity for implantation to occur and tends to ban any action before transfer that might harm the preembryo or that is not immediately therapeutic, such as freezing and some preembryo research.

At the opposite extreme is the view that the preembryo has a status no different from any other human tissue. With the consent of those who have decision-making authority over the preembryo, no limits should be imposed on actions taken with preembryos.

A third view—one that is most widely held—takes an intermediate position between the other two. It holds that the preembryo deserves respect greater than that accorded human tissue but not the respect accorded to actual persons. The preembryo is due greater respect than other human tissue because of its potential to become a person and because of its symbolic meaning for many people. Yet, it should not be treated as a person, because it has not yet developed the features of personhood, is not yet established as a developmental individual, and may never realize its biologic potential.

Id.

137. *Id.* at 597.

138. *Id.*

sion-making authority concerning disposition of the preembryos.”¹³⁹ Since the concepts of ownership and property are inextricably linked,¹⁴⁰ the court was in effect concluding that the Davises had an interest in the nature of a *property* interest. The appropriateness of this conclusion is difficult to evaluate because the court made no distinction between the effects of an ownership interest and the effects of an interest “in the nature of ownership.” Yet, as William James observed, if there is no distinction between the practical effect of two categories, the two categories must be considered identical.¹⁴¹ Thus, the purported “interim category” between property and persons collapses because the “interim category” is indistinguishable from “property,” and the court’s dictum only serves to confuse the analysis. Unfortunately, the court then compounded this confusion by suddenly shifting the focus of its inquiry.

After declaring that preembryos occupy a *sui generis* category, the *Davis* court summarily dropped the issue of the nature of the preembryos and proceeded to compare the degree of decision making authority the parties had over the preembryos.¹⁴² By making decision making authority the basis of its decision, though, the court rendered any discussion of the nature of the preembryos irrelevant. The *Davis* court then quickly determined that both parties had equal decision making authority, and that, therefore, comparison of the parties’ respective procreational rights was the proper basis for deciding the dispute over the preembryos.¹⁴³ In addressing this issue the court immediately admitted that “[a]lthough an understanding of the legal status of preembryos is necessary in order to determine the enforceability of agreements about their disposition, asking whether or not they constitute ‘property’ is not an altogether helpful question.”¹⁴⁴

Although the *Davis* court’s inquiry into decision making authority and the legal status of the preembryos was apparently intended to de-

139. *Id.* (emphasis added).

140. *See supra* text accompanying notes 73-78.

141. WILLIAM JAMES, PRAGMATISM 23-25 (1991). James’ pragmatic method tests purported distinctions by drawing the respective practical consequence of each alternative. *Id.* That is, “what difference would it practically make to anyone if this notion rather than that notion were true? If no practical difference whatever can be traced, then the alternatives mean practically the same thing, and all dispute is idle.” *Id.* at 23. “There can be no difference anywhere that doesn’t make a difference elsewhere.” *Id.* at 25 (emphasis in original.)

142. *Davis*, 842 S.W.2d at 598.

143. *Id.*

144. *Id.*

termine whether the preembryos could be the subject of a contract,¹⁴⁵ the analysis is complete as soon as one concludes that preembryos are in the category of things that may be the subject of a valid contract. Further inquiry into the nature of preembryos as property or an interim category between property and people is unnecessary and inappropriate. As a result, the dicta in *Davis* regarding the legal nature of preembryos provides neither persuasive rationale nor legal authority that preembryos are *sui generis*.

Of course, the failure of the *Davis* opinion to provide guidance in this area does not mean that preembryos (as well as gametes, zygotes, and embryos) are not a *sui generis* category between persons and property; proper *sui generis* analysis, though, is a four-step process. First, the items in question must be shown to possess traits that justify recognition that they are distinct from existing categories of legal classification.¹⁴⁶ Second, once something has been shown to be properly *sui generis*, the courts have historically used that recognition to *refrain* from applying the entire body of law of the category originally presumed to apply.¹⁴⁷ One might then assume that a court would be free to apply new rules to the *sui generis*; but however logical this assumption is, it is incorrect. Historically, the third step has been to apply only those rules that had already developed regarding the item now recognized as *sui generis*.¹⁴⁸ Thus, recognizing something as *sui*

145. *Id.* The court ultimately based its "custody" decision on the procreational rights of the parties. *Id.* at 604. This is a subject which is irrelevant to this article's examination of the state of the law with regard to the ability of a decedent to bequeath items such as frozen preembryos.

146. *See, e.g.*, *Planned Parenthood v. Casey*, 505 U.S. 833, 857 (1992) (the *Roe v. Wade* decision); *Agency Holding Corp. v. Malley-Duff & Assoc.*, 483 U.S. 143, 153 (1987) (RICO); *Grove City College v. Bell*, 465 U.S. 555, 573 (1984) (student financial aid programs in comparison to earmarked direct grants); *United States v. Place*, 462 U.S. 696, 707 (1983) (canine sniff searches); *District of Columbia v. Carter*, 409 U.S. 418, 425 (1973) (the District of Columbia); *United States v. Mississippi Chem. Corp.*, 405 U.S. 298, 310 (1972) (Class C Stock); *Frank v. United States*, 395 U.S. 147, 151 (1968) (criminal contempt proceedings); *Cheff v. Schnackenberg*, 384 U.S. 373, 379 (1963) (criminal contempt proceedings); *Burns v. Wilson*, 346 U.S. 137, 139-40 (1953) (military habeas corpus applications in civil courts); *Brown v. O'Keefe*, 300 U.S. 598, 605 (1937) (lease covenants); *Lang v. Commissioner*, 289 U.S. 109, 111 (1933) (joint tenancy); *Blackmer v. United States*, 284 U.S. 421, 431 (1932) (criminal contempt proceedings); *Ex parte Grossman*, 267 U.S. 87, 117 (1924) (criminal contempt proceedings); *Myers v. United States*, 264 U.S. 95, 103 (1924) (criminal contempt proceedings); *Puget Sound Power & Light Co. v. County of King*, 264 U.S. 22, 27 (1924) (street railway); *The Minnesota*, 230 U.S. 352, 453 (1912) (railroad right-of-way); *In re Wood*, 210 U.S. 246, 253 (1908) (section 60d of the Bankruptcy Act); *Bessette v. W.B. Conkey Co.*, 194 U.S. 324, 326 (1905) (criminal contempt proceedings); *O'Neal v. United States*, 190 U.S. 36, 38 (1903) (criminal contempt proceedings); *The Conqueror*, 166 U.S. 110, 118 (1897) (vessels); *Robertson v. Rosenthal*, 132 U.S. 460, 464 (1889) (hair-pins in relation to the tariff acts); *Union Pacific Ry. Co. v. United States*, 104 U.S. 662, 665 (1881) (land-grant railroad company); *Randall v. Kreiger*, 90 U.S. 137, 147 (1874) (marriage).

147. *See supra* note 146.

148. *See supra* note 138.

generis does not allow a court the unfettered freedom to fashion a new legal regime for it. At this point, if existing laws do not apply, a court must proceed to the fourth step: carrying out the court's traditional function of looking to analogous examples for guidance.¹⁴⁹

Proceeding along the steps described above, gametes, zygotes, preembryos and embryos must first be shown to possess unique traits sufficient to justify a recognition that they do not belong in any existing legal category. As pointed out both by courts¹⁵⁰ and commentators,¹⁵¹ there is neither legal nor scientific justification for recognizing any of the items as people.¹⁵² As examined at length above, a powerful argument exists for recognizing that these items are property.¹⁵³

A New York trial court decision which also involved a divorce action came the closest to the proper starting point of the "person" vs. "property" analysis.¹⁵⁴ In *Kass v. Kass*,¹⁵⁵ Justice Roncallo considered a divorce dispute over custody of five frozen preembryos—to which

149. *Planned Parenthood*, 505 U.S. at 858.

150. See, e.g., *Hecht v. Kane*, 20 Cal. Rptr. 2d 275, 283 (Ct. App. 1993); *Davis*, 842 S.W.2d at 597.

151. See, e.g., Michelle Bourianoff Bray, *Personalizing Personalty: Toward a Property Right in Human Beings*, 69 TEX. L. REV. 209, 220 (1990).

152. See *supra* text accompanying notes 105-110. In fact, considerable practical and conceptual problems arise if the items are considered persons. For example, if the woman who provided the egg dies before the resulting offspring is born, should that child be treated as having been adopted by the woman who brings the child to term? Should there be an adoption procedure before implantation is permitted? If the implantation is treated as an adoption, would this cut off inheritance rights from the biological mother or can the child inherit from two sources: their biological and their birth mother? Similarly in the *Hecht/Kane* situation: would the resulting offspring be treated as having been adopted by Ms. Hecht upon implantation (or birth) and therefore without the right to inherit from Mr. Kane?

Further, if the reproductive material is considered a person, that status would conflict with current statutes which grant only contingent rights prior to birth. See *infra* notes 261-263 and accompanying text.

Finally, if the reproductive material is considered a person prior to birth, then the Rule Against Perpetuities would be essentially eviscerated because the frozen zygote, preembryo, or embryo would be a life in being with theoretically perpetual life. Cryostorage of one or more zygotes could then be used as an estate planning device to circumvent the rule. See Wendy Dullea Bowie, Comment, *Multiplication and Division—New Math for the Courts: New Reproductive Technologies Create Potential Legal Time Bombs*, 95 DICK. L. REV. 155, 175-76 (1990).

These are not simply difficult questions; these questions defy both legislative and judicial solution. A satisfactory statutory solution predicated on the concept that gametes, zygotes, preembryos, and embryos are the equivalent of or analogous to persons would have to be both very detailed and devoid of political influence. Few would seriously contend this was possible. In the absence of well-considered legislation, courts would be required to create, piecemeal, an entire legal structure which details just how "analogous" to persons these items are.

153. See *supra* text accompanying notes 73-78.

154. *Kass v. Kass*, 1995 WL 110368 (N.Y. Super. Ct. Jan. 18, 1995), *rev'd*, 663 N.Y.S.2d 581 (N.Y. App. Dec. 1997).

155. *Kass v. Kass*, 1995 WL 110368 (N.Y. Super. Ct. Jan. 18, 1995), *rev'd*, 663 N.Y.S.2d 581 (N.Y. App. Dec. 1997).

the court also referred as “zygotes”—in which all issues other than possession of the preembryos had been resolved.¹⁵⁶ Although the court characterized the issue as one of classifying the preembryos as either persons or property,¹⁵⁷ a close reading of the decision reveals a more subtle analysis. After rejecting the possibility that the preembryos were “persons,”¹⁵⁸ the court made the following assertion:

The fact that the zygotes are not persons . . . does not establish that they are *within the ordinary sense of that term*. They most assuredly are not. As life inchoate they represent the ultimate in nascency and potentiality. Equating zygotes with washing machines and jewelry for purposes of marital distribution borders on the absurd. The issues involved transcend such a context.¹⁵⁹

The italicized portions of the excerpt point out that the court did indeed assume that the preembryos were property but that the traditional analysis for determining *who should possess* the property was inappropriate. That the court considered the preembryos property is evidenced by the fact that the court ultimately awarded what was essentially ownership of them to Maureen Kass.¹⁶⁰ Thus, the *Kass* decision focused not on the nature of the preembryos as property or persons, but on fashioning new rules regarding awarding possession of a special type of property. In other words, Justice Roncallo implicitly ruled that the preembryos were “property” (they exist and are susceptible of ownership) but that the preembryos were a unique *type* of property deserving of a unique analysis to determine who is entitled to possess them.¹⁶¹

Even though the *Kass* opinion subsumes the proper starting point, no court has fully or correctly assessed whether gametes, zygotes, preembryos or embryos possess characteristics that justify the conclusion that they are neither people nor property. Therefore, for the purpose of illustration, it will be assumed that such a distinction can be

156. *Id.* at *1.

157. *Id.*

158. *Id.*

159. *Id.* (emphasis added.)

160. *Id.* at *4. “Accordingly, it is my determination that plaintiff, if she so elects, is entitled to take possession of the five (5) zygotes . . . for purposes of attempting conception, any such attempt to be made within a medically reasonable time after entry of the judgment.” *Id.* Because Mr. Kass had sought possession to prevent conception, the court’s ruling was tantamount to awarding unconditional possession to Maureen Kass. The *Kass* decision was reversed on appeal; however, the appellate court did not address the issue of the nature of the pre-zygotes. Instead, the court focused on the competing rights regarding forced and voluntary parenthood. *Kass v. Kass*, 663 N.Y.S.2d 581, 587 (N.Y. App. Dec. 1997).

161. *Id.* at *2. As Justice Roncallo acknowledged in his opinion, his analysis was restricted to possession of the preembryos “for purposes of marital distribution.” *Id.* at *1.

made (*i.e.*, that these items are neither persons nor property) and that the first step in the *sui generis* analysis can be thereby completed.¹⁶²

The second step in the *sui generis* analysis is simple: the court refrains from applying the entire body of law that one would have otherwise assumed applied. Curiously, despite having this freedom, neither of the courts which have concluded that reproductive items are *sui generis* (*i.e.*, neither persons nor property) have exercised it.¹⁶³ Although both *Hecht* and *Davis* concluded that sperm and preembryos, respectively, were *sui generis* and refused to apply the law applicable to living persons, both courts applied property law principles *in toto* to these items.¹⁶⁴

The third step in a *sui generis* analysis is the application of existing rules that have already been applied to the *sui generis* item.¹⁶⁵ For example, the United States Supreme Court declared marriage contracts to be *sui generis* as agreements between adults and refused to apply the entire body of contract law to them.¹⁶⁶ However, the Court nevertheless was still able to rely on a large body of law that had already developed regarding marriage contracts. In the case of gametes, zygotes, preembryos and embryos, though, no part of any body of law can be viewed as uniquely applicable. The issue is too new and has yet to be correctly analyzed by the courts.

Lacking any existing jurisprudential rules, the fourth step in addressing a *sui generis* item is to follow the traditional judicial approach of looking to existing analogies for guidance.¹⁶⁷ In the area of reproductive technology and genetic material, commentators have examined analogies to blood,¹⁶⁸ tissue,¹⁶⁹ and organs.¹⁷⁰

162. For example, a characteristic which is commonly emphasized as a justification for *sui generis* classification of reproductive items is their potential for development into human beings. See, e.g., *Hecht v. Kane*, 20 Cal. Rptr. 2d 275, 283 (Ct. App. 1993); *Davis v. Davis*, 842 S.W.2d 588, 596 (Tenn. 1992); Philippe Ducor, *The Legal Status of Human Materials*, 44 *DRAKE L. REV.* 195, 210-11 (1996); William Bonlier, Note, *Sperm, Spleens, and Other Valuables: The Need to Recognize Property Rights in Human Body Parts*, 23 *HOFSTRA L. REV.* 693, 700-01 (1995); see also *supra* text accompanying notes 105-110.

163. *Hecht*, 20 Cal. Rptr. 2d at 281-84; *Davis*, 842 S.W.2d at 597. But see, e.g., *Kass*, 1995 WL 110368 at *2. The *Kass* decision of course *did* evidently consider preembryos to be a *sui generis* category of *property* in terms of the analysis of who should possess them, but the court did not rule that preembryos were distinct *from* property or persons. *Id.* at *1.

164. *Hecht*, 20 Cal. Rptr. 2d at 281-84; *Davis*, 842 S.W.2d at 597.

165. *Randall v. Kreiger*, 90 U.S. 137, 147 (1874).

166. *Id.*

167. Anne Reichman Schiff, *Solomonic Decisions in Egg Donation: Unscrambling the Conundrum of Legal Maternity*, 80 *IOWA L. REV.* 265, 291-92 (1995). While it is possible to look at the *Hecht* and *Davis* cases as applying the law of property by analogy to these items, in actuality, *Hecht* relied on *Davis* without explanation and *Davis* relied on property law without explanation. See *supra* notes 37-46, 137-142 and accompanying text.

168. See, e.g., Ducor, *supra* note 162, at 254.

Gametes, zygotes, preembryos and embryos cannot be considered analogous to organs because none of these items carry out specific system functions as do organs. Even if such an analogy to organs were forced, the fact that the sale of organs is the subject of national legislation indicates that without legislation prohibiting it, the sale of organs would be legal. Therefore, this analogy leads to the conclusion that in the absence of prohibiting legislation the transfer, including the sale or bequest, of any of these items is legal.

Since gametes, zygotes, preembryos and embryos are themselves either carried or supported by fluids, an analogy to the medium of blood does not fit well either. Analogizing these items to individual blood cells is flawed since only gametes remain uni-cellular. Further, blood cells have no potential beyond blood cells; thus making them inherently distinct from gametes and all subsequent stages of gametic and zygotic development. The most fitting analogy would seem to be human tissue which can continue to grow yet does not constitute separate organs. Of course, the inability of tissue to develop into a human being is *the* critical difference that destroys the legitimacy of this analogy. Moreover, while there are some statutory restrictions regarding organ sales,¹⁷¹ there are no common law restrictions on the sale of blood, fluid or tissue. In fact, all three are routinely sold and donated.¹⁷² Thus, even if an analogy to human blood, fluid, or tissue were proper, that analogy leads to the conclusion that no restriction on bequeathing these items is appropriate.

Nonetheless, the purpose of the search for an analogy is to obtain guidance from existing legal rules. That requires that the things which are compared be similar in their essential nature rather than their surface characteristics. If one assumes that gametes, zygotes, preembryos and embryos are properly considered *sui generis* due to their potential for development into a human being,¹⁷³ then except in the case of gametes, no guidance is provided by analogies to existing treatment of any biological products of the human body because none of these has

169. See, e.g., Barry Brown, *Reconciling Property Law with Advances in Reproductive Science*, 6 STAN. L. & POL'Y REV. 73, 74-75 (1995).

170. *Id.* at 74.

171. See, e.g., National Organ Transplant Act, 42 U.S.C. § 274e (1994); UNIF. ANATOMICAL GIFT ACT § 10, 8A U.L.A. 58 (1987).

172. The sale of blood or blood plasma is routine and widespread. Sales of sperm to sperm banks is also commonplace. Both blood and sperm are covered by the National Organ Transplant Act, 42 U.S.C. § 274e(c)(1) and the UNIFORM ANATOMICAL GIFT ACT § 1(7). See Ducor, *supra* note 162, at 254. While tissue sales by individuals are less common, the situation in *Moore* indicates that the hospital was entitled to sell the tissue to various laboratories and that Moore himself could have sold the tissue had he not relinquished possession of it unconditionally.

173. See *supra* text accompanying notes 105-110.

the inherent ability to develop into a human being. Further, gametes themselves can only be considered similar to zygotes, preembryos, and embryos if the distinguishing characteristic of this class of objects is described as contributing to the genetic development of a potential human being rather than possessing itself the potential to develop into a human being. Playing with the wording of the description of the *sui generis* category in this fashion reveals the problem with resorting to the *sui generis* analysis: does the distinction arise from the nature of the thing in question or does it arise from the teleological desires of the taxonomist? Thus, the conclusion that these items are *sui generis* leaves a court with neither directly applicable legal precedent nor analogy to legal precedent.¹⁷⁴

The current state of the law indicates that regardless of whether gametes, zygotes, preembryos and embryos are classified as property,¹⁷⁵ or are analogized to humans,¹⁷⁶ or considered products of human biology,¹⁷⁷ they may be bequeathed according to the deceased's instructions.¹⁷⁸ However, this conclusion regarding the state of the law does not resolve the issue of whether such bequests *can* or *should* be restricted or prohibited by judicial decision.

5. *Judicial Restrictions Based on Public Policy*

Unlike the foregoing analysis of case law which sought to determine the existing state of the law in this area, determining whether such bequests *should* be restricted is normally a legislative decision. However, a potentially legitimate judicial basis for prohibiting such transfers would be public policy.¹⁷⁹ The appropriateness of using public policy to prevent the bequeathing of these items requires a brief examination of how Western society has valued the concept of bequeathing property.

The notion that an individual has the right to bequeath property is an ancient, fundamental principle in Western society, and therefore it should not be infringed without a compelling reason.¹⁸⁰ For instance,

174. As the California Supreme Court noted, establishing *sui generis* categories is typically accomplished by specialized legislation. *Moore v. Regents of the Univ. of Calif.*, 793 P.2d 479, 489 (Cal. 1990).

175. See *supra* text accompanying notes 59-86.

176. See *supra* text accompanying notes 104-10.

177. See *supra* text accompanying notes 168-75.

178. See *supra* text accompanying notes 91-104.

179. It is important to note here that public policy has been used as a basis for withholding legal recognition of certain transactions. Public policy concerns do not permit a court to either create a new category of legal recognition or declare something *sui generis*.

180. See Adam J. Hirsch & William K.S. Wang, *A Qualitative Theory of the Dead Hand*, 68 *IND. L.J.* 1, 6-9 (1992).

the Romans held that the right to bequeath property was a natural right.¹⁸¹ John Locke considered the right of devise to be a logical development of the natural drive of self-preservation and self-propagation, giving "Children a Title, to share in the *Property* of their Parents, and a Right to Inherit their Possessions."¹⁸² Locke also described bequeathing property as a responsibility that "God and Nature has . . . obliged Parents to, as a Duty."¹⁸³ In *The Metaphysics of Morals*,¹⁸⁴ Immanuel Kant strongly implied that inheritance was a natural right when he explained how such acquisition of property was "based on a mere *Idea* of pure reason."¹⁸⁵ Kant's subsequent discussions of the transfer of property at death without interruption of ownership¹⁸⁶ are also based on that notion that the right to transfer property at death is a product of pure reason.¹⁸⁷

While others have disagreed with both the application of the idea of a natural right to bequeath¹⁸⁸ as well as its premise,¹⁸⁹ other rationales supporting the right developed. Jeremy Bentham, for example, argued that the right to bequeath keeps the younger generation attentive to the care and needs of the aging generation.¹⁹⁰ On the other

181. See LUIGI MIRAGLIA, *COMPARATIVE LEGAL PHILOSOPHY* 732-37, 741-42 (John Lisle trans., 1912).

182. JOHN LOCKE, *TWO TREATISES OF GOVERNMENT* 206-07, 227-28 (Peter Laslett ed., 1960) (emphasis in original).

183. *Id.* at 225.

184. IMMANUEL KANT, *THE METAPHYSICS OF MORALS* (Mary Gregor trans., 1991).

185. *Id.* at 108 (emphasis in original).

186. *Id.* at 74-75.

187. *Id.* at 132-33.

188. See, e.g., 2 WILLIAM BLACKSTONE, *COMMENTARIES ON THE LAWS OF ENGLAND* 10-12 (Oxford 2d ed., 1767) (stating that, at death, the individual lost all right to the property and so had no natural right to bequeath it, the right to bequeath property only being granted to maintain the peace).

189. In his *Examination of the Declaration of Rights Issued During the French Revolution*, Bentham declared that there were no natural rights of any kind: "*Natural rights* is simple nonsense: natural and imprescriptible rights, rhetorical nonsense—nonsense upon stilts." JEREMY BENTHAM, *Anarchical Fallacies*, in 2 *THE WORKS OF JEREMY BENTHAM* 501 (John Bowring ed., 1962). Later in that same work Bentham intimates that there are in fact "natural" restrictions on the right to bequeath: "Are there no necessary limits to the employment of [a man's] property? Ought a man to have the right of establishing after his death, either religious or anti-religious foundations at the expense of his family? Ought not the law to hinder an individual from disinheriting his children without cause assigned?" *Id.* at 532-33. Nonetheless, in *THE THEORY OF LEGISLATION*, Bentham declared that inheritance was a civil right that should not be extensively regulated. JEREMY BENTHAM, *THE THEORY OF LEGISLATION* 184 (1950).

190. RONALD CHESTER, *INHERITANCE, WEALTH, AND SOCIETY* 18-20 (1982). It is at least marginally relevant here that Bentham left specific instruction as to what should be done with his body following his death. VIRGIL M. HARRIS, *ANCIENT, CURIOUS AND FAMOUS WILLS* 138 (1911). Bentham bequeathed his body to his favorite disciple, Dr. Southwood Smith, with additional instructions that "his preserved figure might be placed in a chair at the banquet-table of his friends and disciples when they met on any great occasions of philosophy and philanthropy."

hand, many have noted that the right to bequeath is an incentive to industry and saving.¹⁹¹ Furthermore, several commentators have addressed the practical concerns raised by the great difficulty in enforcing a prohibition on inheritance.¹⁹² Finally, while numerous arguments on both sides of the question have addressed the economic desirability of the right to pass property at death,¹⁹³ the fact is that, with the exception of a brief period in Russia following the Communist Revolution,¹⁹⁴ the general right to bequeath has not been restricted by any Western nation.¹⁹⁵ Thus, to prohibit the bequeathing of these items would require public policy reasons powerful enough to overwhelm a Western tradition that has persisted for over 2,000 years.

With regard to the bequeathing of gametes, zygotes, preembryos and embryos, the arguments advancing a natural right to bequeath frequently implicate the impracticality of enforcing such a ban. Indeed, since the likely effect of a ban on such bequests would be to force people to place the cryopreserved item in trust for a named survivor beneficiary, a ban on inter vivos transfer to a trust would also be required. However, banning such transfers would require court inspection of trusts to the same degree courts are involved in probate matters. That difficulty would be compounded by the fact that, unlike wills, trusts are not public documents and, unlike wills, do not normally require judicial administration. While certainly possible, the impracticality of court oversight in this area is probably decisive.

Ultimately, though, one must realize that at least part of the reason why society has repeatedly attempted to follow the instructions of the deceased is the desire to provide the living with some assurance that their wishes will be honored after their death. Regardless of whether one feels that reproduction is less important to the dead than to the living, the issue that must be considered in any public policy debate is

After storing Mr. Bentham in a room of his house in Finsbury Square for several years, Dr. Southwood gave the "Bentham exhibit" to University College. *Id.* at 138-39. The author has not been able to ascertain the further adventures of Mr. Bentham's remains.

191. EDWARD C. HALBACH, JR., *DEATH, TAXES AND FAMILY PROPERTY: ESSAYS AND AMERICAN ASSEMBLY REPORT 5-7* (Edward C. Halbach, Jr. ed., 1977).

192. See JESSE DUKEMINIER & STANLEY M. JOHANSEN, *WILLS, TRUSTS, AND ESTATES 14* (5th ed. 1995); Hirsch & Wang, *supra* note 180, at 11-12.

193. Hirsch & Wang, *supra* note 180, at 8-11.

194. DUKEMINIER & JOHANSEY, *supra* note 192, at 16.

195. While estates are taxed to various degrees, this is a restriction on the *amount* of property an individual may bequeath; United States law has never tolerated complete restriction on the right of an individual to bequeath a particular *type* of property in their estate. In fact, it was exactly that kind of total bar on bequeathing a particular type of property that the United States Supreme Court ruled would be in violation of the 5th Amendment because the property would escheat to the state without compensation. *Hodel v. Irving*, 481 U.S. 704, 717 (1987).

the comfort of the living in knowing that their wishes for reproduction will be carried out as directed. In the absence of a clearly articulated public policy reason, the instructions of the deceased involving parenthood, even though posthumous, should be followed.¹⁹⁶

6. *Fundamental Right to Procreate*

Assuming that one rejects the natural law arguments and that the practical problems of oversight of inter vivos and at-death transfers could be overcome, one must consider whether the United States Constitution protects the transfer of gametes, zygotes, preembryos and embryos, for even public policy arguments fail in light of constitutional protections. Restrictions on the bequest and inheritance of these items raise the question of whether there is a constitutional right to procreate that would be violated by such restrictions.

Surprisingly, the Supreme Court has never recognized a fundamental right to procreate. In fact, in *Buck v. Bell*,¹⁹⁷ the Court, on the grounds of protecting the general public, upheld a law that permitted the involuntary sterilization of an allegedly retarded woman.¹⁹⁸ Admittedly, the *Buck* ruling would almost certainly not be applied to marital reproduction.¹⁹⁹ However, since modern technology readily permits variations on reproduction that include not only posthumous reproduction but also conceiving a child of a particular deceased individual, the issue is whether there is a fundamental right to posthumous reproduction (thereby protecting the bequest), or a fundamental right of reproduction that includes the right to select specific reproductive material (thereby protecting the inheritance).

In several cases the Court has recognized Constitutional rights that are closely related to a fundamental right to reproduce. As one commentator has pointed out,²⁰⁰ Court opinions have implied such a right since 1923,²⁰¹ and recent opinions indicate that if required to face the question directly, the Court would find that such a fundamental right

196. See *supra* note 103.

197. 274 U.S. 200 (1927)

198. *Id.* at 207. The *Buck* case dealt with a retarded woman who had been born of a retarded mother and who had already given birth to a retarded child. *Id.* at 205. The involuntary sterilization was intended to permit the woman to be released from a state institution and be reintegrated into society without fear that future offspring would burden the state. *Id.* at 206. In ruling that the Fourteenth Amendment provided no protection against involuntary sterilization in such circumstances, Justice Holmes made the infamous observation: "Three generations of imbeciles are enough." *Id.* at 207.

199. See ROBERTSON, *supra* note 50, at 36 n.39.

200. *Id.* at 35-36.

201. *Meyer v. Nebraska*, 262 U.S. 390, 399 (1923); *Skinner v. Oklahoma*, 316 U.S. 535, 541 (1942).

to reproduction exists.²⁰² The Court has also emphasized that issues involving the right of procreation necessarily involve the “right of the *individual*, married or single, to be free from unwarranted governmental intrusion into matters so fundamentally affecting a person as the decision whether to bear or beget a child.”²⁰³

Assuming that a fundamental constitutional right to procreate exists, whether that right survives death is unlikely. The Supreme Court has never held that an individual’s constitutional rights survive one’s death. Of course, the distinction that can be made in situations involving possible posthumous children is that, unlike other fundamental rights, a fundamental right to procreate *could* be carried out after one’s death. Regardless of that distinction, though, the likelihood that the Court would decide that a fundamental right to procreate survives one’s death must be considered remote. Therefore, prohibiting the bequest of reproductive material would not appear to impinge on a fundamental constitutional right.

Yet, a fundamental right to procreate might protect such bequests from the perspective of the person to inherit.²⁰⁴ It may be possible to argue successfully that preventing the inheritance of the reproductive material impinges on the fundamental right to procreate of the person named to inherit. The question that remains to be resolved, though, is whether the fundamental right to procreate encompasses an individual’s decision to procreate with specific genetic material. It would seem that if the decision to procreate is protected, then the state cannot restrict with whom (or with whose genetic material) one chooses to procreate, so long as the other individual has consented to the procreation.²⁰⁵ However, unless the actual transfer is conditioned in light

202. *Planned Parenthood v. Casey*, 505 U.S. 833, 851 (1992) (“Our law affords constitutional protection to personal decisions relating to marriage, procreation, contraception, family relationships, childrearing and education. . . . These matters, involving the most intimate and personal choices a person may make in a lifetime, choices central to personal dignity and autonomy, are central to the liberty protected by the Fourteenth Amendment.”); *Stanley v. Illinois*, 405 U.S. 645, 651 (1972) (“The rights to conceive and raise one’s children have been deemed ‘essential’ . . . ‘basic civil rights of man’ . . . and [r]ights far more precious . . . than property rights.”); *Eisenstadt v. Baird*, 405 U.S. 438, 443 (1972) (noting that a statute intending to limit contraception is in conflict with “fundamental human rights.”).

203. *Eisenstadt*, 405 U.S. at 453 (emphasis in original).

204. It appears that, unless the right to procreate encompasses being pregnant as opposed to producing a child with one’s own genetic material, only gametes would be at issue in this situation because the focus is on the right of the living individual to procreate rather than to bear a child. Procreation, of course, could only be accomplished by combining a gamete from the deceased with a gamete from the person who is to inherit.

205. The fundamental right to select with whom one chooses to engage in procreational activity is the basis for the Supreme Court’s ruling invalidating anti-miscegenation statutes. See *Loving v. Virginia*, 388 U.S. 1, 12 (1967) (“[T]here can be no doubt that restricting the freedom to

of the right to procreate, then what is being protected is not the right to procreate, but the general right to inherit or the right to possess property, neither of which is a fundamental right. In order to ensure that inheriting the property is based on a right to procreate, the probate court would have to restrict the transfer to circumstances which are reproductive in nature.²⁰⁶

The unavoidable fact though is that cryogenically preserved gametes, zygotes, preembryos and embryos must go somewhere at the decedent's death. Restricting the right to devise gametes, zygotes, preembryos and embryos simply re-directs the transfer from the decedent's heirs to the State.²⁰⁷

Currently, no state or federal law prohibits bequeathing gametes, zygotes, preembryos or embryos. Moreover, while a state may regulate the bequeathing of reproductive material to some degree,²⁰⁸ no public policy reason has been articulated against allowing such bequests. Thus, no compelling justification for judicial prohibition of the bequeathing of these items exists. That gametes, zygotes, preembryos and embryos are property and may be bequeathed, though, merely moves the inquiry past the threshold questions. The following section examines what the effects of such bequests may be.

II. THE EFFECTS OF BEQUEATHING GAMETES, ZYGOTES, PREEMBRYOS AND EMBRYOS

Affirmatively answering the question of whether gametes, zygotes, preembryos and embryos may be bequeathed leads to consideration of the issues surrounding such bequests. These issues involve not only the rights of the eventual posthumous child, but also rights of other heirs, the gestational host (whether biological or birth mother), and the various reproductive items themselves.

marry solely because of racial classifications violates the central meaning of the Equal Protection Clause."). Other courts have invalidated anti-fornication statutes. *See generally* Susan Clement, et al., Note, *The Evolution of the Right to Privacy After Roe v. Wade*, 13 AM. J.L. MED. 365, 470 (1987) (citing *Doe v. Duling*, 603 F. Supp. 960 (E.D. Va. 1985); *State v. Saunders*, 381 A.2d. 333 (N.J. 1977)). "Courts have found that the fundamental right to privacy encompasses the right to engage in private consensual, nonprostitutional, heterosexual fornication." *Id.*

206. The term "reproductive in nature" refers to circumstances in which procreation is clearly possible. Hence, the gametes of the testator would be brought into contact with the gamete(s) of the heir either through artificial or in vitro fertilization, and zygotes of the testator would be implanted in the heir or a surrogate.

207. While it would be possible to prohibit the devise of these items and not have the property go to the state, this would render it abandoned property available to the first person to take possession of it. Because this would merely change the underlying theory of the transfer of the property rather than prevent it, there seems little logic to adopting it.

208. *Hodel v. Irving*, 481 U.S. 704, 716 (1987).

A. Problems of Parentage

1. Conception and Paternity

When gametes, zygotes, preembryos and embryos are bequeathed, the inheritance rights of the posthumous children who may eventually be born must be examined. The first issue that must be considered is the extension of the presumption that a child born during a marriage is a child of that marriage.²⁰⁹ In many states this presumption is extended to include posthumous children, children born after the death of their mother's husband.

Posthumous children statutes take two forms. The first type refers to children *conceived* during the marriage,²¹⁰ while the second type refers to children *born* within ten months or 300 days of the husband's death.²¹¹ While other states do not have a statutory presumption covering posthumous children, those states nonetheless allow such children to prove the paternity of their deceased father.²¹² Extreme posthumous children,²¹³ however, complicate the operation of both types of statutes.²¹⁴ The following sections address this issue for the various reproductive stages under consideration.

a. Gametes

Gametes must be distinguished from the other items at this point for practical as well as biological and perhaps philosophical reasons. Gametes are, by definition and biology, not fertilized and, therefore, conception must be a future event. Statutes which restrict the presumption of paternity to children *conceived during* the marriage elimi-

209. WILLIAM A. MCGOVERN, JR. ET AL., WILLS, TRUSTS AND ESTATES § 2.1, at 35 (1988).

210. See, e.g., MD. CODE ANN., EST. & TRUSTS § 1-206 (1995).

211. See, e.g., ALA. CODE § 26-17-5 (1996) (300 days); OKL. STAT. tit. 10, § 2 (1996) (ten months). One state, Minnesota, has a 280-day period. MINN. STAT. § 257.55 (1996).

212. See, e.g., CONN. GEN. STAT. § 45a-438 (1997) (permitting proof of paternity after the father's death by showing "clear and convincing evidence that the father has acknowledged in writing that he is the father of the child and has openly treated the child as his"); FLA. STAT. ch. 732.108 (1997) (permitting proof of paternity after the father's death for the purpose of intestate succession).

213. The term "extreme posthumous children" is used here with some frustration at the limits of language in the face of new technology. Nonetheless, the term adequately conveys the circumstance of a deceased individual's child born after the child could have been naturally conceived and born.

214. The phenomenon of single women using artificial insemination to become mothers is becoming so widespread that in many instances, women are accomplishing artificial insemination without resorting to medical procedures. See, e.g., Wikler & Wikler, *supra* note 11, at 5. If the use of artificial insemination by single women is increasing, the motivation in this regard would likely be all the more for a recently widowed woman. See also text accompanying notes 85-88 (recounting efforts by recently widowed women to harvest their dead husband's sperm).

nate paternity complications arising from posthumous children who are born of the frozen sperm of their deceased father.

However, posthumous children statutes that refer to children born within a certain time after their father's death focus on the timing of birth rather than the circumstance of conception. These statutes allow the donor's widow to decide *after the donor's death* whether to proceed with artificial insemination or in vitro fertilization within 3-4 weeks of the death of her husband in order to gain the benefit of the presumption. This situation also permits the presumption to apply to pregnancies resulting from sperm harvested from the deceased.²¹⁵ Since a child born within ten months of the death of its mother's husband benefits from the presumption, the sperm donor's death may be the catalyst for a decision regarding implantation.

While there is little cause for concern that some people who were not intended to be covered by such statutes may benefit from them, these situations nonetheless raise constitutional concerns. Since reproductive technology allows some to benefit from the presumption as a result of the proximity of their birth to their father's death, rather than as a result of conception, the question of whether such a statutory distinction has a rational basis arises. It is difficult to discern the rational basis for distinguishing between a child conceived one day after her father's death who is born within the statutory period, and a child conceived one month after her father's death who is born outside the statutory period. When one considers that such a distinction actually encourages premature delivery in order to benefit from the presumption, the possibility of a rational basis appears remote. Prior to the widespread availability of cryogenic storage and artificial insemination, laws regarding posthumous children could meet the rational basis test by the simple fact that ten months or 300 days is a period of time that corresponds to a typical gestation period. The application of current cryogenic technology, though, has eliminated that rational basis. This is not to suggest that there would be a mob of mothers rushing to have their children born prematurely merely to gain the benefit of the presumption, but this extreme scenario is not necessary to undermine any purported rational basis. The mere fact that the distinction would *encourage* such action could well be sufficient to demonstrate the irrationality of the statute, regardless of whether anyone actually acts on that encouragement.²¹⁶

215. See *supra* note 8 and text accompanying notes 85-88.

216. The only remaining rational purpose for such a statute would be ease of administration, but this should be outweighed by the potential of successfully encouraging premature delivery.

If no constitutional distinction is possible, then statutes providing the ten month/300 day period presumption of paternity are unconstitutional regardless of whether they are viewed as either an extension or a limitation of the presumption of paternity. The availability of cryotechnology and the increasing likelihood of extreme posthumous children apparently lead to only two alternatives: either no child born after its father's death may benefit from the presumption, or all posthumous children must be presumed to be the product of their mother's late husband. Invalidating such statutes would not be a catastrophe since testimony of the child's mother, coupled with the relevant death and birth certificates, should be sufficient to establish paternity. Indeed, since obtaining the current presumption requires proof of death and birth dates, the loss of the statutory presumption would have little practical effect.

b. Zygotes, Preembryos and Embryos

In those states which create a presumption of paternity based on conception during the marriage, the effect of the laws governing presumption of paternity changes considerably once fertilization of the egg occurs. Under the terms of these statutes, if an egg is fertilized and frozen before the husband dies, then the posthumous child will be presumed to be the child of the deceased father regardless of the duration of the interval between death of the father and birth of the child. In this situation the presumption of paternity becomes very important.²¹⁷ While in the absence of a presumption it is still possible to show paternity through a chain of custody, only a negative result from a DNA comparison would overcome a presumption of paternity in these cases. This is important because as a result of normal biological decay the availability of DNA evidence to disprove paternity would diminish over time; the longer the time between the death of the father and the posthumous birth, the greater the likelihood that the presumption of paternity would be effectively irrebuttable.

Obtaining the presumption may prove problematic, though. Rather than relying on the mother's testimony regarding the timing of sexual relations and proof of the child's date of birth as evidence sufficient to

217. For example, the Social Security Administration recently reversed an appeals panel decision applying state law and extended benefits to a child conceived through artificial insemination after her father's death. *Bureaucracy Finally Yields to Science*, DENVER POST, Mar. 12, 1996, at A5, available in LEXIS, News Library, Dpost File. However, Social Security Commissioner Shirley Chater stated that the decision would be limited to that case while changes in the law were considered. *Id.*

gain the presumption of paternity,²¹⁸ the widow would probably have to provide evidence of in vitro fertilization, cryopreservation, the timing of the implantation procedure, and the date of birth. Given that normally the mother would be the only party who would know whether the attempted implantation was successful, only DNA evidence could rebut the presumption.

c. The Problem of Legitimacy

A different situation arises with regard to proving paternity if no presumption of paternity applies. If extreme posthumous children are not presumed to be children of the deceased father, and their mother has not remarried, then until they can prove paternity these children will be illegitimate, with no inheritance rights regarding their biological father. While some states only require proof of paternity by a preponderance of the evidence,²¹⁹ most states impose a higher burden. In fact, many states require proof by clear and convincing evidence,²²⁰ while other states require either proof of the alleged father's conduct indicating paternity, or proof of acknowledgment during the father's life.²²¹

Meeting a burden of preponderance of the evidence in these situations should not be difficult. In the case of a living potential father, paternity is typically established through a comparison of blood or DNA from the potential father and the possible offspring.²²² In the case of a claim by a posthumous child, if blood or DNA matching is not possible, proof of paternity by a preponderance of the evidence could be accomplished by establishing a chain of custody of the ge-

218. See, e.g., *Tierce v. Ellis*, 624 So. 2d 553 (Ala. 1993); *In re R.T.L.*, 780 P.2d 508 (Colo. 1989); *RM v. State Dept. of Family Serv.*, 891 P.2d 791 (Wyo. 1995).

219. MCGOVERN, *supra* note 209, at 39.

220. *Id.*

221. See, e.g., Charles Nelson LeRay, Note, *Implications of DNA Technology on Posthumous Paternity Determination: Deciding the Facts when Daddy Can't Give His Opinion*, 35 B.C. L. REV. 747, 748 (1994); Robert Silverman, Comment, *Inheritance Rights of Non-Marital Children Under Michigan's 1993 Probate Code Changes*, 1995 DET. C.L. REV. 1123, 1132 (1995). These statutes vary widely in the burden they impose. For example, CALIFORNIA FAMILY CODE section 7611 creates a presumption of paternity based on the alleged father's conduct toward the child (e.g., taking the child into his home, openly holding the child out as his natural child). CAL. FAM. CODE § 7611 (West 1997) Other states require written acknowledgment or a court order during the alleged father's life. See, e.g., WIS. STAT. § 852.05 (1991). Section 852.05 provides:

A nonmarital child . . . is entitled to take in the same manner as a marital child by intestate succession from . . . his or her father if the father has either been adjudicated to be the father in a paternity proceeding . . . or has admitted in open court that he is the father, or has acknowledged himself to be the father in writing signed by him.

Id.

222. LeRay, *supra* note 221, at 748.

netic material through medical record keeping from storage to implantation. Establishing a chain of custody from storage to birth should also meet the clear and convincing standard of proof.

In some states, however, establishing paternity posthumously is not permitted because the relevant statutes require paternal acknowledgment or a court order during the potential father's life.²²³ For example, in 1978 the United States Supreme Court upheld New York's rule that an illegitimate child can only inherit from his or her father if a court order declaring paternity had been issued during the father's life.²²⁴ However, the court rulings that have considered these statutes did not involve children who could only have been born after their father's death. While the Supreme Court has upheld such restrictions on proving paternity as fulfilling a legitimate public policy,²²⁵ a law which effectively prohibits proving paternity may be unconstitutional.²²⁶

Yet another problem arises if extreme posthumous children are not presumed to be children of the deceased husband of their mother. As discussed above, if their mother has not remarried, then these children are illegitimate, with no inheritance rights from their father, unless they can prove paternity. However, if their mother *has* remarried, then these children will be presumed to be the children of the second marriage. Since children typically only have intestate succession rights regarding the estate of their apparent biological parents, their personal decision as to whether to prove paternity to their deceased father will unavoidably involve materialistic considerations involving the values of the estates of their "competing" fathers.

223. See, e.g., GA. CODE ANN. § 53-4-4 (1997); IOWA CODE § 633.222 (1996); N.Y. EST. POWERS & TRUSTS LAW § 4-1-2 (McKinney 1997); OHIO REV. CODE ANN. § 2105.15 (Anderson 1997).

224. *Lalli v. Lalli*, 439 U.S. 259, 275 (1978).

225. *Id.* at 266.

226. Cf. *Mills v. Habluetzel*, 456 U.S. 91 (1982). The Court, in *Habluetzel*, invalidated on equal protection grounds a Texas statute that barred paternity actions by illegitimate children if not brought before the child was one year old:

The equal protection analysis in this case . . . focuses on two related requirements. First, the period for obtaining support must be sufficiently long in duration to present a reasonable opportunity for those with an interest in such children to assert claims on their behalf. Second, any limitation placed on that opportunity must be substantially related to the State's interest in avoiding the litigation of stale or fraudulent claims. Applying these two requirements to the one-year right granted by Texas, we find a denial of equal protection.

Id. at 99-100; see also *Clark v. Jeter*, 486 U.S. 456 (1988) (invalidating Pennsylvania's six-year statute of limitations for establishing paternity in order to obtain child support payments as a violation of equal protection because the statute did not provide a reasonable opportunity to assert a claim on behalf of the illegitimate child); see also *supra* text accompanying notes 200-203 (discussing procreational rights).

Note how involved this situation can be. If paternity of the deceased is proven, then the child will not be considered the offspring of her mother's current husband. After proving paternity, the child's birth certificate (and possibly social security records) would be changed. At this point, the probate proceedings could continue and distribution of the biological father's estate would be completed. Following inheritance from her deceased father's estate, the child would then have to be adopted by her mother's husband in order to return her to her legal status quo ante.²²⁷

However, proving paternity of someone other than the mother's current husband raises an additional complication: overcoming the presumption that the parents to whom a child is born are the child's biological parents. This presumption has been called "one of the strongest presumptions in law"²²⁸ and would almost certainly require DNA or chain of custody evidence to overcome. Whereas obtaining that evidence might be difficult, it would not be impossible. Yet this evidentiary approach misses the point that the strength of the presumption of parenthood has been rendered outdated by technology. Where once the presumption served a valuable function of providing social and familial stability, technology has produced the possibility of more than one set of legal parents—a situation the combination of presumption of parenthood and intestate inheritance restrictions fails to address adequately.

The aforementioned possibility of selecting one's parents based on their material wealth is the least vexing of the problems created in this area, though. The possibility of having more than one set of legal parents requires a reconsideration of the typical, modern statutory approach which restricts children to intestate inheritance from only one set of parents.²²⁹ Statutes which restrict intestate inheritance to one set of parents by cutting off intestate inheritance rights to and from the child's biological parent upon the child's adoption "away from" the child's biological parent also must be reconsidered.²³⁰ The follow-

227. Fortunately, the infant would be oblivious to these proceedings, although her inheritance would likely be eroded by the concomitant legal fees.

228. *Leach v. Leach*, 942 S.W.2d 286, 288 (Ark. 1997); *R. McG. v. J.W.*, 615 P.2d 666, 675 & n.5 (Colo. 1980); *Schmeizl v. Schmeizl*, 42 A.2d 106, 109 (Md. 1945); *Serafin v. Serafin*, 258 N.W.2d 461, 464 (Mich. 1977); *Brinkley v. King*, 701 A.2d 176, 177 (Pa. 1997).

229. MCGOVERN, *supra* note 209, at 47.

230. *See, e.g.*, ALASKA STAT. § 25.23.130 (Michie 1997); ARK. CODE ANN. § 9-9-215 (Michie 1997); CONN. GEN. STAT. § 45a-731 (1997); DEL. CODE ANN. tit. 13, § 920 (1997); FLA. STAT. ch. 63.172 (1997); GA. CODE ANN. § 19-8-19 (1997); IDAHO CODE § 16-1509 (1997); IOWA CODE § 633.223 (1997); MASS. GEN. LAWS. ch. 210, § 7 (1997); W. VA. CODE § 48-4-11 (1997).

ing section examines whether these and other issues can be satisfactorily resolved through analogizing the situation to adoption.

2. *Effects on Inheritance: An Analogy to Adoption?*

A potential solution to some of the problems raised by technologies is to analogize the bequeathing of cryogenically preserved reproductive materials to the act of giving up for adoption the children that are eventually born from them, thereby cutting off intestate inheritance rights running to the biological parent. While this analogy would solve some of the inheritance problems, the analogy does not fit well with the conceptual foundations of adoption statutes.

Statutes which restrict inheritance to only one set of parents can be seen as based on the idea that the biological parent has "released" the child to the adopting parent either by death or by affirmative act. That release assures society that the statutory cut-off of intestate inheritance rights is fair. If the biological parent has already died, then presumably the child has already inherited from their biological parent. If the biological parent consents to the adoption, then the biological parent is fully aware of the loss of intestate inheritance rights, but need only include their biological child in their will to avoid the effects of the law. Reproductive technologies prevent any analogy to this arrangement presumed by statute.

First, if the analogy to adoption is applied and inheritance rights are thereby cut off, an extreme posthumous child produced from frozen reproductive material will not have had the opportunity to inherit from his or her biological parent. Second, the act of placing genetic materials in cryogenic storage cannot be seen as analogous to giving a child up for adoption because there is no demonstration that the biological parent is aware that their eventual children will lose intestate inheritance rights. The rationale supporting the restriction that children can only inherit from one set of parents is lacking in this situation; logically, extreme posthumous children should be granted intestate inheritance rights in both their biological parents' estates and in the estate of their current parents.

The possibility of inheriting from two sets of parents raises an additional complication, though: if children who result from cryogenic technology are allowed intestate inheritance from two sets of parents because they are not adopted, there is little sense in limiting naturally produced children who are adopted to intestate inheritance from only one set of parents. While allowing extreme posthumous children to inherit from two sets of parents does amount to special legal treatment, a rational basis sufficient to withstand a constitutional challenge

would not be difficult to establish. First, allowing adoption in the first place is entirely a matter of state policy, and therefore, a state may limit that state-created right as it sees fit. Second, since the process resulting in more than two parents is not the product of a state statute, allowing intestate inheritance from more than one set of parents is simply a recognition of a biological and technological reality, rather than state-sanctioned discrimination.

3. *Proving Maternity*

Cryotechnology also raises the novel problem of establishing maternity. Recently, two situations demonstrating the potential for this problem were reported. While not raising the legal issue of proving maternity, the technological potential for such problems became a reality when twenty-eight-year old Julie Garber died, leaving behind twelve frozen embryos created from her eggs and sperm from an anonymous donor.²³¹ Evidently this was the first instance in the United States of a woman providing for posthumous reproduction.²³² Prior to the Garber situation, a doctor in Rome announced that two years after a woman's death he thawed the woman's frozen embryo and successfully implanted it in her sister's womb.²³³ While this issue is not complicated by presumptions as the issue of paternity can be,²³⁴ the same problems of identifying the child's mother to establish inheritance rights now exist. This situation leads to its own unique complications. In *Johnson v. Calvert*,²³⁵ for example, the California Supreme Court relied on intent to be the child's mother rather than genetics in resolving competing claims to an infant between the biological mother and the birth mother. However, in a situation involving proving maternity to a deceased woman in addition to the birth mother, intent to be the child's mother would have to be seen as equal, leaving genetics as the only possible determiner of maternity.

231. Ann Pepper, *Victim of Leukemia Leaves Embryos*, PORTLAND OREGONIAN, Dec. 22, 1996, at A34, available in 1996 WL 11418908. Ms. Garber's parents declared their determination to find a surrogate to bring at least one of the embryos to term. *Id.* at * 2. On December 7, 1997 the New York Times reported that one of Julie Garber's frozen zygotes had been successfully implanted in a surrogate mother. *Woman Who Died May Become a Mother*, N.Y. TIMES, Dec. 7, 1997, § 1, at 33.

232. See *supra* note 231.

233. *Vatican Denounces "Monstrous" Frozen Embryo Baby*, AGENCE FRANCE-PRESSE, Jan. 11, 1995, available in LEXIS, News Library, Curnews File; *Doctor's Claims of How Baby Was Born Doubted*, PATRIOT LEDGER, Jan. 18, 1995, available in LEXIS, News Library, Curnews File.

234. While there is no presumption that a child born to a woman is *her* child, until recently there has been no need for a presumption that presumed the only possible conclusion.

235. 851 P.2d 776 (Cal. 1993).

A court need not feel compelled to resort to DNA testing in such circumstances, though. In the absence of competing claims to maternity, nothing prevents a court from ruling that a child has two mothers. In fact, the two-mother precedent has already been established in the context of lesbian couple adoptions.²³⁶ To date, no court has limited inheritance rights to only one mother in such families. The question for courts facing the possibility of two mothers has become an evidentiary one, rather than one involving a principle of law. Traditionally, birth established maternity not as a matter of law but by virtue of eye-witness evidence. Recently, DNA testing has emerged as the most reliable method of establishing parentage. As a result, technological advances present a modern court with a conflict of evidence: (1) the traditionally accepted proof of maternity, eye-witnesses to the birth, and (2) DNA evidence establishing biological ancestry. In effect, technology has allowed the severing of two previously inseparable evidentiary conclusions. Existing legal principles do not exclude either mother in this circumstance, and therefore, when facing the issue of inheritance from birth and biological mothers, a court is compelled to rule that a child may inherit from both mothers.

4. *The Possibility of Four Parents*²³⁷

It is also possible for both biological parents to die, bequeathing the frozen zygote, preembryo or embryo for birth to parents without a

236. See generally Maxwell S. Peltz, *Second-Parent Adoption: Overcoming Barriers to Lesbian Family Rights*, 3 MICH. J. GENDER & L. 175 (1995) (discussing the legal barriers faced by lesbian couples seeking to have families).

[I]n recent years courts in roughly a dozen states and the District of Columbia have granted second-parent adoptions to lesbian and gay couples, overcoming statutory barriers by liberally interpreting provisions of adoption statutes in the best interests of the child. Yet these decisions have done more than simply create an additional avenue for adoption. Courts' recognition of second-parent adoption has conferred upon lesbian-headed family units a degree of legal status denied by legislatures and opposed by a majority of society. This anomalous right emerges because the virtually unprotected family law rights of lesbians happen to converge with the highly protected interests of children. The result is that the former can ride the latter into legally recognized status.

Id. at 177 (citations omitted).

237. Of course, modern technology makes it possible to have more than four "parents": (1) the genetic father, (2) the genetic mother, (3) a surrogate mother who gives birth to the zygote composed of the donated material, (4) the mother and (5) the father to whom the surrogate surrenders the child, and (6) an adopting mother and (7) adopting father should the child later be put up for adoption. Two other events increase the possibility of additional parents. First, it is also possible for the zygote to be placed into a surrogate for development into a preembryo or embryo, then removed for cryopreservation and later implanted into another surrogate. This would increase the number of potential "parents" to eight. Second, subsequent adoptions could of course increase the numbered parents, but such acts add nothing to the equation because they merely repeat a process already described. These possibilities are not discussed in the text because they do not increase the number of parents from whom one may inherit.

genetic relationship to the child. While this situation does not increase the number of new legal issues regarding inheritance claims and establishing parenthood, it complicates those issues already discussed. For example, this situation raises the question of whether parenthood should be established to both biological parents or would it be more "lucrative" to choose between combinations of biological and birth parents based on their various estate plans. As discussed in the previous section, existing legal principles ought to compel a court to recognize inheritance rights of the offspring which run to both biological parents and both birth parents.

B. The Wrath of the Rule Against Perpetuities

In any discussion of posthumous children, the effects of the Rule Against Perpetuities must be considered. The Rule invalidates any bequest of an interest that could possibly vest beyond a life in being plus twenty-one years.²³⁸ Obviously this is not a problem in the traditional situation since the biological mother is the life in being with regard to bequests to her children made by her or her late husband and her children will certainly be born within twenty-one years of her death. Just as obviously, though, this is not necessarily the case when current reproductive technology is considered.

In fact, the combination of advances in reproductive technology and the Rule Against Perpetuities produces some startling results. For example, the routine bequest "to all my children" has never violated the rule. However, the possibility of freezing sperm followed by artificial insemination after the father's death means that this simple bequest is invalid since it creates the classic possibility of the unborn widow.²³⁹ Similarly, artificial insemination means that bequests such as "to the children of my good friend Frank Jones" violate the Rule, since Frank's cryogenically preserved sperm could be used to impregnate his unborn widow over twenty-one years after his death.²⁴⁰ In fact, since the technology for impregnation after thawing frozen sperm was evidently available as early as 1953,²⁴¹ every bequest "to all my chil-

238. MCGOVERN, *supra* note 209, at 504.

239. Caroline Sappideen, *Life After Death—Sperm Banks, Wills and Perpetuities*, 53 AUSTRALIAN L.J. 311, 314 (1979). After making the bequest, the testator has some sperm frozen. Later, the testator marries a woman who was not born when he wrote his will. He dies. His wife (the unborn widow) waits 22 years before being artificially inseminated with his frozen sperm.

240. *Id.*

241. Kluger, *supra* note 4, at 106; see also W. Barton Leach, *Perpetuities in the Atomic Age: The Sperm Bank and the Fertile Decedent*, 48 ABA J. 942-44 (1962) (discussing sperm banks and the rule against perpetuities).

dren" since 1953 made in a state with the traditional perpetuities rule was, is, and will be invalid!²⁴²

A considerable measure of relief from this disquieting result is gained as a result of perpetuities reform and savings clauses.²⁴³ However, these solutions to the harshness of the effects of the Rule Against Perpetuities lead to their own set of complications. If the testator's bequests to his children who could be born after a life in being plus twenty-one years are valid, then the effects of those bequests must be considered.

C. Testate Inheritance Rights of Extreme Posthumous Children

1. Specifically Stated Bequests

A bequest "to my children, including whatever children are born from my [sperm or eggs] stored at Cryo-Keep" should be treated no differently than a bequest "to my grandchildren, including any born after my death." While there is no legal reason *unique* to heirs who develop from cryogenically preserved genetic material that should void such bequests, there are considerable practical problems a probate court must face in giving effect to specific bequests to extreme posthumous children.

The most obvious practical problem is determining how to distribute the estate if the testator calls for distribution to living and afterborn children in equal shares. Even if the testator provides specific amounts to then living children, the practical problem of how to distribute the undivided portion of the estate would remain. The potential number of posthumous children in such circumstances is not difficult to calculate, however. Certainly, in the case of frozen eggs, zygotes or embryos, the number is readily ascertained.²⁴⁴ In the case of sperm, medical testimony could establish the number of times the gametic material could be portioned out to attempt artificial insemination.

One issue involving inheritance rights in the pre-birth context is relevant here: the rights of the recipient of the frozen item. Since the

242. In fact, unless interpreted to refer only to children living at the time the will was written, an atypical interpretation of such references, the reference "to my children" also violates the Rule.

243. One of Professor Leach's proposed solutions to this problem was to extend the measuring life to "the period of. . . [the testator's] reproductive capacity, including any post-mortem period in which his sperm remains fertile." Leach, *supra* note 241, at 944. To date, no state has adopted this approach.

244. At least it is for the time being. Cleaving preembryos is one of the stages of cloning technology. There is no theoretical limit to the number of times that cells can be harvested from a preembryo in order to produce identical offspring.

item was bequeathed to that individual for use in producing a child,²⁴⁵ the bequest would either be considered conditional (*i.e.*, "to Mary as long as she uses it to produce *our* child") or precatory (*i.e.*, "to Mary, in the hope that she will use it to produce our child"). Without specific direction in the will, determining the testator's intention would be impossible. Presumably, if the bequest is interpreted as a conditional bequest to have a child and the bequest is disclaimed, then the condition could be imposed on any subsequent, contingent heir. Further, if a monetarily valuable bequest were conditioned on the heir attempting to have a child by use of the reproductive material, then a court should imply that the transfer of the reproductive material be made in a manner consistent with producing pregnancy. Traditionally, courts have been unwilling to add conditions other than those imposed by the wording of the will²⁴⁶; however, the very nature of bequests of reproductive material calls for shedding that traditional reluctance under these circumstances.²⁴⁷

2. Pretermission

The standard pretermission situation occurs when a testator dies before revising his will to include a child born after his will was last updated. Rather than exclude those afterborn children omitted from the decedent's will, all but one state²⁴⁸ provides some share of the estate for the omitted child as long as the omission was not intentional.²⁴⁹ An extreme posthumous child complicates the pretermission analysis in several ways.

First, pretermission statutes are premised on the assumed intent of the testator to include an afterborn child in the testator's will unless evidence of intent to exclude the child exists.²⁵⁰ For example, the Uni-

245. Even without an explicit testamentary statement to that effect, it must be presumed that a testator would not bequeath frozen zygotes as mantelpiece curios.

246. *See, e.g.*, *Knupp v. District of Columbia*, 578 A.2d 702, 705-06 (Ct. App. D.C. 1990); *In re Estate of Kerr*, 433 F.2d 479, 489-90 (D.C. Cir. 1970).

247. Potential problems such as the court refusing to imply conditions necessary to ensure that the reproductive material will be used to attempt conception emphasize the importance of advising a client regarding carefully worded bequests in these situations.

248. Wyoming is evidently the only state that does not have a pretermitted heir statute. *McGOVERN, supra* note 209, at 106 & n.1.

249. *See, e.g.*, UNIF. PROBATE CODE § 2-302 (1993).

250. There are two major distinctions in the types of pretermission statutes. The first distinction is whether evidence of intent to exclude which is not contained in the will may be introduced. *McGOVERN, supra* note 209, at 108. The second distinction is whether the statute covers only children born or adopted after the will or also includes children living at the time the will was executed. UNIFORM PROBATE CODE section 2-302, for example, covers only children born or adopted after execution of the will and prohibits extrinsic evidence regarding intent of the testator. UNIF. PROBATE CODE § 2-302.

form Probate Code (“UPC”)²⁵¹ provides a share to the pretermitted child unless “it appears from the will that the omission was intentional.”²⁵² Though technically all afterborn children, including posthumous children, are covered by the pretermisssion statutes,²⁵³ the purpose of a pretermisssion statute is to presume the deceased’s intent regarding his *living* children by presupposing that these children were *overlooked* rather than intentionally excluded. This statutory presupposition of the deceased’s intent regarding living children is quite reasonable. In fact, the presupposition is also reasonable with regard to the typical posthumous child—even though presuming that the deceased probably would have intended to provide for a child had the deceased known that the child might be born is somewhat strained. However, the logic underlying that presumption in the case of a child born several years after the testator’s death is far less compelling.

The simple fact that the testator took the unusual step of cryogenically preserving his or her reproductive material could be seen as an indication of the intention by the testator that the eventual posthumous child receive a share from the estate. If so, then it seems unlikely that a court would conclude that the testator desired to disinherit a product of the cryogenically preserved material. However, as the recent destruction in England of thousands of forgotten zygotes demonstrates,²⁵⁴ many people forget that the reproductive material is in storage. If a testator specifically devises reproductive material but does not include a testamentary provision for potential offspring from that material, a court could reasonably reach two contrary conclusions: either that the testator deliberately excluded such children, or that the testator’s mention of them in the will implied a desire to treat them as any other children. The inherent ambiguity in such actions strains theoretical foundations of pretermisssion statutes designed for less complex situations. Nonetheless, unless the testator specifically excludes children resulting from cryogenically preserved reproductive material, straightforward application of statutes which protect all afterborn children should result in the award of a share to the extreme posthumous child. In fact, given the demonstrated reluctance of courts to exclude children who were alive when the will was written even in the face of allowable extrinsic evidence,²⁵⁵ the exclu-

251. UNIF. PROBATE CODE § 2-302 (a)(1).

252. *Id.*

253. UNIFORM PROBATE CODE section 2-302 simply refers to a testator’s failure to include any of the testator’s children born after the execution of the will. *Id.*

254. Bonnie Erbe & Betsy Hart, *What Should Become of Un-needed Embryos?*, DAYTON NEWS DAILY, Aug. 9, 1996, at A15, available in LEXIS, News Library, Daydnew File.

255. MCGOVERN, *supra* note 209, at 108.

sion of children born after the testator executed the will would almost certainly have to be explicit and unequivocal.

The possibility of a testator forgetting about a potential posthumous child, as opposed to forgetting to amend his will, points out yet another important aspect of the pretermission laws. Pretermission laws are predicated on the notion that the testator was aware of the omitted child but forgot to amend his will.²⁵⁶ Long-term cryogenic storage can essentially reverse this formula: the testator is aware of the provisions in his will but forgets that additional children may eventually be born. It is one thing for a statute to supply the presumption that a parent intended to provide for all of his or her living children, but it is quite another thing for the statute to presume that same intention toward potential children, the possibility of whom the testator has completely forgotten about.²⁵⁷

The inherent differences between gametes and zygotes also raises the possibility of a distinction between them regarding pretermission. Zygotes, preembryos and embryos have the potential to develop into a human being upon implantation into a womb. A gamete has no such inherent potential. In attempting to intuit the intention of the testator in a pretermission situation, courts may be tempted to allow pretermission laws to cover children who result from frozen zygotes, but not those who result from frozen gametes, by reasoning that a testator is much more likely to be aware of potential offspring from frozen zygotes, preembryos or embryos than from frozen gametes.²⁵⁸ Courts may also be swayed by the sheer weight of numbers involved. Frozen semen contains millions of gametes. The process of obtaining a zygote, however, greatly reduces the likely number that would be frozen and probably reduces that number to less than twenty.²⁵⁹ Nurturing zygotes to the preembryo stage places an even greater practical limitation on the number eventually placed in storage. Further, since the process of obtaining and preserving reproductive material requires more active involvement by the parents the further along the develop-

256. *Id.* at 106.

257. An analogy to the inheritance rights of pretermitted *illegitimate* children does not fit this situation. Although the rights of illegitimate children are identical to the rights of children born within the marriage, see, for example, *In re Estate of Inger Heyn*, 266 F.2d 206, 207 (3d Cir. 1959), inheritance by illegitimate children often has certain prerequisites such as written acknowledgment. Such requirements have been held constitutional. See, e.g., *In re Estate of Erbe*, 457 N.W.2d 867 (S.D. 1990).

258. This distinction would not be subject to equal protection attack because it would be based on a factual inquiry into the intention of the testator.

259. For example, seven frozen preembryos were at issue in the *Davis* case, five frozen preembryos were at issue in the *Kass* case and only one in the *York* case. See also Appendix (describing the preservation process in detail).

mental stages at which cryostorage occurs, it is logical to assume that a testator was more likely to be aware of potential offspring the later in development freezing occurs.

Unfortunately for any court which finds itself faced with a pre-emption case involving offspring made possible by cryogenic technology, the court will not be considering how to treat millions of gametes or even a set of embryos; the court may very well be considering how to treat a living individual. Denying that individual a share of inheritance on the rationale that he or she developed from likely forgotten frozen sperm rather than a likely remembered frozen zygote is dubious. If no clear indication of the testator's contrary intent can be found, the safest course for a court would be to apply the statutory assumption that the testator intended for all afterborn children to be included in the testator's will.

D. Intestacy

In addressing intestate inheritance rights only two situations need be considered: pre-birth entities (gametes, zygotes, preembryos, and embryos) and the posthumous child.²⁶⁰ Neither gametes nor zygotes have any rights until their birth. As one commentator has observed, potentialities do not equal actualities: "Potential spouses do not have equal rights or powers or privileges with actual ones; nor do potential adults, potential presidents, potential graduates, potential citizens, or potential persons."²⁶¹ The closest one can come to recognizing any rights in a pre-birth stage of development is the description provided by the New York Supreme Court: "In point of fact, although an unborn child has certain rights under property law, his enjoyment of those rights is contingent upon his being born alive."²⁶² As the following sections demonstrate, though, interpretation and application of those statutes which provide those rights to unborn children is far from simple.

260. Consideration of the rights of living blood relatives to avoid their legal relationship to the posthumous child is an interesting, but tangential, issue. The courts in the *Davis* and *Kass* cases reached different conclusions in considering the right of potential future *parents* to avoid the status and obligations of parenthood. See *supra* notes 113-165 and accompanying text. Given that the courts in those cases considered the resolution of that issue to be a close decision, it is unlikely that a similar objection to a legal relationship from potential blood relatives would be honored.

261. Rem B. Edwards, *Abortion Rights: Why Conservatives Are Wrong*, NAT'L FORUM, Sept. 22, 1989, at 19.

262. *Endresz v. Friedberg*, 248 N.E.2d 901, 904 (N.Y. 1969).

1. *The Statutory Problem of Afterborn Heirs*

The question of intestate inheritance by a posthumous child is one of statute rather than common law because every state except Louisiana has codified and modified the common law intestate succession scheme.²⁶³ In all states in which the surviving spouse does not receive the entire estate of the decedent, the remaining property is divided among the children of the deceased.²⁶⁴ The statutory wording of who qualify as children of the deceased therefore becomes crucial in determining whether extreme posthumous children may inherit.²⁶⁵

The Uniform Probate Code illustrates the problems that extreme posthumous children pose in any attempt to determine their status under a given state's probate law. The UPC states that following the surviving spouse, property of the estate passes to "the decedent's descendants"²⁶⁶ who survive the decedent by 120 hours.²⁶⁷ The UPC does not define the term "descendants," presumably because the meaning is obvious. The official comment to section 2-103 merely states that "descendants" was selected over the term "issue" so that to avoid the biological connotation of "issue" so that adopted children would not be excluded from coverage.²⁶⁸ Obviously, this explanation does not provide any guidance with regard to posthumous children except by negative implication: since they are not excluded from the definition of "descendants," they must be included in it. This is consistent with a legal tradition that until very recently could not have anticipated heirs born years after a decedent's death. Thus, any bio-

263. Louisiana has never codified common law because its succession law has always been contained in the Napoleonic Code under which the Louisiana Territory operated at the time of its incorporation into the United States. LA. CIV. CODE ANN. arts. 870-1466 (West 1997).

264. DUKEMINIER & JOHANSEN, *supra* note 192, at 80-81.

265. Over a decade ago, the Los Angeles Superior Court was forced to address the question of how to apply succession law when both husband and wife die leaving behind frozen embryos. In 1983 Elsa and Mario Rios died leaving behind two frozen embryos. See Sandra Blakeslee, *New Issue in Embryo Case Raised Over Use of Donor*, N.Y. TIMES, June 21, 1984, at A16, available in LEXIS, News Library, Nyt File. The Rioses died intestate and did not leave instructions regarding the disposition of the embryos. *Id.* Mr. Rios was also survived by a son from a previous marriage. *Id.* Before the question of Mr. Rios' estate could be answered it was discovered that the embryos were not fertilized by Mr. Rios' sperm. *Id.* This discovery evidently precluded consideration of whether the frozen embryos could inherit from Mr. Rios' estate if thawed, implanted, and brought to term. *Id.* However, the issue of whether eventual children could inherit from Mrs. Rios remained and was decided in the negative by the Los Angeles Superior Court in 1985. See Thomas H. Maugh II, *Legacy of a Dead L.A. Couple; OK Granted to Implant 2 Disputed Frozen Embryos*, L.A. TIMES, Dec. 4, 1987, at 3, available in LEXIS, News Library, Lat File.

266. UNIF. PROBATE CODE § 2-103 (1991).

267. *Id.* § 2-104.

268. *Id.* § 2-103 commentary.

logical descendant of the deceased, regardless of when or how they came to be born, would be a "descendant" under section 2-103.

If the UPC said nothing more, a rule could be easily discerned and applied. However, the UPC attempts to address the issue of afterborn heirs specifically as follows: "An individual in gestation at a particular time is treated as living if the individual lives 120 hours or more after birth."²⁶⁹ Unfortunately this provision, which has no accompanying explanatory comment and has been adopted by nine states,²⁷⁰ does not explain what "afterborn heirs" are being distinguished from. It is not clear whether section 2-108 is simply re-phrasing the traditional presumption of paternity²⁷¹ or is distinguishing afterborn heirs "in gestation" from afterborn heirs who result from cryogenic storage.²⁷² The previous version of section 2-108 stated that individuals who were conceived before the decedent's death, but born after it, inherit as though they had been born while the decedent was alive.²⁷³ Even when one assumes that the provision was changed for a particular purpose, whether the change narrows the class of potential heirs by excluding those conceived before the decedent's death but placed in cryopreservation before the decedent's death, is not clear. Regardless of the reason for the change, inheritance based on conception occurring prior to the decedent's death is the law in nineteen states.²⁷⁴

Adding to the muddle is the fact that section 2-108 does not define "in gestation." Once upon a time, gestation could only refer to post-

269. *Id.* § 2-108.

270. ALASKA STAT. § 13.12.108 (Michie 1996); ARIZ. REV. STAT. § 14-2108 (1996); HAW. REV. STAT. § 560:2-108 (1996); MINN. STAT. § 524.2-108 (1996); MONT. CODE ANN. § 72-2-118 (1995); N.M. STAT. ANN. § 45-2-108 (Michie 1997); N.D. CENT. CODE § 30.1-04-08 (1997); S.D. CODIFIED LAWS § 29A-2-108 (Michie 1997); W. VA. CODE § 42-1-3f (1996).

271. The previous version of section 2-108 read: "Relatives of the decedent conceived before his death but born thereafter inherit as if they had been born in the lifetime of the decedent." UNIF. PROBATE CODE § 2-108 (1983). The reason for the change in wording is not clear but one must assume that either a change in meaning or a clarification was intended. Unfortunately, neither a new meaning nor a clarification is apparent.

272. It is possible that section 2-108 is an attempt to do both (i.e., distinguish traditional afterborn heirs from cryogenically preserved heirs and state the traditional presumption of paternity for *in utero* heirs); however, one would expect that an attempt to amalgamate two separate concepts would be either more explicitly worded or accompanied by an explanatory comment.

273. UNIF. PROBATE CODE § 2-108 (1991).

274. ALA. CODE § 43-8-47 (1996); ARK. CODE ANN. § 28-9-210 (Michie 1995); CAL. PROB. CODE § 6407 (West 1996); COLO. REV. STAT. § 15-11-108 (1996); FLA. STAT. ch. 732.106 (1996); HAW. REV. STAT. § 560:2-107; IDAHO CODE § 15-2-108 (1997); ME. REV. STAT. ANN. tit. 2, § 108 (West 1996); MD. CODE ANN., EST. & TRUSTS § 3-107 (1996); MICH. COMP. LAWS § 27.5109 (1996); NEB. REV. STAT. § 30-2308 (1996); N.J. STAT. ANN. § 3B:5-8 (1996); N.Y. EST. POWERS & TRUSTS LAW § 4-1.1 (McKinney 1997); OR. REV. STAT. § 112.075 (1996); S.C. CODE ANN. § 62-2-108 (Law. Co-op. 1996); TENN. CODE ANN. § 31-2-108 (1996); UTAH CODE ANN. § 75-2-108 (1996); VA. CODE ANN. § 64.1-8.1 (Michie 1997); WYO. STAT. ANN. § 2-4-103 (Michie 1997).

conception, in utero development.²⁷⁵ However, this meaning is clouded by the now routine sequence of conception, traditional gestation, cryogenic storage,²⁷⁶ traditional gestation, and birth. Moreover, none of the nine states which have enacted section 2-108 as part of their probate law have defined "gestation."²⁷⁷

Further complicating the analysis of section 2-108 is the unstated premise that a descendant must be alive to inherit. Just as the meaning of "descendant" was apparently too obvious to merit stating, the requirement that one be alive to inherit is not explicitly stated in the UPC, but is implicit in section 2-108 which states that individuals in gestation are treated as living while in gestation if they subsequently survive birth by 120 hours.²⁷⁸ As a result, if section 2-108 is interpreted so that "in gestation" does not include zygotes, preembryos and embryos in cryogenic storage, then one must conclude that at the moment of fertilization the zygote is "in gestation" and alive for purposes of section 2-108, ceases to be alive upon freezing, then becomes alive again when thawed. Such an application of section 2-108 and the state laws modeled on it would lead to serious theoretical problems.

First, no compelling case has been made for conditioning biologically-based inheritance rights on the timing of the cryopreservation procedure. That the law would mandate inquiry into both the time of a deceased's fatal accident and the moment of cryopreservation to determine whether the eventual child was "alive" at the time of the decedent's death is absurd. This situation is not analogous to inquiries into simultaneous deaths for three reasons. First, simultaneous death inquiries focus on the timing of the end of life rather than the end of one life and the beginning of another. This leads directly to the sec-

275. According to the American Heritage Dictionary, gestation is "the period of carrying developing offspring in the uterus after conception." AMERICAN HERITAGE DICTIONARY 556 (2nd College ed. 1985). The ramifications of the different possible definitions of "in gestation" are discussed, *infra*, in notes 254-73 and accompanying text.

276. Using the term "cryogenic interruption" would beg the question just as would using the term "cryogenic gestation."

277. ALASKA STAT. § 13.12.108 (Michie 1996); ARIZ. REV. STAT. § 14-2108 (1996); HAW. REV. STAT. § 560:2-108; MINN. STAT. § 524.2-108 (1996); MONT. CODE ANN. § 72-2-118 (1995); N.M. STAT. ANN. § 45-2-108 (Michie 1997); N.D. CENT. CODE § 30.1-04-08 (1997); S.D. CODIFIED LAWS § 29A-2-108 (Michie 1997); W. VA. CODE § 42-1-3f (1996).

278. In some states the statute addressing afterborn heirs is more explicit than the UPC. For example, OREGON REVISED STATUTE section 112.075 states: "The relationships existing at the time of the death of the decedent govern the passing of the net intestate estate, but persons conceived before the death of the decedent and born alive thereafter inherit as though they were alive at the time of the death of the decedent." OR. REV. STAT. § 112.075. The implication that only the living may inherit is more obvious here than in the UPC. Also, the reference to conception, rather than "gestation," unambiguously covers cryopreserved zygotes, preembryos, and embryos as long as conception occurred prior to the decedent's death.

ond distinction: in the context of intestacy, simultaneous death inquiries inevitably result in a grant of inheritance rights to the heirs of the party deemed to have predeceased the testator; a similar inquiry into coincidental death and cryopreservation would result in a *denial* of inheritance rights to one's *offspring*. Finally, an inquiry into the timing of death and cryopreservation would actually be premised on the unsupported assumption that the deceased would want to deny inheritance rights to their offspring born following cryopreservation.

The second reason for not conditioning inheritance rights on the timing of the cryopreservation process is that avoiding the loss of inheritance rights by bad timing is precisely why afterborn heirs have been allowed to inherit since at least the time of the Roman Empire.²⁷⁹ To illustrate how easily the "bad timing" situation can arise, consider this uncomplicated scenario: father and mother arrive at the fertility clinic at separate times to deposit sperm and eggs; they depart at separate times as well; upon the second deposit fertilization occurs and the clinic prepares for cryopreservation; the second parent to leave is involved in a fatal accident after leaving the facility. A probate court applying a version of section 2-108 interpreted as excluding cryopreserved zygotes would be forced to inquire as to precisely when the parent died as compared to precisely when the zygote was actually frozen.²⁸⁰

Third, if the zygote is to be considered alive ("in gestation") prior to freezing, "not alive" while frozen, then alive upon thawing, peculiar legal problems develop. For instance, if the frozen zygote is not considered alive, then prior to freezing the zygote, it would possess inchoate inheritance rights which it would lose upon freezing (because it was no longer legally alive), even though it was subsequently born. If that is the case, this would be the first time a medical procedure re-

279. *Developments in the Law—Medical Technology and the Law*, 103 HARV. L. REV. 1519, 1559 (1990). "Since the days of the Roman Empire, a fetus in existence at the time of the testator's death and subsequently born alive has been entitled to inherit property equally with its living siblings." *Id.*

280. Admittedly, this kind of second-by-second inquiry occurs in simultaneous death situations, but that has some theoretical legitimacy—who was alive at the time of the decedent's death? In the case of cryopreservation this type of inquiry would pile logical legal theory on top of logical legal theory to reach an illogical result. We start from the premise that only people alive can inherit. Then we expand this to include children conceived before the decedent's death because, while not truly alive in the traditional sense, we feel that to ignore the reality of their inchoate existence and deny them inheritance rights due to an accident of timing would not only be unjust but would ignore the fact of parentage. However, to deny a child inheritance rights based on when they were placed in cryopreservation is to do exactly what the exception sought to avoid: denying inheritance rights due to an accident of timing that negates the reality of an ongoing biological relationship with the deceased.

sulted in the loss of legal rights.²⁸¹ The alternative is to treat the frozen zygote as “not alive,” or “not in gestation,” and allow it to retain the inchoate rights it gained prior to freezing. If that approach is taken, then there seems no logic in allowing one frozen zygote to retain inheritance rights because it was frozen *after* the deceased died while denying those rights to a zygote frozen *before* the deceased died. Since couples usually deposit sufficient gametes to create several zygotes, the duration and sequence of the fertilization and cryopreservation procedure could result in some zygotes acquiring inheritance rights, while other zygotes that were part of the same process being denied those rights. Again, we return to the issue of the logic of providing inheritance rights based on the timing of a medical procedure over which the parents ultimately have no control, rather than the undeniable biological connections on which the rights of afterborn heirs have always been based.

If zygotes, preembryos, and embryos are allowed to retain inchoate inheritance rights because they were in gestation at the time of the decedent's death, subsequent freezing can delay birth indefinitely. Thus, the basic problem posed by the use of cryotechnology remains: applying the laws of inheritance when children of the deceased are born years after the decedent's death.

2. *The Statutory Problem of Paternity vs. Inheritance*

At this point, the issue of presumption of paternity discussed earlier,²⁸² must be revisited. As previously explained, several states provide a presumption of paternity if a child is born within either ten months or 300 days following the death of the decedent.²⁸³ This presumption of paternity is distinct from granting afterborn children the right to be treated as living at the time of the deceased's death. Unfortunately, when cryotechnology is involved, that distinction causes problems in several jurisdictions.

281. The only medical procedure which alters, rather than eliminates, legal rights is a sex change operation. Of course, when an individual undergoes a sex change they do lose the right to enter the bathroom of their former sex, but this circumstance is readily distinguishable: a sex change is surgical and results in fundamental physiological changes, cryopreservation is not surgical and does not alter the zygote, preembryo, or embryo in any way. Moreover, a sex change does not actually result in a loss of rights but rather a substitution of the same rights and restrictions imposed on both sexes.

282. See *supra* notes 209-32 and accompanying text.

283. See *supra* notes 209-11 and accompanying text. Several states require birth within ten months or 300 days of the decedent's death, although one state requires birth within 280 days. See *supra* notes 209-11 and accompanying text.

Since cryotechnology allows storage of reproductive material at various stages of development, it is possible for children to benefit from a presumption of paternity but lack intestate inheritance rights. The potential for violating the fundamental premise that children inherit from their parents exists in twelve states: Alabama,²⁸⁴ Arizona,²⁸⁵ Colorado,²⁸⁶ Hawaii,²⁸⁷ Minnesota,²⁸⁸ Montana,²⁸⁹ New Jersey,²⁹⁰ New Mexico,²⁹¹ North Dakota,²⁹² South Dakota,²⁹³ Tennessee²⁹⁴ and Wyoming.²⁹⁵ In Alabama, Colorado, New Jersey, Tennessee and Wyoming, it is possible for a child to be conceived from the deceased's frozen sperm after the decedent's death and born within the time al-

284. ALA. CODE §§ 26-17-5(2)(a), 43-8-47 (1996) (presuming paternity if the child is born within 300 days of the death of the mother's husband, and requiring conception prior to death for intestate inheritance).

285. ARIZ. REV. STAT. ANN. §§ 25-814(A)(1), 14-2108 (West 1996) (presuming paternity if the child is born within 10 months of the death of the mother's husband, and requiring the child to be "in gestation" at time of decedent's death).

286. COLO. REV. STAT. §§ 19-4-105, 15-11-108 (1996) (presuming paternity if the child is born within 300 days of the death of the mother's husband, and requiring conception prior to death for intestate inheritance).

287. HAW. REV. STAT. §§ 584-4(2)(A), 560:2-107, 560:2-108 (1996) (presuming paternity if the child is born within 300 days of the death of mother's husband, and requiring either conception prior to the father's death or requiring the child to be "in gestation" at time of decedent's death for intestate inheritance). The situation in Hawaii is confusing because evidently two versions of that state's afterborn heir statute exist: one in which the heir must be "in gestation" at the decedent's death, *id.* § 560:2-108, and another in which the heir must be conceived at the time of the decedent's death, *id.* § 560:2-107.

288. MINN. STAT. §§ 257.55, 524.2-108 (1996) (presuming paternity if the child is born within 280 days of the death of the mother's husband, and requiring the child to be "in gestation" at time of decedent's death for intestate inheritance).

289. MONT. CODE ANN. §§ 40-6-105, 72-2-118 (1995) (presuming paternity if the child is born within 300 days of the death of the mother's husband, and requiring the child to be "in gestation" at time of decedent's death for intestate inheritance).

290. N.J. REV. STAT. ANN. §§ 9:17-43, 3B:5-8 (West 1996) (presuming paternity if the child is born within 300 days of the death of the mother's husband and requiring conception prior to death for intestate inheritance).

291. N.M. STAT. ANN. §§ 40-11-5, 45-2-108 (Michie 1997) (presuming paternity if the child is born within 300 days of the death of mother's husband, and requiring the child to be "in gestation" at time of decedent's death for intestate inheritance).

292. N.D. CENT. CODE §§ 14-17-04, 30.1-04-08 (Michie 1997) (paternity presumed if the child is born within 300 days of the death of mother's husband, and requiring the child to be "in gestation" at time of decedent's death for intestate inheritance).

293. S.D. CODIFIED LAWS §§ 25-8-57, 29A-2-108 (Michie 1997) (presuming paternity if the child is born within 10 months of the death of mother's husband, and requiring the child to be "in gestation" at time of decedent's death for intestate inheritance).

294. TENN. CODE §§ 36-1-102, 31-2-108 (1996) (presuming paternity if the child is born within 300 days of the death of mother's husband, and requiring conception prior to death for intestate inheritance).

295. WYO. STAT. ANN. §§ 14-2-102, 2-4-103 (Michie 1997) (paternity presumed if child born within 300 days of the death of mother's husband, and requiring conception prior to death for intestate inheritance).

lotted for the presumption of paternity, yet not receive intestate inheritance rights because the child was not *conceived* before the decedent died. In Arizona, Minnesota, Montana, New Mexico, North Dakota and South Dakota, if "in gestation" is interpreted to exclude cryopreserved zygotes, preembryos and embryos, then regardless of whether conception occurs before or after the decedent's death, the child will not have intestate inheritance rights despite enjoying the presumption of paternity if born within the statutory period following the death of the decedent. The conflict in both logic and theory presented by denying children the right to inherit from their parents is obvious.

Cryopreservation technology also makes it possible for a child to gain intestate inheritance rights but not the presumption of paternity. This potential exists in thirteen states²⁹⁶: Alabama, Alaska, Arizona, Colorado, Minnesota, Montana, New Jersey, New Mexico, North Dakota, South Dakota, Tennessee, West Virginia and Wyoming. In all of these states, if cryopreservation of the zygote, preembryo or embryo occurs after the death of the decedent, it is possible for an afterborn child to be either conceived or "in gestation" (depending on the statute in question) at the time of the decedent's death, yet not born within the allotted statutory period for the presumption of paternity.

In fact, depending on how "in gestation" is defined and when cryopreservation occurs, at least sixty combinations of these rights are possible. The combinations result from the confluence of three factors. The first is whether a state provides a presumption of paternity if the child is conceived prior to the decedent's death or the state has a "born within 300 days of the death of the mother's husband" type of statute. The second factor is the timing of cryopreservation and birth. The third factor is whether the statute that grants intestate inheritance rights is based on either conception or the commencement of gestation prior to the decedent's death. Therefore, before considering a chart which illustrates the combinations, it is necessary to explain the possible interpretations of "in gestation."

As mentioned above,²⁹⁷ gestation has traditionally meant in utero development.²⁹⁸ Of course, this definition was developed in a time

296. See *supra* notes 288-95. The potential may actually exist in thirteen states if Hawaii is included. As mentioned in note 287, the situation in Hawaii is confusing because evidently two versions of that state's afterborn heir statute exist: one in which the heir must be "in gestation" at the decedent's death, HAW. REV. STAT. § 560:2-108 (1996), and another in which the heir must be conceived at the time of the decedent's death, *id.* § 560:2-107.

297. See *supra* notes 275-77 and accompanying text.

298. Incidentally, this definition is also found in BLACK'S LAW DICTIONARY, but this source is of no value in the analysis. BLACK'S definition of gestation is "the time during which a woman carries a fetus in her womb, from conception to birth." BLACK'S LAW DICTIONARY 687 (6th ed.

when this was the only possible method of gestation. Not all sources are so restrictive in defining the term. For example, Webster's Third International Dictionary defines gestation in pertinent part as: "the carrying of young [usually] in the uterus from conception to delivery . . . the incubation of eggs."²⁹⁹ Two things are of interest in this definition. The first is the qualification "*usually* in the uterus." The second is the reference to "incubation"; the same source defines "incubate" in pertinent part as "to maintain . . . under prescribed and [usually] controlled conditions . . . favorable for hatching or development . . . to cause to develop"³⁰⁰ What is clear from these various definitions is that at least three interpretations of "in gestation" are possible: (1) "in the process of developing," (2) "in utero development," and (3) "any point after conception." The third interpretation is arguably a legitimate possibility since cryopreservation can occur after conception; however, this interpretation effectively equates to "conception" which was the term replaced by "in gestation" in UPC Section 2-108.

The following tables illustrate the applications of reproductive technology and possible interpretations of "in gestation" in combination with the presumptions of paternity and afterborn heirs' right to inheritance. Prior to the use of cryopreservation technology in the area of reproduction, only the last two situations noted in the tables were possible: conception prior to the father's death with the only possible variation being duration of the resulting pregnancy. As the tables demonstrate, reproductive technology now allows every possible combination of inheritance rights and presumptions of paternity. What was once both intuitive and easily predictable has now proliferated into sixty combinations which include the illogical results of gaining a presumption of paternity but no inheritance rights as well as obtaining inheritance rights but no presumption of paternity.

1990). However, the definition is taken from *Dazey v. Dazey*, 122 P.2d 308 (Cal. Dist. Ct. App. 1942), in which the court refers to an unidentified dictionary as its authority.

299. WEBSTER'S THIRD INTERNATIONAL DICTIONARY 952 (1971).

300. *Id.*

TABLE 1(A)

SITUATION: ZYGOTE CREATED AFTER FATHER'S DEATH,
CHILD BORN AFTER 10 MONTH/300 DAY PERIOD

Type of Jurisdiction	Inheritance Rights if Gestation Defined As:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	No presumption of paternity/ No inheritance rights	No/No	No/No
Paternity presumed if child born within 10 month/300 day period after father's death	No/No	No/No	No/No

TABLE 1(B)

SITUATION: ZYGOTE CREATED AFTER FATHER'S DEATH,
CHILD BORN WITHIN 10 MONTH/300 DAY PERIOD

Type of Jurisdiction	Inheritance Rights if Gestation Defined As:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	No/No	No/No	No/No
Paternity presumed if child born within 10 month/300 day period after father's death	Yes/No	Yes/No	Yes/No

TABLE 2(A)

SITUATION: ZYGOTE FROZEN PRIOR TO FATHER'S DEATH,
CHILD BORN AFTER 10 MONTH/300 DAY PERIOD

Type of Jurisdiction	Inheritance Rights if Gestation Defined As:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/No	Yes/No	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	No/No	No/No	No/Yes

TABLE 2(B)

SITUATION: ZYGOTE FROZEN PRIOR TO FATHER'S DEATH,
CHILD BORN WITHIN 10 MONTH/300 DAY PERIOD

Type of Jurisdiction	Inheritance Rights if Gestation Defined As:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/No	Yes/No	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	Yes/No	Yes/No	Yes/Yes

TABLE 3(A)

SITUATION: ZYGOTE *IN VITRO* AT FATHER'S DEATH,
 ZYGOTE THEN FROZEN AFTER FATHER'S DEATH,
 CHILD BORN AFTER 10 MONTH/300
 DAY PERIOD

Type of Jurisdiction	Inheritance Rights if Gestation Defined As:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/No	Yes/Yes	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	No/No	No/Yes	No/Yes

TABLE 3(B)

SITUATION: ZYGOTE *IN VITRO* AT FATHER'S DEATH,
 ZYGOTE THEN FROZEN AFTER FATHER'S DEATH,
 CHILD BORN WITHIN 10 MONTH/300
 DAY PERIOD

Type of Jurisdiction	Inheritance Rights if Gestation Defined As:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/No	Yes/Yes	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	Yes/No	Yes/Yes	Yes/Yes

TABLE 4(A)
SITUATION: ZYGOTE CREATED PRIOR TO FATHER'S DEATH
AND ZYGOTE FROZEN PRIOR TO FATHER'S
DEATH, CHILD BORN AFTER 10 MONTH/
300 DAY PERIOD

Type of Jurisdiction	Definition of Gestation:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/No	Yes/No	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	No/No	No/No	No/No

TABLE 4(B)
SITUATION: ZYGOTE CREATED PRIOR TO FATHER'S DEATH
AND ZYGOTE FROZEN PRIOR TO FATHER'S
DEATH, CHILD BORN WITHIN 10
MONTH/300 DAY PERIOD

Type of Jurisdiction	Definition of Gestation:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/No	Yes/No	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	Yes/No	Yes/No	Yes/Yes

TABLE 5(A)

SITUATION: ZYGOTE *IN UTERO* AT FATHER'S DEATH AND
 ZYGOTE FROZEN AFTER FATHER'S DEATH, CHILD
 BORN AFTER 10 MONTH/300 DAY
 PERIOD

Type of Jurisdiction	Definition of Gestation:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/Yes	Yes/Yes	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	No/Yes	No/Yes	No/Yes

TABLE 5(B)

SITUATION: ZYGOTE *IN UTERO* AT FATHER'S DEATH AND
 ZYGOTE FROZEN AFTER TO FATHER'S DEATH,
 CHILD BORN WITHIN 10 MONTH/300
 DAY PERIOD

Type of Jurisdiction	Definition of Gestation:		
	Carrying the child	In the process of development	Any point beyond conception
Paternity presumed if child conceived before father's death	Yes/Yes	Yes/Yes	Yes/Yes
Paternity presumed if child born within 10 month/300 day period after father's death	Yes/Yes	Yes/Yes	Yes/Yes

3. *Distribution Issues Involving Extreme Posthumous Children*

In those states in which extreme posthumous children may be entitled to intestate inheritance, two situations may arise. In the first situation, the potential extreme posthumous child is specifically provided for in a will, but intestate property remains to be distributed. In the second situation, the entire estate, including the reproductive material that may eventually produce an extreme posthumous child, passes according to intestacy laws.

The only issue raised by the first situation is how the estate is to be divided so that the interests of the potential extreme posthumous children are protected. As discussed above,³⁰¹ determining the number of potential offspring is simply a matter of counting the number of frozen eggs, zygotes, preembryos or embryos.³⁰² In the case of frozen sperm, even though millions of sperm may be stored, medical testimony could establish the maximum number of portions into which the gametic material could effectively be divided for artificial insemination attempts. Once the number of potential offspring is established, the number of living intestate heirs would be added to determine the total number of potential heirs; the intestate estate would be divided into that number of shares. The living heirs would be given their shares as in a typical probate proceeding, while the remainder of the estate would be held and distributed to extreme posthumous children as they are born.³⁰³ Should the number of potential extreme posthumous children be reduced (*e.g.*, through failed conception attempts, miscarriages or stillbirths³⁰⁴) a distribution of that share would be divided among the living and potential posthumous heirs.³⁰⁵

Resolving the second scenario in which the entire estate must pass according to intestate law is more complicated. While the same method of dividing the estate in order to provide for potential extreme posthumous children would be used, the complicating factor is that the reproductive material that may eventually produce extreme

301. See *supra* note 244 and accompanying text.

302. The ability to cleave human cells from preembryos, thereby creating a theoretically unlimited supply of identical offspring which could be born at different times, will likely be perfected in the near future.

303. Protection of the interests of potential afterborn heirs can be afforded in one of two ways: either by placing their shares in escrow, or by filing a bond that would cover their shares in the event of their birth. The latter is commonplace when a trust is terminated, but afterborn beneficiaries are a possibility. See RESTATEMENT (SECOND) OF TRUSTS § 340 cmt. (e) (1959).

304. The most recent article available documents a successful implantation rate of 7.7% when implanting frozen and thawed embryos and a pregnancy rate of only 16% in those receiving frozen and thawed embryos. David Levron et al., *Pregnancy Potential of Human Oocyte: The Effect of Cryopreservation*, 323 NEW ENG. J. MED. 1153, 1153 (1990). Obviously, successful birth rates will be lower than those documented pregnancy rates.

305. For instance, assuming there is no surviving spouse, if three heirs are currently alive and two zygotes are in cryostorage, the estate would be divided in ninths, with the living heirs each receiving their one fifth presently. Then as additional heirs were born, they would receive their one fifth distribution. If the number of zygotes is reduced, thereby reducing the number of potential additional heirs, then heirs living at the time of that reduction would receive an additional distribution based on equal division of that share. Thus, in the example provided herein, if a zygote is thawed but fails to develop after implantation, the one fifth share held in escrow (or protected by a bond), for that had been held for potential heir would be divided by four (the number of living heirs plus the remaining zygote in cryostorage), and distributed accordingly.

posthumous children is itself property of the estate.³⁰⁶ Thus, current heirs would actually inherit the material that could eventually produce an extreme posthumous heir.³⁰⁷ This raises two issues.

The first issue is division of the reproductive material among the current heirs. Resolving this issue is not difficult. As is currently the case with items in an estate which are not susceptible of division (e.g., a family heirloom), the heirs agree to a division of the estate. In this context, the value of the reproductive material is a matter of negotiation and its resolution is reduced to a settlement agreement. Determining the value of the material is not difficult in this context as it is simply a matter of the private negotiating process; resort to third party evaluation is not necessary. If the parties cannot agree and must resort to judicial determination of the value of the material, the calculation would be simple: the value of the material if sold to a medical facility.³⁰⁸ Arguments that the material has a "special" nature and therefore is insusceptible of valuation³⁰⁹ fail because these items are routinely bought and sold. Moreover, any additional, "special" value asserted by the heirs would fall into the category of sentimental or emotional value and should be treated the same way that the emotional value aspect of family heirlooms is considered in tort cases—as having no additional compensable value at all.³¹⁰ Complicating the

306. See *supra* text accompanying notes 73-78 (discussing classification of reproductive material as property which is subject to ownership, bequeathing, and inheriting).

307. One colleague, Professor Douglas Beloof, has suggested that the probate court might refuse to allow the deceased's offspring to inherit the deceased's reproductive material out of a public policy concern that the court would be assisting the commission of incest should the deceased's children use the material themselves. Interview with Douglas Beloof, visiting professor, Northwestern School of Law, at Northwestern School of Law (Nov. 17, 1997). The idea is interesting, but is addressed in two ways. First, the motivation of the current heir need not be so singularly focused. The current heir may not wish to have a child themselves, but may wish for another sibling to be born from a surrogate. Second, the court could order that transferral of the deceased's reproductive material be made at the appropriate facility and in the appropriate fashion (e.g., artificial insemination of someone who is not related to the deceased) so as to avoid any possibility of incest. *Id.*

308. Recently an Oregon jury awarded a man \$1,250,000 when the hospital storing his sperm lost the sperm. Laura Trujillo, *Hospital Will Pay \$1.25 Million in Lost Sperm Case*, PORTLAND OREGONIAN, Oct. 11, 1997, at A1, available in 1997 WL 13127860. The man had made the sperm deposits prior to chemotherapy treatments in case those treatments left him sterile. *Id.* The plaintiff's argument was not based on the value of the sperm itself, though, but on the plaintiff's loss of his ability to have a family. *Id.*

309. See, e.g., George R. Smith, III, *Australia's Frozen "Orphan" Embryos: A Medical, Legal and Ethical Dilemma*, 24 J. FAM. L. 27, 31 (1985-86) (arguing that such material cannot be given an economic value).

310. Typically claims for sentimental or emotional damages for loss of property are considered too speculative to allow. See, e.g., *Carpel v. Saget Studios, Inc.*, 326 F. Supp. 1331, 1333 (E.D. Pa. 1971) ("The alleged lost sentimental value . . . is so highly speculative that it is not a proper element of damages for consideration by the jury. There are no guidelines available to aid the

determination of value, though, would be the claim that whoever receives custody of the reproductive material would also be a potential guardian or birth parent of the extreme posthumous heir and thereby have some control over yet another portion of the deceased's estate. However, that potential additional gain would be of inconsequential value since it is both speculative and remote as it will not inure directly to the guardian's benefit if indeed it ever occurs.

The second issue raised involving intestate inheritance by extreme posthumous heirs is that the extreme posthumous heirs would themselves be heirs of whatever reproductive material that remains in cryostorage after their birth. Initially, this would seem to greatly complicate calculation of distribution as the potential heirs would be entitled to a re-division of the remaining material in cryostorage. Such re-division should not be necessary, though, since the extreme posthumous heirs would simply be entitled to a distribution of a set amount of funds rather than the property that was once in the estate. Their interests in this manner would have been protected by the appointment of a guardian *ad litem* during the probate proceedings and their shares would come from either an escrow account or as a result of bond posted precisely for this purpose.³¹¹

III. THE DIFFICULTIES OF LEGISLATIVE SOLUTIONS

As noted above,³¹² the long-standing unrestricted right to bequeath property cannot be circumvented by a legislative declaration that these items are not property because this would be a taking requiring compensation. The creation by a legislature of a new legal status which is neither property nor person faces several objections. First, since current legal principles allow these items to be bequeathed, the only reason for creating a new legal category would be to prohibit such bequests. This is an extreme and unnecessary step because placing safeguards on either the bequest or the guardianship of these items would be much more appropriate than creating an entirely new category of legal existence which is neither property nor person. Second, creating a special category that prohibits recognition of the deceased's instructions regarding such items on the theory that they are

jury in determining a dollar value for this loss."); see also *Herberg v. Swartz*, 578 P.2d 17, 26 (Wash. 1978) (stating that it is impermissible to value property solely for its sentimental value); *Palin v. General Constr. Co.*, 287 P.2d 325, 328 (Wash. 1955) (stating that recovery of damages cannot be had on the basis of purely sentimental value); *Kimball v. Betts*, 169 P. 849, 850 (Wash. 1918) (commenting that determination of value does not include sentimental or fanciful value).

311. See *supra* note 303.

312. See *supra* note 196.

something more than property would actually afford greater protection for gametes, zygotes, preembryos and embryos than for minor children whom the courts attempt to place into custodianships as directed by the decedent's will.³¹³ Third, the law already allows these items to be donated and sold; it makes little sense to prohibit the transfer at death of things that may be transferred during life. To be consistent and effective, a ban on the posthumous transfer of these items would have to be combined with a ban on all such transfers; in effect, a legislature would have to take the unprecedented step of declaring these items to be both *sui generis* and *res extra commercium*.³¹⁴

Further, constitutional issues arise if bequeathing reproductive material is prohibited. First, prohibiting the bequest of these items means that they must escheat to the state. Mandating that something escheat to the state amounts to a taking for which due process requires adequate compensation.³¹⁵ Further, if the reproductive material is to be bequeathed to the surviving spouse, then the procreative rights of the surviving spouse also must be considered if a law purports to ban the bequest. As one commentator has observed, "[r]espect for the procreative liberty of the surviving spouse should permit posthumous thawing and implantation to occur. The survivor has a real interest in procreating, which the frozen embryo serves well [A] law that prohibited posthumous implantation would infringe the survivor's procreative liberty, and is unnecessary."³¹⁶

While an outright prohibition of the right to bequeath these items would be unprecedented, impractical and probably unconstitutional, this does not mean that it is impossible to limit the right to bequeath these items; therefore, the issues and problems relevant to this legislative option must be examined. Any effort at suggesting detailed legislation in this area would require consideration of numerous philosophical and political issues, and consideration of those areas is beyond the scope of this inquiry. However, while it is not realistic to speculate about the details of comprehensive legislation in this area, it

313. UNIF. PROBATE CODE § 5-202 (1975) (amended 1993).

314. Roman law used the term *res extra commercium* to refer to things which were deemed inalienable. Oliver Metzger, Note, *Making the Doctrine of Res Extra Commercium Visible in United States Law*, 74 TEX. L. REV. 615, 615 (1996) (citing 2 CHARLES P. SHERMAN, ROMAN LAW IN THE MODERN WORLD 139-41 (1917)). In the modern world, few things fit into this category, and *res extra commercium* has never been formally applied in U.S. law. *Id.*

315. See *supra* note 196. Legislatively deeming these items to be something other than property (and therefore not covered by the Fifth and Fourteenth Amendments) would not end the inquiry but would force judicial examination of the nature of property. As discussed above, see *supra* notes 66-71 and accompanying text, the proper analysis requires the conclusion that these items are property.

316. ROBERTSON, *supra* note 50, at 111.

is worthwhile to point out the larger difficulties which the drafters of such legislation would face.

Assuming the political will existed to regulate the right to bequeath and inherit these items, several issues of legal classification must be addressed. First, the threshold issue is legislative recognition of the biological differences among gametes, zygotes, preembryos and embryos. Egg and sperm have no inherent potential to develop beyond their condition as gametes. Once these gametes have joined with each other to form a zygote, their biological nature changes radically. Zygotes, preembryos and embryos by virtue of their varying potential to develop into human beings are inherently distinct from gametes, and this distinction might justify distinct legal treatment of them. Further, since the potential for development varies significantly among the zygote, preembryo, and embryo stages, it may be possible to justify distinct legal treatment of these three as well. Finally, since none of the post-conception group has the ability to develop into a human being unless implanted in a woman, that characteristic might justify treatment which is different once the items are inside of a woman's body.³¹⁷ Any legislation which does not fully integrate consideration of those biological distinctions risks foundering on the constitutional requirement that legislation have, at the very least, a rational basis.³¹⁸

IV. CONCLUSION

The foregoing discussion provides an analytical framework for addressing the issues raised by the effect of reproductive technology in the field of inheritance law. As has been demonstrated, gametes, zygotes, preembryos and embryos are inescapably *property*. They are not persons nor are they properly classified as occupying a category between persons and property. Moreover, since the correct analytical framework demonstrates that "persons" are not outside of the category of "property" but are undeniably within a sub-category of property, any legislation that attempted to establish these items as non-property would be both unprecedented and theoretically infirm. The proper judicial approach therefore should be to acknowledge the nature of gametes, zygotes, preembryos and embryos as property. Fur-

317. The abortion rights cases apparently have relevance here only after the item has been implanted because they address rights in the context of a woman and her body. In the case of items which have yet to be implanted, those concerns are non-existent.

318. Indeed the constitutional requirements may be significantly higher in certain instances: "Embryo protection laws, however, even if they do not infringe bodily integrity, do interfere with decisions about having biologic offspring and thus limit procreative choice." ROBERTSON, *supra* note 50, at 108.

ther, although it is possibly legitimate to classify these items as a *sui generis* type of property, no adequate appropriate analogies exist to guide the courts once this conclusion is reached.

As property, a probate court has jurisdiction over such items in one's estate. Additionally, as property, such items may be bequeathed unless a statute specifically prevents it. Currently, no laws prohibit such bequests, and the consistent, historical trend of jurisprudence favors maximizing the freedom of the deceased in disposing of his estate.

The existence of probate property which may itself eventually become an heir to an estate does not pose insurmountable problems. There appears to be no reason why the offspring produced from cryopreserved gametes, zygotes, preembryos or embryos should not be permitted to inherit if provided for by the testator. Further, existing methods of preserving property for unborn, contingent trust beneficiaries can readily be used to preserve property for distribution to heirs born long after the death of the testator.

Intestate succession, however, presents some problems that apparently may only be solved through statutory reform. While intestate succession generally is granted to afterborn heirs, judicial interpretation of particular statutory wording will determine whether an afterborn heir may inherit even though the heir is conceived before the deceased has died. The most sensible analysis based on biological reality indicates that such afterborn heirs should be allowed to inherit. Nevertheless, statutory reform is needed in several states to resolve statutory inconsistencies which grant presumptions of paternity but deny inheritance rights to afterborn heirs, or which deny the presumption of paternity but grant inheritance rights.

As stated in the introduction to this Article, the source of the legal conundrums discussed here is the inherent inability of law to maintain pace with technologically-driven social change. Law is, by nature and design, the social institution which changes most gradually. As a result, the law faces difficulties when confronted with technological developments that transcend traditional categories. As one commentator has observed:

Once we start to separate sex from conception and gestation from genetics, we jeopardize some rather basic assumptions about the entire structure of life. If a child can have many mothers—genetic, gestational, custodial—how can we use the traditional concept of “mother” or “family” to judge who should raise the child?³¹⁹

319. David DeVoss, *Lives in Limbo: Ethical and Legal Implications for Frozen Embryos*, REDBOOK, Feb. 1990, at 102, available in LEXIS, News Library, Arcnews File (quoting Michael

That question, as is true of the other, similar questions addressed in this Article, is not an end-point, but typifies the modern challenge to law.

The autocatalytic process of technologically driven social change forces the abandonment of traditional concepts in favor of more relevant, more flexible points of view. The push of technology inevitably challenges every area of law, and now, after several hundred years of relative quietude, the law of inheritance must face the winds of major, technologically-driven, social change.

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APPENDIX

THE TECHNIQUES AND PROCEDURES OF
CRYOPRESERVATION OF
REPRODUCTIVE MATERIAL

Since 1990, cryopreservation of embryos has become routine. In 1993 alone approximately "13,000 human embryos were thawed and implanted into American women."³²⁰ The increasingly frequent use of these and other reproductive technologies which are the subject of this Article merits a brief account of the technological processes at issue.

CRYOPRESERVATION OF HUMAN EMBRYOS

Human embryos can be frozen at the zygote, early cleavage, or blastocyst stages.³²¹ Which stage is best is undecided.³²² Some studies have shown that the post-thaw survival rate can range from nine to eighty-eight percent and pregnancy rates can range from zero to fifty-three depending on which developmental stage the embryo was frozen.³²³ "A literature review . . . indicate[s] that currently available cryopreservation procedures are most successful for one-cell fertilized oocytes."³²⁴ Human embryos can be cryopreserved by slow cooling or rapid freezing techniques. Studies have shown no decrease in embryo survival or pregnancy rates with extended length of cryopreservation.³²⁵ However, out of fear that children could be born after decades in storage, in 1991 England passed a law which required the destruction of frozen embryos after five years of storage despite the absence of scientific evidence that a longer storage period was harmful.³²⁶

320. Robert Cooke, *New Evidence Prompts Concerns About Deep-Freezing Live Embryos*, HOUS. CHRON., Jan. 21, 1995 at A5, available in LEXIS, News Library, Hchron File.

321. Neri Laufer et al., *In-Vitro Fertilization*, in INFERTILITY: A COMPREHENSIVE TEXT 481, 497 (Machelle M. Seibel, M.D. ed., 1990) (hereinafter INFERTILITY).

322. Pierre Jouannet et al., *Cryopreservation and Infertility*, in INFERTILITY, *supra* note 321, at 525, 531.

323. Alan Trounson, Ph.D. & Jillian Shaw, Ph.D., *The Cryopreservation of Human Eggs and Embryos*, in REPRODUCTIVE MEDICINE AND SURGERY 860, 861 (Edward E. Wallach, M.D. et al. eds., 1995) [hereinafter REPRODUCTIVE MEDICINE AND SURGERY].

324. *Id.*

325. Yeong P. Lin, M.D. et al., *Successful Implantation of Frozen Sibling Embryos Is Influenced by the Outcome of the Cycle from Which They Were Derived*, 63 FERTILITY AND STERILITY 262, 267 (1995).

326. Jenny Hope, *Infertile Couples Fear for Their "Ice Babies,"* DAILY MAIL, June 20, 1995, available in LEXIS, News Library, Mail File.

Both slow cooling and rapid freezing require a cryoprotectant to be in the cryopreservation solution. The cryoprotectant enables the cells to survive cooling to sub-zero temperatures.³²⁷ The embryos selected for cryopreservation are transferred to the cryopreservation solution and allowed to equilibrate with the cryoprotectant.³²⁸ This allows water to pass out of the cells and cryoprotectant to pass in.³²⁹ Normally, equilibration is carried out at room temperature because the embryos tolerate the cryoprotectant concentrations well at this temperature.³³⁰

Slow Cooling

Once loaded into the container, the embryos are cooled to approximately minus seven degrees Celsius, a few degrees below the freezing point of the cryopreservation solution.³³¹ The embryologist touches the outside of the container with a precooled object. The ice formed at the point of contact spreads through the whole solution causing the salt concentration to rise and the embryo to begin dehydrating.³³² Slow cooling (less than one degree Celsius per minute) enables the equilibrium conditions to be maintained.³³³ The embryos are cooled to very low temperatures and stored in liquid nitrogen.³³⁴

Rapid Freezing

The rapid freezing technique utilizes higher concentrations of cryoprotectants; however, the cryoprotectant does not exceed forty percent of the total cryopreservation solution.³³⁵ The embryos are transferred into a 0.25-mL clear plastic insemination straw.³³⁶ The straw is sealed and, after three minutes, submerged into liquid nitrogen.³³⁷

327. Trounson & Shaw, *supra* note 323, at 861.

328. *Id.* at 862.

329. *Id.*

330. *Id.*

331. *Id.*

332. *Id.*

333. *Id.*

334. *Id.*

335. *Id.* at 863-64.

336. *Id.* at 864.

337. *Id.*

CRYOPRESERVATION OF HUMAN OOCYTES AND SPERM

Mature preovulatory human oocytes have been successfully cryopreserved using the conventional slow cooling techniques.³³⁸ However, survival rates tend to be low and there is a high risk of chromosomal abnormalities.³³⁹

Human sperm is tolerant to a wide range of cooling rates (one-half degree to fifty degrees Celsius per minute).³⁴⁰ After cooling, the sperm is stored in liquid nitrogen at approximately minus 196 degrees Celsius.³⁴¹ The ultra rapid cooling techniques used with embryos have not yet been tried with sperm.³⁴² Although there is some loss of motility due to the cold shock and/or dilution in the cryoprotective medium,³⁴³ studies have shown sperm motility remains stable when cryopreserved more than ten years.³⁴⁴ The primary risk of lengthy storage in liquid nitrogen is accumulated exposure to cosmic radiation which may not accumulate enough exposure to cause harm for hundreds of years.³⁴⁵ Despite this, the current trends persists that sperm survival declines over time so many banks limit storage time to ten years.³⁴⁶ Freezing sperm cells often reduces their fertilizing capacity; however, recent success in freezing spermatological stem cells may eliminate this problem.³⁴⁷

338. *Id.*

339. *Id.*

340. Don P. Wolf, Ph.D., *Cryopreservation of Sperm*, in REPRODUCTIVE MEDICINE AND SURGERY, *supra* note 323, at 795, 800.

341. *Id.* at 795.

342. *Id.* at 800.

343. Jouannet et al., *supra* note 322, at 528.

344. *Id.* at 530.

345. Wolf, *supra* note 340, at 803.

346. *Id.*

347. See Tim Beardsley, *Mouse to Father Rat?*, SCI. AM., Aug. 1, 1996, at 26; see also Lemonick, *supra* note 1, at 69.