Pepperdine Law Review

Volume 18 | Issue 3 Article 3

4-15-1991

Beyond Abortion: Human Genetics and the New Eugenics

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Beyond Abortion: Human Genetics and the New Eugenics

"And God Blessed them, and God said unto them, Be fruitful, and multiply."

—*Genesis* 1:28

I. INTRODUCTION

The promise of genetic science, particularly human genetic engineering, appeals to that in humans which strives for perfection — perfection in oneself, one's life, one's children. Genetic manipulation offers the dream of controlling disease,[1] extending life,[2] and providing one's offspring with super-human strength, intelligence, and beauty.[3] There is, however, an unsettling discomfort that manipulating life is indulging in a *hubris* that will eventually destroy humanity. By creating wholly unknown life forms, it is feared scientists may inadvertently unleash plagues of incurable disease. A new discrimination may emerge where genetically superior humans have greater entitlements than those whose genes are inferior.[4] History provides horrific examples of despots who would abuse the eugenic[5] power of genetic engineering to create a master race. Some see a future of loathsome monsters, constructed from the genetic material of variant species, mixing plants, animals, microbes, and even humans. Should such fears prove unfounded, there is a lingering uneasiness that tampering with the essence of life is somehow unholy, that there is an inherent evil in made-to-order life.

This Article examines the bioethical, moral and legal implications of using genetic sciences, including human genetic engineering, in a new, already emerging eugenics. Section II describes genetic engi-

1. PRESIDENT'S COMMISSION FOR THE STUDY OF ETHICAL PROBLEMS IN MEDICINE AND BIOMEDICAL AND BEHAVIOR RESEARCH, SPLICING LIFE 42 (1982) [hereinafter SPLICING LIFE].

2. *See* Begley, *Outsmart Your Genes, Be Young Forever*, NEWSWEEK, Jan. 7, 1991, at 49.

3. Rosenkranz, *Custom Kids and the Moral Duty to Genetically Engineer Our Children*, 2 HIGH TECH. L.J. 1, 1 (1987).

4. *See infra* notes 178-91 and accompanying text.

5. For a definition of eugenics, see *infra* notes 51-54 and accompanying text.

neering, its basic processes, and its potential eugenic uses. That section defines eugenics, examines its history, and the history of genetic engineering, describing current uses of genetics in genetic screening and gene therapy. Section III discusses the problem of access to genetic services, explores the problem of distributing its benefits and considers the difficulty of maintaining the confidentiality of an individual's genetic profile. That section examines the moral and religious arguments for and against using genetic engineering. Section III also looks at the legal arguments affecting both continued research and individual rights in using genetic science. Finally, section IV addresses the controversial present day eugenic effects of fetal abortions. Although the abortion issue often arises in the genetics debate, genetic engineering and eugenics will ultimately swallow the abortion issue. With every step toward perfecting the control of genetics and procreation, abortion becomes a mere relic - a crude, Draconian attempt from a bygone age to affect propagation. Eugenic uses of genetic engineering go beyond the termination of human life, to the potential alteration of what it means to be human. While these changes may hold great benefit, there is also the potential for great destruction. In the eugenics debate is a classic slippery slope down which science and the law, despite the best intentions, are already sliding.

II. BACKGROUND

A. Genetic Engineering

1. What is Genetic Engineering?

Genetic engineering[6] is the chemical manipulation of the genetic information contained in plant, animal and human cells,[7] causing biological alterations in both individual cells and organic structures.[8] Genetic information is stored in the nucleus of every living cell.[9] Genes containing this information are arranged along fibrous structures called chromosomes, composed mainly of deoxyribonucleic acid (DNA) and protein.[10] Humans have twenty-three pairs of chromo-

6. The term "genetic engineering" was coined in 1965 by Rollin Hotchkiss. J. AREEN, P. KING, S. GOLDBERG & A. CAPRON, LAW, SCIENCE AND MEDICINE 2 (1984).

7. Genetic engineering is possible in all life forms. This Article addresses only human genetic engineering.

8. *See* G. SMITH, GENETICS, ETHICS AND THE LAW 1 (1981). "The essence of engineering is design and, thus, the essence of genetic engineering . . . is the introduction of human design into formulation of new genes and new genetic combinations." Sinsheimer, *Troubled Dawn for Genetic Engineering*, in CONTEMPORARY ISSUES IN BIOETHICS 607, 607 (T. Beauchamp & L. Walters eds. 1978) [hereinafter CONTEMPORARY ISSUES].

9. THE AMERICAN MEDICAL ASSOCIATION ENCYCLOPEDIA OF MEDICINE 478 (C. Clayman ed. 1989) [hereinafter AMA ENCYCLOPEDIA].

10. *Id.* at 279. DNA is the substance that encodes and transmits the genetic char-

somes, one of each pair having been contributed by each of an individual's parents.[11]

Genetic structure influences virtually every aspect of human development including body weight, height, eye color, intelligence, disease resistance, longevity, and perhaps even personality.[12] By altering a cell's genetic code, it is possible to change not only the basic characteristics of that cell, but also the organism itself.[13] Depending on the type of cell modified, it is possible to alter all of the individual's offspring as well.[14]

2. Genetic Engineering Methods

Genetic engineering refers to specific "techniques by which scientists can add genetically determined characteristics to cells that would not otherwise possess them."[15] Genetic engineering occurs in two forms, depending on the kind of cells altered. When somatic cells are changed, those which compose an individual's tissues and organs, genetic change results only in that individual.[16] Such changes are not inheritable.[17] Applied to germ cells, sperm or ovum (egg), changes affect not only the individual but also his or her offspring.[18] Thus, the alteration of germ cells holds the greatest eugenic possibilities.

a. In Vitro Fertilization

In vitro[19] fertilization (IVF) allows manipulation of the egg and

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acteristics of a parent to his child. STEADMAN'S MEDICAL DICTIONARY 377 (W. Donnette ed. 1982). It is a long, twisted molecule consisting of subunits, the arrangement of which determines the genetic characteristics of the organism containing the molecule. TABER'S CYCLOPEDIC MEDICAL DICTIONARY 440 (C. Thomas ed. 1981).

11. AMA ENCYCLOPEDIA, *supra* note 9, at 279.

12. *Id.* at 478-80.

13. *Id.* at 484.

14. *Id.*

15. SPLICING LIFE, *supra* note 1, at 8.

16. Patterson, *The Great Genetics Debate*, INDUSTRY WEEK, Dec. 10, 1984, at 42. Genetic engineering of germ cells is called gametic genetic engineering. BIOLAW 105-06 (1989). The sperm and the egg are called gametes. 2 INTERNATIONAL DICTIONARY OF MEDICINE AND BIOLOGY 1172 (S. Landau ed. 1986) [hereinafter INTERNATIONAL DICTIONARY].

17. BIOLAW, *supra* note 16, at 105-06.

18. *Id.*

19. From the Latin, meaning "in glass." INTERNATIONAL DICTIONARY, *supra* note 16, at 1466.

young embryo outside the womb.[20] It may be useful when a woman's fallopian tubes are blocked or when a man's sperm count is insufficient to achieve fertilization without laboratory assistance.[21] In such circumstances, one or more eggs[22] are surgically withdrawn from a woman's ovary and fertilized with male sperm.[23] The resulting zygotes[24] are implanted into the uterus of the woman who is to bring the baby to term.[25] Once the zygote begins to divide, the organism is known as an embryo.[26] After the embryo has grown in the uterine wall for about six weeks, the embryo becomes a fetus.[27] IVF is not itself genetic engineering but it is a process used in many genetic technologies.[28] When the zygote or embryo is outside the mother, radical forms of genetic engineering, such as cloning[29] or gene-splicing,[30] may be performed.

b. Cloning

Cloning is a technology which makes possible production of offspring in the exact genetic likeness of the parent organism.[31] The

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20. *See* Smith v. Hartigan, 556 F. Supp. 157, 159 n.4 (N.D. Ill. 1983). This is a gametic process.

21. *See* Robertson, *Embryos, Families, and Procreative Liberty: The Legal Structure of the New Reproduction*, 59 S. CAL. L. REV. 939, 947 (1986) [hereinafter Robertson, *New Reproduction*].

22. Neuhaus, *The Return of Eugenics*, in GUARANTEEING THE GOOD LIFE: MEDICINE AND THE RETURN OF EUGENICS 3 (R. Neuhaus ed. 1990).

23. In 1985, over 20,000 children were conceived by artificial insemination. Note, *Genesis Retold: Legal Issues Raised by the Cryopreservation of Preimplantation Human Embryos*, 36 SYRACUSE L. REV. 1021, 1022 (1985). This process may be performed either *in vitro* or, more commonly, without removing the egg from the mother. *Id.* at 1022-23.

24. A zygote is the single cell which contains the genetic information from both the male and female but has not yet begun the process of division to form new cells. INTERNATIONAL DICTIONARY, *supra* note 16, at 3200.

25. It is not necessary to implant the fertilized egg in the woman who provided the ovum. *See, e.g., In re* Baby M., 217 N.J. Super. 313, 525 A.2d 1128 (1987), *aff'd in part and rev'd in part*, 109 N.J. 396, 537 A.2d 1227 (1988) (fertilized egg implanted in surrogate who later sought custody of child). One may observe that it is possible, using *in vitro* fertilization (IVF), for a child to have as many as six parents: the two who contract for the baby's conception, the woman who provides the egg, the man who provides the sperm, the woman in whose womb the zygote or embryo is implanted and that woman's husband.

26. INTERNATIONAL DICTIONARY, *supra* note 16, at 923.

27. Fletcher, *Moral Problems and Ethical Issues in Prospective Human Gene Therapy*, 69 VA. L. REV. 515, 534 n.71 (1983).

28. Note, *Designer Genes: An Ethical Perspective on Genetic Manipulation*, 15 RUTGERS COMPUTER & TECH. L.J. 447, 449 (1989).

29. *See infra* notes 31-34 and accompanying text.

30. *See infra* notes 35-40 and accompanying text.

31. Hudock, *Gene Therapy and Genetic Engineering: Frankenstein Is Still a Myth, But It Should Be Reread Periodically*, 48 IND. L.J. 533, 549-50 (1973). This is a gametic process. Animals as genetically complex as calves have been cloned. B. ZIMMERMAN, BIOFUTURE: CONFRONTING THE GENETIC ERA 271 (1984). As applied to eugenics, cloning would allow the copying of humans who have superior genetic traits. Attanasio,

nucleus of the cell to be replicated is microsurgically substituted for the nucleus of an egg cell.[32] The modified cell then multiplies and grows to produce an exact copy of the original organism from which the nucleus of the cell was taken.[33] Through cloning, it is possible to reproduce an organism asexually with both halves of the chromosome pairs coming from the same individual rather than from two parents.[34] Cloning provides the eugenic opportunity to create any number of individuals with the exact same genetically-based characteristics.

c. *Recombinant DNA*

Perhaps the most radical form of genetic engineering is recombinant DNA (rDNA), or gene-splicing. Through rDNA, scientists can isolate a specific DNA sequence from one individual and splice it to the DNA sequence of another individual.[35] Even the genetic material from different species may be combined.[36] Scientists have, for exam-

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The Constitutionality of Regulating Human Genetic Engineering: Where Procreative Liberty and Equal Opportunity Collide, 53 U. CHI. L. REV. 1274, 1282 (1986).

32. Hudock, *supra* note 31, at 549-50.

33. R. MCKINNELL, CLONING: A BIOLOGIST REPORTS 10-11 (1979). The steps required to clone a human would be, first, to remove the nucleus of the donor's egg cell. *Id.* at 82-85. If the subject to be cloned is female, she might even provide her own donor cell. *Id.* at 80. Next, a nucleus from any of the cells of the person to be cloned would replace the destroyed nucleus of the donor cell. *Id.* at 85-92. The microsurgical techniques to perform this portion of the process are, as yet, undeveloped. *Id.* at 87-90. Third, the new cell is placed *in vitro* in a nutrient medium where it would begin to divide. *Id.* at 92. Four to six days after initial cell division, it would be implanted in the uterus of a woman who would carry the baby to term. *Id.* at 93. The cloned individual would be the identical twin of the person who contributed the body cell. Lederberg, *Experimental Genetics and Human Evolution*, 100 AM. NATURALIST 549, 562 (1966). With banks of tissue cultures, it would even be possible to clone a deceased person using this process. *See* B. ZIMMERMAN, *supra* note 31, at 47.

34. Rivers, *Genetic Engineering Portends a Brave New World*, in HUMAN GENETICS 3, 10 (T. Mertens ed. 1975).

35. SPLICING LIFE, *supra* note 1, at 9. See *supra* notes 9 and 10 and accompanying text for a description of genes, chromosomes, and the function of DNA. Unlike cloning, this process alters the genetic code of the individual. Recombinant DNA technologies splice the chain of genes which are arranged in the chromosomes. *Id.* By rearranging the chain or substituting new genetic material, the genetic composition of the cell is altered. *Id.*

A process similar to rDNA is cell fusion wherein the genetic material from two different cells are combined to produce a hybrid. *Id.* This new cell exists, develops and reproduces in its own right. *Id.*

36. BIOLAW, *supra* note 16, at 104. In 1972, scientists first split DNA and then recombined it. Jackson, *Principles and Applications of Recombinent DNA Methodology*, in THE RECOMBINANT DNA DEBATE 39, 39 (D. Jackson & S. Stich eds. 1979). The possibility of combining traits from different species, even between plants and animals, significantly troubles the opponents of genetic engineering. *Id.* at 105.

ple, created a strain of "supermice" by injecting synthesized human growth hormone genes into mouse embryos.[37] Experiments in which copies of a human gene are transplanted into monkeys are part of an effort to treat adenosine deaminase, a rare genetic disorder affecting the human immune system.[38] Through rDNA, scientists may literally manipulate the building blocks of life. The cross-species combinations that are possible are limited only by the scientist's imagination.[39] Through the use of gene-splicing it would be possible to alter the nature of human life.[40]

3. The Importance of Genetic Engineering

The potential significance of human genetic engineering is difficult to overstate, especially as applied to eugenics. The development of genetic engineering has been called "a watershed in history, perhaps even in evolution."[41] It is believed human genetic experimentation will provide scientists with the ability to predict both an individual's expected performance as well as the performance of future generations.[42] Because of both the positive and negative potential of genetic engineering, there is considerable controversy whether such experimentation should even be permitted.[43] These experiments, for example, may alter the human "gene pool," the universe of existing human genes.[44] The present gene pool provides the variety of human characteristics that allow humans to adapt to changing environments.[45] Altering the gene pool would almost certainly affect the fu-

37. M. Singer, *Genetics and the Law: A Scientist's View*, 3 YALE L. & POL'Y REV. 315, 327 (1985). Similar attempts have been made with sheep and pigs. 50 Fed. Reg. 9760 (1985). A gene which controls growth in rainbow trout has been introduced into the genetic structure of a common carp creating a much faster growing carp. N.Y. Times, June 2, 1988, at A20, col. 1.

38. *Gene Therapy for Humans Moves Nearer to Reality*, N.Y. Times, May 26, 1987, at C1, col. 1 [hereinafter *Gene Therapy*]. These experiments were conducted at the Memorial Sloan-Kettering Cancer Center in New York. *Id.* University of California at San Diego researchers have successfully transplanted human genes into rabbits in experiments directed at regulating cholesterol, an important factor in controlling heart disease. *Gene Studies Emerging as Key Engine of Science*, N.Y. Times, Sept. 6, 1988, at C1, col. 1.

39. *See* Novick, *The Dangers of Unrestricted Research: The Case of Recombinant DNA*, in RECOMBINANT DNA, SCIENCE ETHICS, AND POLITICS 71, 85-91 (J. Richards ed. 1978).

40. Rivers, *supra* note 34, at 10.

41. *Whether to Make Perfect Humans*, N.Y. Times, July 22, 1982, at A22, col. 1. "Human beings [could] have the chance to 'rise above [their] nature' for 'the first time in all time'. . . ." SPLICING LIFE, *supra* note 1, at 68-69.

42. Elsas, *A Clinical Approach to Legal and Ethical Problems in Human Genetics*, 39 EMORY L.J. 811, 815 (1990).

43. See *infra* notes 232-255 and accompanying text for a discussion of regulatory attempts to restrict and limit genetic engineering.

44. Ziegler, *Battle of the Potato Field Highlights Future of Genetic Engineering*, Aug. 13, 1984 (LEXIS, Nexis library, Wires file).

45. Rosenkranz, *supra* note 3, at 23.

ture of humanity.[46]

Even if such genetic experimentation continues, there is considerable disagreement as to how soon the power to directly affect human genetic structure will be available. There are those who believe the possibilities of gene therapy[47] are near term.[48] Although many technical hurdles have been cleared in identifying and treating single-gene defects, other problems still remain.[49] It will be even longer before complex polygenetic human traits can be engineered.[50]

B. Eugenics

1. What is Eugenics?

Eugenics has been described as a social movement to improve the human species through the use of technology.[51] The eugenic poten-

46. *See* Hilts, *Clergyman Ask Ban on Efforts to Alter Genes*, Wash. Post, June 8, 1983, at A1.

47. Genetic engineering for purposes of gene therapy has two distinguishable goals depending on whether the cells affected are somatic or gametic. The goal of somatic gene therapy is to rectify a genetic defect in an individual. *See infra* notes 92-96 and accompanying text. *See also* Orkin & Williams, *Gene Therapy of Somatic Cells: Status and Prospects*, in MOLECULAR GENETICS IN MEDICINE 130, 130 (B. Childs, N. Holtzman, H. Kazazian, D. Valle eds. 1988). On the other hand, gametic genetic engineering is designed to alter genes *both* in the individual and the individual's offspring. *Id.* at 131. It is this latter use which may be eugenic. *See supra* note 16 and accompanying text.

48. *See, e.g.*, Gore & Owens, *The Challenge of Biotechnology*, 3 YALE L. & POL'Y REV. 336, 354 (1985) (noting that "the technology to perform gene therapy may be upon us sooner than originally imagined"); B. ZIMMERMAN, *supra* note 31, at 192 (stating that direct manipulation of complex, polygenic traits such as intelligence "probably won't be as much as 50 years and could be as short as 10").

49. Childs & Motulsky, *Recombinant DNA Analysis of Multifactoral Disease*, in MOLECULAR GENETICS IN MEDICINE 180, 180 (B. Childs, N. Holtzman, H. Kazazian & D. Valle, eds. 1988). *See infra* note 95 and accompanying text.

50. Robertson, *Genetic Alteration of Embryos: The Ethical Issues*, in GENETICS AND THE LAW III 115-17 (A. Milunsky & G. Annas eds. 1985) [hereinafter Robertson, *Genetic Alteration*]. "[I]t is a mistake to think that human applications of genetic engineering to root out even single-gene defects, much less for incredibly more complex multifactorial and polygenic traits, is just around the corner." *Id.* at 116. *See also* SPLICING LIFE, *supra* note 1, at 48 (stating that "[t]he technical uncertainties, the ethical implications, and the low probability of actually treating an affected person are strong contraindications against therapy of fertilized eggs or embryos becoming a useful clinical option in the near future."); D. KEVLES, IN THE NAME OF EUGENICS: GENETICS AND THE USES OF HUMAN HEREDITY 296 (1985) (asserting that "There is widespread agreement among geneticists that, with a few exceptions, gene therapy is distant for single-gene disorders and beyond sight for the polygenic variety."). Kevles warns that predictions of early success result from both biomedical advocates intent on justifying large government research grants and press reports based on insufficient examination. *Id.* at 296.

51. Neuhaus, *supra* note 22, at 1. The originator of the term "eugenics" defined it as "the study of agencies under social control that may improve or impair . . . future

tial of genetic engineering is considerable. There are a number of other genetic processes, however, that arguably have eugenic effects. These include genetic screening[52] and even the general practice of medicine.[53]

Eugenics may be classified as either negative or positive. Negative eugenics seeks to reduce or eliminate deleterious genes, while positive eugenics encourages desirable or superior traits.[54] Except for selective breeding through genetic screening, positive eugenics is still beyond the limits of current technology.[55] In contrast, negative eugenics already holds some footholds in current culture which cause little controversy. For example, states engage in negative eugenics through laws prohibiting incest and requiring couples to be tested for disease and other disorders prior to marriage.[56] Amniocentesis and other technologies allow doctors to examine the genetic makeup of the fetus well before birth.[57] Parental knowledge of the fetus' sex or

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generations either physically or mentally." Ferster, *Eliminating the Unfit — Is Sterilization the Answer?*, 27 OHIO ST. L.J. 591, 591 (1966) (quoting Sir Francis Galton, grandfather of the eugenics movement at the turn of the century). For a discussion of the history of the genetics movement, see *infra* notes 64-91 and accompanying text.

52. Genetic screening based on the presence of desired genetic traits may be part of a sperm bank's selective breeding process. *See* G. SMITH, *supra* note 8, at 104. *See also infra*, note 55 and accompanying text. Selective breeding, which operates by discouraging the procreation of couples who are likely to bear children with a significant genetic defect, is also common. For a discussion of recent developments concerning genetic screening therapy, see *infra* notes 92-106 and accompanying text.

53. For a discussion of the role of the practice of medicine in eugenics, see *infra* notes 59-63 and accompanying text.

54. van Loon, *A Buddhist Perspective*, in GENETICS AND SOCIETY 148, 154-55 (G. Oosthuizen, H. Shapiro & S. Strauss eds. 1980). This eugenic distinction parallels the distinction between genetic therapy, which seeks to alter or eliminate genes which cause negative characteristics, and genetic engineering, which seeks to promote positive traits. Note, *supra* note 28, at 452.

55. Such selective breeding includes the use of sperm banks which have been established to maintain the semen of "distinguished" persons beyond their lifetimes. Smith, *Through a Test Tube Darkly: Artificial Insemination and the Law*, 67 MICH. L. REV. 127, 147 (1968). In 1979, the Repository for Germinal Choice became operational in Escondido, California. It is designed to make available the sperm of Nobel Prize winners and other "creative, intelligent people." *Owner of "Genius" Sperm Bank Pleased by Results*, N.Y. Times, Dec. 11, 1984, at A17, col. 1. *See also Playboy Interview: William Shockley*, PLAYBOY, Aug. 1980, at 69.

56. Note, *Asexual Reproduction and Genetic Engineering: A Constitutional Assessment of the Technology of Cloning*, 47 S. CAL. L. REV. 476, 534-35 (1974). State statutes require premarital testing for maternal rubella, blood group, and Rh status. *Id.* at 535. For example, the State of New York provides for premarital testing to identify carriers of the sickle cell gene. N.Y. DOM. REL. LAW § 13-aa (McKinney 1988).

The United States Supreme Court approved compulsory sterilization for imbecility in Buck v. Bell, 274 U.S. 200, 207-08 (1927). In approving another form of negative eugenics, the Court stated, "It is better for all the world, if instead of waiting to execute degenerated offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind." *Id.* at 207. *See infra* notes 81-82 and accompanying text.

57. Note, *Sex Selection Abortion: A Constitutional Analysis of the Abortion Liberty and a Person's Right to Know*, 56 IND. L.J. 281, 284-85 (1981). Chorion villi sam-

genetic defects may result in abortion for purposes that could easily be described as eugenic.[58] Although these practices are not usually recognized as eugenic, their modern day use and prevalence portends the eventual acceptance of genetic engineering for eugenic purposes.

2. The Practice of Medicine as Eugenics

Some areas of medicine that are not usually recognized as eugenic affect the human gene pool. These include sterilization and surgical techniques that allow reproductive organs to function. However, even medicine that does not directly involve reproductive organs may alter the gene pool.[59] This is most evident in the treatment of disease, particularly genetically-based diseases, which normally result in death before the patient reaches reproductive age. Medicine often makes it possible for persons to reproduce who in an earlier era, because they would have died at an earlier age, would not have reproduced.[60] Genetic abnormalities in such persons are thus duplicated, altering the gene pool.[61] There is considerable disagreement as to how seriously the general practice of medicine affects the gene pool.[62] However, regardless of public concern over eugenic effects, the fact remains that medical treatment of such disorders impacts the

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pling reveals genetic makeup at eight to ten weeks, some six weeks earlier than amniocentesis. Robertson, *Procreative Liberty and Human Genetics*, 39 EMORY L.J. 697, 709 (1990) [hereinafter Robertson, *Procreative Liberty*].

58. *See* Green, *Genetic Technology: Law and Policy for the Brave New World*, 48 IND. L.J. 559, 560 (1973). Abortion for gender selection has received opposition. Wertz & Fletcher, *Fatal Knowledge? Prenatal Diagnosis and Sex Selection*, 19 HASTINGS CENTER REP. May-June 1989, at 21. Such abortions are illegal in Pennsylvania. Act 1989-64, 1990 Pa. Legis. Serv. 3204(c) (Purdon). A poll conducted in the early 1980s found that 75% of people surveyed approved abortion of an abnormal fetus. Henshaw & Martire, *Abortion and the Public Opinion Polls*, 14 FAM. PLAN. PERSP. 53, 59 (1982) (noting that 16% of the women polled felt it was morally wrong to have an abortion when the fetus has a severe genetic defect, while nine percent were unsure).

59. SPLICING LIFE, *supra* note 1, at 8.

60. *Id.* (corrective treatments that prolong life expectancies include insulin injection for diabetics and prescriptive lenses for myopia patients).

61. *Id.*

62. *Compare* J. FLETCHER, THE ETHICS OF GENETIC CONTROL 182 (1974) ("We are now approaching a situation in which genetic causes account for as many *or more* deaths than 'disease' in the popular sense." (emphasis in original)) *and* Francoeur, *We Can — We Must: Reflections on the Technological Imperative*, 33 THEOLOGICAL STUD. 428, 437 (Theological Studies, Inc., No. 3, 1972) (asserting that "Today's medicine has opened the door to a pollution of a human gene pool which may well be a death warrant for mankind.") *with* Lappe, *Moral Obligations and the Fallacies of "Genetic Control,"* 33 THEOLOGICAL STUD. 411, 419 (Theological Studies, Inc., No. 3, 1972) (stating that "Imminent 'genetic deterioration' of the species is for all intents and purposes, a red herring.").

gene pool by "increas[ing] the prevalence in the population of certain genes that have deleterious effects."[63] It is on the basis of such widely accepted practices that more radical eugenic processes may also find acceptance.

C. *Historical Background*

1. From Plato to Watson

Eugenics precedes the development of genetic science, but their histories have become intertwined. Plato idealized selective human breeding as the foundation for the creation of a superior Guardian class.[64] In ancient Sparta, expectant mothers gazed at statues of Castor and Pollux to encourage the birth of healthier, more perfect children.[65] In 1860, Austrian monk Gregor Mendel laid the foundation for genetics and more scientific selective breeding when he observed that characteristics of the pea plant were transmitted from generation to generation in a predictable manner.[66] Nine years later, Charles Darwin's cousin, Sir Francis Galton, coined the term "eugenics," asserting that the practice, when applied to humans through selective breeding, would give the "more suitable races or strains of blood a better chance of prevailing speedily over the less suitable."[67]

Mendel's theories were rediscovered in the early twentieth century when the ability to predict genetic characteristics was noted in both plants and animals.[68] In the early 1900s, eugenicists in the United States were confident that improvements in human genetic structure could be achieved through eugenics.[69] Proponents asserted that "mental illness, mental retardation, epilepsy, criminality, pauperism and various other defects were hereditary."[70] Since there were no known cures for hereditary defects, measures preventing propagation

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63. SPLICING LIFE, *supra* note 1, at 8.

64. *Plato, The Republic*, in I THE DIALOGUES OF PLATO 163, 217-21 (B. Jowett Trans. 3d ed. impression of 1931).

65. Warkany, *Congenital Malformations in the Past*, 10 J. CHRONIC DISEASES 84, 88 (1959).

66. *See generally* F. PORTUGAL & J. COHEN, A CENTURY OF DNA: A HISTORY OF THE DISCOVERY OF THE STRUCTURE AND FUNCTION OF THE GENETIC SUBSTANCE 112-14 (1977).

67. Golding, *Ethical Issues in Biological Engineering*, 15 U. CAL. L.A. L. REV. 443, 464 (1968), *quoted in* L. DUNN & T. DOBZLANSKY, HEREDITARY, RACE AND SOCIETY 9 (1946). *See also* Smith, *Genetics, Eugenics, and Public Policy*, 1985 S. ILL. U. L.J. 435, 437 [hereinafter Smith, *Genetics, Eugenics, and Public Policy*] (citing Comment, *Eugenic Artificial Insemination, A Cure for Mediocrity?*, 94 HARV. L. REV. 1850, 1852 (1981)).

68. *See* Morgan, *The Relation of Genetics to Physiology and Medicine*, in NOBEL LECTURES IN MOLECULAR BIOLOGY 1933-1977 3-4 (D. Baltimore ed. 1977).

69. Larson, *Human Gene Therapy and the Law: An Introduction to the Literature*, 39 EMORY L.J. 855, 868 (1990).

70. Ferster, *supra* note 51, at 592.

by "the unfit" were advocated.[71]

Eugenicists preached social reform citing fear that lower classes were reproducing in greater proportions than the rest of the population.[72] They urged the "well-bred" to increase their reproductive activity[73] and criticized democracy as a form of government that enables the ignorant masses to exercise political power over the intelligentsia.[74]

Believing that immigrants to the United States were a prime source of social decline, in 1912 the United States Public Health Service administered IQ tests to determine the extent of "feebleminded-ness" among entering classes of foreigners.[75] According to the tests, eighty-three percent of the Hungarians, eighty-seven percent of the Russians, eighty-three percent of the Jews and seventy-nine percent of the Italians demonstrated a source of feeblemindedness.[76] As a result, Congress passed the Immigration Restriction Act of 1924,[77] mandating entry quotas based upon the immigrant's nationality and the proportion of that nation's people living in the United States as of 1890.[78] Critics staunchly argued that the Act was racist and eugenically motivated.[79]

About that time, a more active eugenics program was developing in many states. By 1931, thirty-two states had passed eugenic laws authorizing the involuntary sterilization of certain groups.[80] The high water mark for eugenics came in 1927 when the United States Supreme Court upheld the constitutionality of a Virginia compulsory sterilization statute in the landmark case of *Buck v. Bell*.[81] In the majority opinion, Justice Oliver Wendell Holmes penned the state-

71. *Id.*

72. Cynkar, Buck v. Bell: *"Felt Necessities" v. Fundamental Values?*, 81 COL. L. REV. 1418, 1422-25 (1981).

73. *Id.* at 1422-27.

74. *Id.* at 1427.

75. Beckwith, *Social and Political Uses of Genetics in the United States: Past and Present*, in ETHICAL AND SCIENTIFIC ISSUES POSED BY HUMAN USES OF MOLECULAR GENETICS, 265 N.Y. ACAD. SCI. 46, 48 (M. Lappe and R. Morison eds. 1976).

76. *Id.*

77. Ch. 190, 43 Stat. 153 (1924). *See* Beckwith, *supra* note 75, at 49 (stating that "[p]robably the greatest impact of the eugenics movement on the nature of our society was the passage of the Immigration Restriction Act of 1924").

78. Beckwith, *supra* note 75, at 49.

79. *Id.* ("The testimony and support for this law was explicitly racist.").

80. Smith, *Genetics, Eugenics, and Public Policy*, *supra* note 67, at 438-39.

81. Buck v. Bell, 274 U.S. 200, 207 (1927). For an enlightening examination of this case, see Lombardo, *Three Generations, No Imbeciles: New Light on* Buck v. Bell, 60 N.Y.U. L. REV. 30 (1985).

ment that came to epitomize the eugenics movement: "Three generations of imbeciles are enough."[82]

Despite the Court's monumental decision supporting pro-eugenicists, the popularity of the eugenics movement began to decline.[83] State laws mandating involuntary sterilization were overturned.[84] Research in psychology, sociology, and anthropology in the 1930s began to show that not only hereditary, but also environmental influences, were important in determining human characteristics.[85] Crowning the eugenic decline and discrediting the movement as a whole were the atrocities of the Third Reich.[86] Experiments attempting to fashion a master race and the devastation of the Holocaust are the most often cited examples of the potential misuse of eugenics.[87]

Despite the horrors of Nazi Germany, however, the scientific basis of what might be called a new eugenics began in 1953, when Watson and Crick postulated the double helix of DNA as the chemical basis

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82. *Buck*, 274 U.S. at 207.

83. Cynkar, *supra* note 72, at 1454 (noting that "Though the number of sterilzations in Virginia dramatically increased following *Buck v. Bell*, the frequency of sterilizations in other states generally followed their pre-1927 pattern [of decline]."). These sterilization laws were found to be unconstitutional on equal protection, due process, or cruel and unusual punishment grounds. *Id.* at 1434.

Today nearly half the states have some form of sterilization legislation on the books. The present eugenic sterilization statutes include: CAL. PENAL CODE § 645 (West 1988); DEL. CODE ANN. tit. 16, §§ 5701-16 (Supp. 1990); IDAHO CODE §§ 39-3901 to 3910 (1985); ME. REV. STAT. ANN. tit. 34B §§ 7001-17 (1964); MISS. CODE ANN. §§ 41-45-1 to -19 (1972 & Supp. 1989); MONT. CODE ANN. §§ 50-5-501 to -505 (1989); N.C. GEN. STAT. §§ 35-36 to -50 (1990); OR. REV. STAT. §§ 436.205 -.335 (1987); VT. STAT. ANN. tit. 18, § 8705-16 (1987); VA. CODE §§ 54.1-2974 to -2980 (1950 & Supp. 1990); W. VA. CODE §§ 27-16-1 to -5 (1986). Courts typically have upheld the validity of these statutes. *See, e.g.*, Cook v. Oregon, 9 Or. App. 224, 230, 495 P.2d 768, 771-72 (1972) (equal protection challenge based on indigency rejected); *In re* Cavitt, 182 Neb. 712, 721, 157 N.W.2d 171, 178 (1968) (compulsory sterilization as a prerequisite to a parolee's release from state home held to be valid exercise of police power), *cert. denied*, 396 U.S. 996 (1970). *See also* Comment, *Eugenic Sterilization Statutes: A Constitutional Re-evaluation*, 14 J. FAM. L. 280-302 (1975) (increases in social problems may cause increased usage of eugenic sterilization laws).

84. Sterilization laws in seven states were found unconstitutional. *See* Williams v. Smith, 190 Ind. 526, 527-28, 131 N.E. 2, 2 (1921) (Indiana statute held to violate due process); State Board of Eugenics v. Clinic, No. 15, 442 (Cir. Ct. Marion County, Oregon, Dec. 13, 1921) (Oregon statute held to violate due process); Mickle v. Henrichs, 262 F. 687 (D. Nov. 1918) (Nevada statute held to be cruel and unusual punishment); Haynes v. Lapur Circuit Judge, 201 Mich. 138, 166 N.W. 938 (1918) (Michigan statute held to violate equal protection); Osborn v. Thomson, 103 Misc. 23, 169 N.Y.S. 638 (1918) (New York statute held to violate equal protection); Davis v. Berry, 216 F. 413 (S.D. Iowa 1914) (Iowa statute held to violate due process, impose cruel and unusual punishment and an improper bill of attainder); *rev'd on other grounds*, 242 U.S. 468 (1917); Smith v. Board of Examiners of Feeble-Minded, 85 N.J.L. 46, 54, 88 A. 963, 967 (1913) (New Jersey statute held to violate guarantees of equal protection).

85. *See* K. LUDMERER, GENETICS AND AMERICAN SOCIETY 139-44 (1972).

86. D. KEVLES, *supra* note 50, at 116-18.

87. *See* K. LUDMERER, *supra* note 85, at 127-28.

of heredity.[88] In 1961, scientists broke DNA's genetic code[89] laying the groundwork for its manipulation of the code and the potential construction of new life forms.[90] Finally, some thirty years after the discovery of the structure of DNA, experimenters began performing the first clinical trials with noninheritable, somatic-cell therapy on humans.[91]

D. Recent Developments

1. Genetic Screening and Therapy

It is now possible to diagnose a number of genetically induced diseases[92] in even the earliest forms of life.[93] Thousands of human diseases have genetic components.[94] Some diseases result from a defect in a single gene while others involve a number of genes.[95] Presumably these diseases may be cured by transplanting functioning copies of the appropriate normal gene into the patient's cells using rDNA.[96]

88. F.H.C. Crick, an Englishman, and James D. Watson, an American, worked together at Cambridge using X-ray diffraction methods developed by English physicist M.H.F. Wilkins to discover the shape and structure of the DNA molecule. I. ASIMOV, THE GENETIC CODE 129-30 (1962). *See also* J. WATSON, THE DOUBLE HELIX (1968). The DNA molecule is a long string of smaller molecules arranged into two parallel helixes shaped like bedsprings or "spiral staircases." *Id.* at 130. Discovering this structure was a critical step in making further genetic discoveries possible. *See* R. HUTTON, BIO-REVOLUTION: DNA AND THE ETHICS OF MAN-MADE LIFE 22-29 (1978).

89. J. CHERFAS, MAN-MADE LIFE 23 (1983).

90. *See* G. NOSSAL, RESHAPING LIFE 2 (1985).

91. Robertson, *Genetic Alteration*, *supra* note 50, at 115.

92. Childs, *Genetics and Preventative Medicine*, in GENETIC DISEASES AND DEVELOPMENTAL DISABILITY 7 (T. Sadick & S. Puelchel eds. 1979).

93. MOLECULAR GENETICS IN MEDICINE (Progress in Medical Genetics, New Series Vol. 7 (1988)) (stating that "Since 1976 over 500 prenatal diagnosis have been accomplished by analysis of fetal DNA samples."). Two diseases being targeted are Lesch-Nyham syndrome and adenosine deaminase deficiency. Their symptoms result from the lack of genes necessary to initiate production of enzymes, a characteristic of most diseases caused by a single-gene defect.

94. During the 1970s, it was estimated that at least 15,000,000 people living in the United States suffer from one or more inherited disorders. *Id.* These disorders account for 30% of the admissions to children's hospitals and 10% of adult hospital admissions. *Id.* A 1981 article claimed that 182 fetal conditions can be diagnosed prenatally. Stephenson & Weaver, *Prenatal Diagnosis: A Compilation of Diagnosed Conditions*, 141 AM. J. OBSTET. & GYN. 319 (1981).

95. *Gene Therapy*, *supra* note 38, at C1, col. 1. While the average person carries hundreds of genes that are in some way abnormal, no more than 10 are considered fatal when received from both parents. Henig, *Pitfalls of Genetic Screening: New Techniques Raise Difficult Ethical Questions*, Wash. Post, Jan. 29, 1991, at Z14.

96. *Gene Therapy*, *supra* note 38, at C1, col. 1. There is much experimentation in somatic genetic engineering, but not in humans. *Id.*

However, an even simpler form of genetic therapy, and subtler form of eugenics, is presently being practiced — genetic screening.

Screening for genetic abnormalities is a relatively simple process that may be used at three distinct points in a person's life. First, a genetic profile may reveal whether a person is likely to develop a particular disease or condition. Second, genetic information may affect an individual's marriage partner choice and whether one should produce children with a particular mate. Finally, such information may determine whether a pregnancy should be carried to term. Decisions made at each of these points have eugenic implications.

The genetic screening process consists of analyzing a blood sample to determine if an individual has recessive traits for genetic disease.[97] Some state laws require mandatory screening of newborns for hypothyroidism and phenylketonuria which may cause mental retardation.[98] Many states also screen for other types of inherited metabolic disorders.[99] Currently, the eugenic effects of such programs are fairly limited. With each new discovery of genetic links to disease, however, the likelihood increases that more eugenic programs will be implemented.[100]

Presently, genetic tests can screen for only a handful of diseases, all caused by single genes, but there is a potential to diagnose up to some three thousand disorders.[101] In many cases, early diagnosis can reduce the more serious effects of a disease.[102] The eugenic effect of such genetic screening is particularly acute when applied to early life forms.[103] For example, one future eugenic process would not even

97. Waltz & Thigpen, *Genetic Screening and Counseling: The Legal and Ethical Issues*, 68 NW. U.L. REV. 696-70 (1973). For a discussion of the ban on fetal tissue research, see *infra* notes 246-47 and accompanying text. Fetal genetic screening is currently practiced through amniocentisis. *Id.* at 700-01.

98. Elsas, *supra* note 42, at 844.

99. *Id.*

100. *See* D. KEVLES, *supra* note 50, at 285-86.

101. McAuliffe, *Predicting Diseases*, U.S. NEWS & WORLD REP., May 25, 1987, at 64. Federal legislation permits the use of public funds to establish voluntary screening and counseling programs for the purpose of controlling genetic diseases, with preference given to centers for sickle cell anemia and Cooley's anemia. National Sickle Cell Anemia, Cooley's Anemia, Tay-Sachs, and Genetic Diseases Act, 42 U.S.C. § 300b-1 to -6 (1982).

102. Elsas, *Newborn Screening*, in PEDIATRICS 222, 223 (A. Rudolph & J. Hoffman 18th eds. 1987). Some state legislatures require genetic screening of school children. *See, e.g.*, ILL. ANN. STAT. ch. 122 para. 27-8.1 (Smith-Hurd 1989); MASS. GEN. LAWS ANN. ch. 76, § 15A (West 1982); N.Y. EDUC. LAW § 904 (McKinney 1988).

Parents who learn that their genetic profile indicates the possibility of a child with a genetic defect have a number of options. They may 1) decide not to have children, 2) adopt, 3) reproduce with an egg or sperm donor, 4) conceive through IVF and then screen the embryo (this technique has yet to be developed), 5) conceive, undergo prenatal diagnosis, and abort if the fetus is affected by the genetic defect, or 6) have the child and live with the consequences. Robertson, *Procreative Liberty*, *supra* note 57, at 698-99.

103. D. KEVLES, *supra* note 50, at 285-86. Anti-abortionists oppose prenatal screen-

require genetic manipulation. A doctor would remove a number of eggs from a woman, fertilize them using IVF, and then profile the genetic characteristics of each embryo.[104] The eugenic effect is in the selection of embryos for implantation.[105] It is thus possible to implement a very effective eugenic program with merely the knowledge of which genes and combination of genes are involved in disease; actual genetic engineering is not necessary. Of course, when genetic profiling is used together with gametic genetic engineering, the eugenic possibilities are virtually limitless. A very large step is currently being taken toward creating these options in the "Human Genome Initiative."[106]

2. The Human Genome Initiative

The Human Genome Initiative is a fifteen year,[107] three billion dollar, congressionally funded study[108] directed at mapping and sequencing the fifty to one hundred thousand genes that constitute the human genome.[109] A genome is the set of chromosomes and genes that a particular species contains.[110] James Watson, part of the team that discovered the structure of DNA,[111] is the project director. Mapping determines the location of the genes on the chromosomes, while sequencing identifies a gene's constituent parts.[112] With this knowledge it will be possible to locate specific, disease-related genes and

ing as "search and destroy mission[s]." Robertson, *Procreative Liberty*, *supra* note 57, at 710.

104. Dubler, Murray, Rifkin, Salk & Lapham, *Ethics in Embryo*, HARPER'S MAG., Sept. 1987, at 37, 42.

105. An ethical and moral issue which may arise is embryo discard. Such discard is illegal in Louisiana and Missouri. LA. REV. STAT. ANN. §§ 9:121-9:133 (West Supp. 1991); MO. ANN. STAT. § 1.205 (Vernon 1991). Opponents of such laws argue that an embryo is too rudimentary in form and development to warrant such protection. *See* Robertson, *In the Beginning: The Legal Status of Early Embryos*, 76 VA. L. REV. 437, 444 (1990). An alternative to implanting is freezing the embryo for storage. *See* 1 BIO-LAW § 7-2.5 (1986).

106. The Human Genome Initiative is a project to identify the component parts of human genetic structure. *See infra* notes 107-12 and accompanying text.

107. COMMITTEE ON MAPPING AND SEQUENCING THE HUMAN GENOME OF THE NATIONAL RESEARCH COUNCIL, MAPPING AND SEQUENCING THE HUMAN GENOME 90 (1988).

108. Andrews, *Genetics and the Law: Introduction*, 39 EMORY L.J. 619, 619 (1990).

109. Fletcher & Wertz, *Ethics, Law and Medical Genetics: After the Human Genome is Mapped*, 39 EMORY L.J. 747, 754 (1990).

110. WEBSTER'S NEW COLLEGIATE DICTIONARY 346 (2d ed. 1959). For the chemical composition of the human genome, see *supra* notes 10-11 and accompanying text.

111. *See supra* note 88 and accommpanying text.

112. Fletcher & Wertz, *supra* note 109, at 754. About 1900 genes have already been mapped and 600 have been sequenced. This is two to four percent of the estimated total. *Id.* at 755.

the mechanisms of the diseases they cause.[113] This information is important in developing diagnostic and treatment technologies.[114] Because the Initiative is directed at the *entire* human genome rather than merely those genes that cause disease, it will also provide information that would be vital to both positive and negative eugenics programs.

III. THE EUGENIC IMPLICATIONS OF HUMAN GENETIC ENGINEERING

Arguments as to the wisdom of continued genetic experimentation and the possible eugenic effects of genetic engineering fall generally into three areas: biomedical ethics, morality and religion, and the law.[115]

A. Biomedical Ethics

Genetic engineering implicates the central moral principle of biomedical ethics, which is beneficence.[116] This principle implies an obligation "to confer benefits and remove harms."[117] Arguments favoring genetic experimentation emphasize the benefits of knowing the genetic causes of disease.[118] Arguments against such research cite the fact that genetic experiments inevitably involve human embryos[119] and, thus, are performed without the consent of the experi-

113. Elsas, *supra* note 42, at 826.

114. *See* Friedmann, *Progress Toward Human Gene Therapy*, 244 SCIENCE 1275, 1275 (American Assoc. for the Advancement of Science No. 4910, 1989) (asserting that "modern molecular genetics is providing tools for an unprecedented new approach to disease treatment through an attack directly on mutant genes").

115. There is a marked difference between the principles of law and ethics. This may be useful to keep in mind when examining the desirability of continued genetic experimentation. Fletcher and Wertz have articulated the distinction as follows:

> [L]aw expresses a basic minimum standard of human behavior considered acceptable in society. On the other hand, ethics aspires to an ideal of optimum behavior and conduct. . . . [W]hat is immoral and unethical may not always be illegal, nor should it necessarily be. . . . Law, despite its frequent association with the concept of justice, does not necessarily seek, nor achieve, justice; rather, law seeks to allocate power and claims to distribute the cost of risks and losses (compensation for injuries). Ethics on the other hand, is consciously concerned with seeking justice and bringing about social change to enhance the search for justice.

Fletcher & Wertz, *supra* note 109, at 750-51. Watson has stated: "[I]f we do not think about [the ethical issues of human genetic engineering] now, the possibility of our having a free choice will one day suddenly be gone." Watson, *Moving Toward the Clonal Man*, ATLANTIC, May 1971, at 50, 53.

116. T. BEAUCHAMP & J. CHILDRESS, PRINCIPLES OF BIOMEDICAL ETHICS 135 (1979).

117. *Id.* at 35-36 (emphasis omitted).

118. *See* Ruse, *The Dangers of Unrestricted Research: The Case of Recombinant DNA*, in RECOMBINANT DNA: SCIENCE, ETHICS AND POLITICS 103, 106 (J. Richards ed. 1978).

119. *See* P. RAMSEY, FABRICATED MAN 134 (1970) (stating that "a parent cannot legitimately submit a child who is yet a hypothetical nothing to additional hazards for the sake of the accumulation of knowledge"). *See also* Kass, *Making Babies — The New Biology and the "Old" Morality*, THE PUB. INTEREST, Winter 1972, at 18, 26-30

mental subject.[120] Beyond the conflict between the benefits and the burdens of genetic engineering lie more specific ethical problems, namely: access,[121] quality,[122] confidentiality,[123] decisionmaking control,[124] and self-concept.[125]

1. Access

In a market economy, not all people will have equal access to the benefits of genetic engineering.[126] Even existing genetic technologies do not reach all portions of the population equally. Women in higher economic strata, for example, have greater access to amniocentesis.[127] The more affluent will continue to be in a better position to purchase genetic services for their offspring. As a result, their children will be genetically better equipped to prevail than were their parents.[128] Limited access to genetic engineering will exacerbate the distance be-

(manipulation of embryos during artifical insemination and genetic screening poses serious moral issues as to effects of manipulations on the normalcy of the child to be produced and the parent's entitlement to manipulate).

120. "[W]hen measured by the principles of sound ethics or by the canons of medical ethics, germinal engineering would be an immoral experiment on the child-to-be — immoral because it is not consented to by the primary subject; immoral because, when he is not yet, the child suffers no defect which could justify anyone to give such consent on his behalf, or justify a physician in making the risk-filled balancing judgment." Ramsey, *Genetic Engineering*, in HUMAN GENETICS 233, 235 (1975) [hereinafter HUMAN GENETICS]. For a survey of concerns that arise with embryo research, see Robertson, *Embryo Research*, 24 U.W. ONTARIO L. REV. 15 (1986).

121. *See infra* notes 126-170 and accompanying text.

122. There are at least two quality issues affecting biomedical ethics. First, there are not enough genetic counselors to handle the needs created by multiplying technologies. Andrews, *supra* note 108, at 623. *See also* Wilfond & Fost, *The Cystic Fibrosis Gene: Medical and Social Implications for Heterozygote Detection*, 263 J. A.M.A. 2777, 2780-81 (1990) (screening done annually on 3,000,000 couples contemplating children would require the 950 certified genetic counselors and clinical geneticists in the United States to commit more than 17 weeks a year to cystic fibrosis alone). Second, medical schools do not emphasize genetics. N. HOLTZMAN, PROCEED WITH CAUTION 160-61 (1989).

123. *See infra* notes 171-92 and accompanying text.

124. Supporters of the use of genetic engineering assert that the patient's decisionmaking control is protected under the general doctrine of "informed consent." *See* Dyck, *Ethics and Medicine*, in ETHICS AND MEDICINE 114, 120-21 (S. Reiser, A. Dyck, W. Curren eds. 1977). Part of this issue is addressed as privacy at *infra* notes 256-74 and accompanying text.

125. Andrews, *supra* note 108, at 620-21. Regarding self-concept, see *infra* notes 316-18 and accompanying text.

126. SPLICING LIFE, *supra* note 1, at 67.

127. Andrews, *supra* note 108, at 622. An estimated 24% of all new mothers annually receive no prenatal care in the first trimester of pregnancy. U.S. DEP'T OF HEALTH AND HUMAN SERVICES, HEALTH, UNITED STATES 1989, 31 (1990).

128. Note, *supra* note 28, at 462.

tween social classes.[129] There are at least two approaches to the distribution of limited resources: utilitarianism and Rawls' theory of justice.

a. Utilitarianism

The utilitarian approach addresses issues from the premise that the rightness and wrongness of an action is determined by the usefulness of its consequences.[130] Utilitarianism suggests that genetic technology should be applied to optimize total goods and satisfaction.[131] This may be achieved either by minimizing suffering and unhappiness, or by maximizing pleasure and happiness.[132] The actual distribution system could be directed either to those who are least genetically well-off, so as to minimize suffering, or to those who are already well-off so as to increase happiness.[133] Whether the benefits are distributed to the genetically deprived or the genetically fit is not important to the utilitarian, so long as the optimum good is achieved.[134]

Because the deprived and the fit will likely have unequal numbers in the population, the problem may also raise issues of minority rights. Whatever distribution scheme is adopted, if the benefits of genetic engineering are provided to a majority at the expense of a minority (a distinct possibility since the goal is merely the greatest total benefit), profound injustice may result.[135] It is, indeed, this lack of a theory of justice for which critics often reprove utilitarianism.[136] Philosopher John Rawls[137] attempts to alleviate this deficiency.

b. Rawls' Theory of Justice

(1). The Difference Principle

Rawls objects to the utilitarian approach because it contemplates only the greatest net total of satisfaction[138] without considering the

129. *See* Shapiro, *Who Merits Merit? Problems in Distributive Justice and Utility Posed by the New Biology*, 48 S. CAL. L. REV. 318, 325 (1974). It may be argued that any disparity in the population as to access to genetic engineering will result in an undermining of the first amendment since the amendment is based on the premise that all must have freedom to speak so that the will of the majority may be ascertained. *See generally* A. MEIKLEJOHN, POLITICAL FREEDOM 24-48 (1960).

130. *See* Taylor, *Utilitarianism*, in BIOMEDICAL ETHICS 19 (T. Mappis & J. Zembaty eds. 1981).

131. Note, *supra* note 28, at 465.

132. *Id.*

133. *Id.*

134. *Id.*

135. Beauchamp, *Ethical Theory and Bioethics*, in LAW, SCIENCE AND MEDICINE 131, 140 (1984).

136. *See id.* at 138.

137. Rawls is a professor of philosophy at Harvard University.

138. J. RAWLS, A THEORY OF JUSTICE 24 (1971).

manner in which the sum of satisfactions is distributed.[139] Rawls notes that, in every society, people have different natural assets and are born into different social strata.[140] Although each of these conditions is undeserved, they have a profound effect on a person's life.[141] Because these inequalities of birth and natural assets are undeserved, Rawls asserts they require compensation.[142] Such compensation, however, does not necessarily mean equality for all.[143] Rawls proposes instead a theory of justice that capitalizes on the inherent differences in individuals and utilizes them to the benefit of all.[144] This is Rawls' "difference principle."[145]

Rawls arrives at the difference principle by considering how justice might be drawn from a hypothetical "original position."[146] A person in the original position operates behind a "veil of ignorance" that prevents her from knowing any information about herself such as social status, physical or mental capabilities, or even her belief system.[147] Only from such a position of universal equality can principles of justice be drawn.[148] In establishing how to distribute social primary goods, for example, "rights and liberties, powers and opportunities, income and wealth" and self-respect,[149] Rawls determines that a person operating from the original position would develop two principles. First, liberties ascribed to each individual should be as extensive as possible without infringing upon the liberties of others.[150] Second, social primary goods should be distributed to the greatest advantage of everyone and by mechanisms that allow equal opportunity to all.[151]

Of course, in reality there will be differences in the natural assets

139. *Id.* at 25.
140. *Id.* at 7.
141. *Id.*
142. *Id.* at 100.
143. J. RAWLS, *supra* note 138, at 101.
144. *Id.*
145. *Id.*
146. *Id.* at 136.
147. *Id.* at 136-37.
148. J. RAWLS, *supra* note 138, at 140.
149. *Id.* at 62.
150. *Id.* at 60-61. The liberties to be ascribed are: the right to vote, eligibility for political office, "freedom of speech and assembly; liberty of conscience and freedom of thought; freedom of the person along with the right to hold (personal) property; and freedom from arbitrary arrest and seizure." *Id.* at 61.
151. *Id.* at 60-61. Social and economic inequalities must be distributed "to everyone's advantage, and at the same time, positions of authority and offices of command must be accessible to all." *Id.* at 61.

and social strata of individuals.[152] Such differences are acceptable, however, if under the second principle, they are distributed to the greatest benefit of the least advantaged.[153] Rejecting strict egalitarianism,[154] Rawls asserts this does not mean it is necessary to take these social primary goods from the advantaged and redistribute them to the disadvantaged.[155] Such a system, he claims, would lower the expectations of the advantaged, reducing their abilities to provide for the benefit of all.[156] This would result in *less* social primary goods than if the advantaged were allowed the benefits of their advantages.[157]

For example, if the advantaged are allowed the freedom to utilize their greater abilities they will use capital to provide jobs for the disadvantaged.

> [T]he greater expectations allowed to entrepreneurs encourages them to do things which raise the long term prospects of laboring class. Their better prospects act as incentives so that the economic process is more efficient, innovation proceeds at a faster pace, and so on. Eventually the resulting material benefits spread throughout the system to the least advantaged.[158]

Thus, the difference principle does not attempt to eliminate inequalities, rather it operates to minimize inequalities by increments.[159] No social primary good may be afforded an already advantaged individual unless it has the effect of raising the expectations of the disadvantaged.[160] Rawlsian society seeks the highest possible social minimum wherein the more advantaged utilize their greater goods in a scheme designed to benefit the least advantaged persons.[161]

Rawls' theory of justice also addresses opportunity.[162] There should be absolute equality without consideration for the expectations of the advantaged.[163] Opportunities such as education should be allocated according to both the principle of maximizing productivity in training and the principle of "enriching the personal and social life of citizens, including here the less favored."[164] Rawls also identifies "excellences" such as "imagination and wit, beauty and grace, and other natural assets and abilities" that benefit society.[165] Using

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152. *Id.* at 78.
153. J. RAWLS, *supra* note 138, at 73.
154. *Id.* at 538-39.
155. *Id.* at 102.
156. *Id.* at 78-80.
157. *Id.* In economic terms, this may be what is sometimes pejoratively referred to as the "trickle down" theory.
158. J. RAWLS, *supra* note 138, at 78.
159. *Id.* at 79.
160. *Id.* at 95.
161. *Id.* at 105.
162. *Id.* at 73.
163. J. RAWLS, *supra* note 138, at 73.
164. *Id.* at 107.
165. *Id.* at 443.

these concepts, it is possible to address the problem of access to genetic engineering.

(2). Applying Rawls to Genetic Engineering

Under Rawls' theory of justice, genetic engineering is seen as a tool to increase economic wealth by providing society with greater ability to create social primary goods. There would also be an increase in the "excellences." Access to genetic engineering, however, implicates both the principle of greatest benefit to the least advantaged as well as equal opportunity. Indeed, genetic engineering may alter the assumption that there will be differences in people's natural assets.

Genetic engineering should not be permitted merely for the enhancement of physical attractiveness because that would not benefit the least advantaged.[166] Arguably, resources should be concentrated on genetic therapy to address disease and genetic defects.[167] However, such a result is not required under Rawls' theory. Genetic enhancement of those already intellectually gifted, for example, might result in even greater benefit to the least advantaged as a result of the gifted individual's improved productivity.[168] Moreover, Rawls asserts that using genetic engineering to prevent the most serious genetic defects is a matter of intergenerational justice.[169] Such actions are necessary in terms of what the present generation owes to later generations.[170]

These are just two approaches to the problem of equal access to genetic engineering. Unless genetic engineering is universally available at the time it is fully developed, there is great potential for injustice in its distribution.

2. Confidentiality

A second issue of biomedical ethics, particularly as it concerns genetic screening, is confidentiality. There is significant potential for third parties to misuse a specific individual's genetic information. Such third parties include employers, insurance companies, and the state.[171] On one hand, it may be relatively simple for a physician to maintain confidentiality regarding an individual's genetic profile. Ef-

166. Note, *supra* note 28, at 464.
167. *Id.* at 464-65.
168. *Id.* at 465.
169. J. RAWLS, *supra* note 138, at 108.
170. *Id.*
171. *See* Fletcher & Wertz, *supra* note 109, at 753; Foreman, *Working Out the Gen-*

forts to reduce the cost of genetic disorders may, however, overwhelm individual efforts to maintain privacy.[172]

Life and health insurance provide an example. Such insurance is theoretically a mechanism for spreading risk among a large population; however, precise genetic screening may destroy this concept.[173] The ability to accurately predict disease and premature death may also put tremendous pressure on the individual's ability to keep her genetic profile confidential. Changes in the insurance industry itself have exacerbated these difficulties.

During the 1950s, insurance rates were based on "community ratings," *i.e.*, the health costs of an entire community were used to calculate insurance premiums for individuals and groups without regard for the health of any particular individual.[174] Competition among insurance companies for increased volume and profits, however, caused them to identify smaller groups with better than average loss histories.[175] Companies began offering bargain rates based on occupation groups.[176] Reduced rates have also been based on habits such as nonsmoking and safe driving.[177] In contrast, rates became higher for high-risk occupations as well as for employee groups who experienced high loss rates.

Genetic testing may allow insurance companies to carry this trend to its logical conclusion: an insurance premium based upon an individual's genetic profile.[178] By identifying persons whose genes show a disposition toward developing high cost diseases, companies can protect themselves by offering insurance at rates designed to cover those costs.[179] At the same time, lower rates may be offered to those who show fewer genetic abnormalities.

Insurance eligibility based on passing a physical examination is

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ome Project Ethics - In Advance Medical Ethics, Boston Globe, Feb. 4, 1991, Science & Tech., at 25.

172. *Id. See also* Andrews, *supra* note 108, at 625; School Bd. of Nassau County v. Arline, 480 U.S. 273 (1987) (discrimination in hiring of individual with tuberculosis).

173. Thiel, *Brave New Medicine*, GEORGIA TREND, Dec. 1990, at 44 (individuals with access to their own genetic makeup "will either load up on insurance if they are likely to die early, or go without coverage if their genetic composition is extraordinarily good").

174. Gladwell, *Health Insurers Grapple with 'Fairness': Linking Premiums to Risks Puts Heavy Burden on Some Employers*, Wash. Post, Nov. 22, 1990, at A1, col. 1.

175. *Id.*

176. *Id.*

177. Z. HARSANYI & R. HUTTON, GENETIC PROPHECY: BEYOND THE DOUBLE HELIX 257 (1981).

178. Saltus, *Bias Issue Looms Over Insurers Creating Another Underclass?*, Boston Globe, Nov. 12, 1990, Health/Science, at 33, col. 3, 34, col. 2 (stating that "With gene testing . . . insurers could have more powerful tools to pinpoint high-risk individuals, as well as those likely to remain healthy.").

179. *Id.*

quite common.[180] Such examinations have become increasingly extensive with developing medical technology.[181] Having accepted the notion that a company may offer coverage based on an individual's preexisting health, it is a very small step to require that there be evidence of limited genetic susceptibility to disease.[182] The issue is twofold: first, whether a company may offer or deny coverage based on a required genetic profile[183] and second, whether the individual may procure such information *privately* and submit it to a company to obtain less expensive coverage.

The answer to the first question has yet to be determined, but the trend toward basing coverage on preexisting conditions remains.[184] The second issue of the individual's private screening goes beyond whether a physician will keep an individual's profile confidential or even whether such screening is mandatory or voluntary. The issue is how the *individual* may use a truly definitive genetic profile. If insurance companies are authorized to offer policies based on genetic probabilities, it leaves the individual who wishes to keep her genetic profile confidential in a difficult position. Either she reveals the results of her genetic profile or she pays the higher life and health insurance premiums required of those who will either not submit to such tests or not reveal their results. At no point in this process is there a need for an involuntary genetic test or a breach of confidence. The linkage between the consumer and the company is purely economic; the forces operating are free enterprise and freedom of contract.

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180. Gladwell, *supra* note 174, at A10, col. 1.

181. In 1988, the Office of Technology Assessment issued a report indicating "75 percent of insurers for small companies (under 25 employees) and more than 50 percent of commercial insurers of large groups were either screening or planning to screen applicants for medical problems that might push up health care bills — cardiovascular diseases, liver and kidney conditions and diabetes." Gladwell, *supra* note 174, at A10, col. 1. In many states insurers test for HIV infection. *Id.* Although this is not genetic screening, it indicates a trend towards genetic testing in determining insurance premiums and even the availability of coverage.

182. Donald B. White, a spokesman for the Health Insurance Association of America in Washington has stated that genetic information should not be used to *deny* persons insurance but only to set rates for persons without existing medical conditions. Blakeslee, *Ethicists See Omens of an Era of Genetic Bias*, N.Y. Times, Dec. 27, 1990, at B9, col. 5. *But see* Saltus, *supra* note 178, at 33 (family denied employer-provided group health insurance because two members carried defective gene).

183. Reports of insurance being denied based on genetic profiles are beginning to surface. One result is that those at risk may avoid testing in order to avoid losing insurance coverage, even though early treatment might alleviate effects of the disease. Blakeslee, *supra* note 182, at B9, col. 3.

184. *See id.*

The eugenic effect of such insurance is similar to what is sometimes described as "social Darwinism" in other areas of the free market system. But the effect of such insurance becomes more profound as genetic knowledge increases. While limiting insurance availability may not be an actively eugenic program, it may affect the individual's ability to reproduce or the ability to live to an age at which one may reproduce, or even the individual's decisions regarding reproduction.

An insurance company could require a couple's genetic profiles to determine coverage of both the couple and their children even before the children are born. Such a profile could be required of a fetus to determine whether it will be covered after birth. Knowledge of such a profile, and the availability of insurance, could easily affect the parents' decision regarding carrying the pregnancy to term.[185] Inherent in these issues is a passive eugenics that, while not requiring the actual genetic manipulation of an individual, may result in selective breeding based on the economics of insurance actuarial tables.

Similar issues arise in employment.[186] First, while discrimination laws may prevent an employer from basing its hiring decisions on genetic profiles (an issue yet to be determined), it may very well be to the advantage of a prospective employee, who can show contraindications of genetically-related disease, to include that information in a resume. Such information would be useful to forecast not only the potential number of workdays that may be missed due to illness, but it may also help determine an employee's resistance to specific workplace health hazards.[187] Genetically sound persons would be attractive to employers desiring to minimize the costs of employment.

Second, and another link to insurance, genetic profiles might help an employer reduce the costs of its health insurance plan. Although the employer may not be able to base hiring decisions solely on such information, an applicant who voluntarily provides evidence of a

185. Observers have recently noted instances where insurers issue policies with coverage designed to influence couples to have abortions where birth defects in the offspring are probable. Saltus, *supra* note 178, at 34, col. 3.

186. Dr. Paul Billings, a medical ethicist at Pacific Presbyterian Medical Center in San Francisco has said, "If employers can identify prospective workers who are not currently disabled but who may later develop illnesses, they can save themselves anticipated health insurance and other costs by refusing employment to the worker." Blakeslee, *supra* note 182, at B9, col. 4. Timothy Gailey, a Massachusetts Insurance Commissioner, has also noted that insurers and employers are beginning to screen out high-risk individuals by requiring physical examinations prior to employment. Saltus, *supra* note 178, at 34, col. 4. Until it was challenged by the American Civil Liberties Union, the city of Athens, Georgia, based hiring decisions in part on an applicant's cholesterol level. Theil, *supra* note 173, at 44.

187. Henig, *supra* note 95, at Z14 (remarking that "Employers . . . may selectively hire only those people whose genes indicate they are resistant to health hazards of the workplace, which is a cheaper alternative than cleaning up the workplace to make it safe for everyone.").

healthy genetic background could certainly have an advantage over other applicants.

Because of the potential for third parties to misuse genetic information, some commentators argue that such information should be protected by law.[188] It may also be necessary to legislate against genetic discrimination.[189] While it may be argued that screening should be voluntary,[190] the fear is that societal problems such as over-population, the increasing costs of the nation's general welfare program, and the expense of providing for the elderly and the handicapped, will favor a trend toward a mandatory genetic screening.[191]

It should also be noted that the ability to accurately predict the likelihood of disease and premature death through genetic screening may destroy the private insurance industry.[192] By requiring genetic testing prior to entering into an insurance contract, insurance companies can become more conservative in their coverage practices. At its logical conclusion, risks are no longer spread; both parties to the insurance contract will know the probabilities of both death and disease. If any risk is to be spread it will have to be done by an organization willing to ignore genetic profiles, namely, the government in the form of a national health insurance program.

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188. *See, e.g.*, Andrews, *supra* note 108, at 625 (citing Fletcher, *Where in the World are We Going with the New Genetics?*, 5 J. CONTEMP. HEALTH L. & POL'Y 33, 40 (1989)). George Annas, professor of health law at Boston University, has stated: "What people are worried about is that insurers are going to create a new underclass of medically uninsurable people, based not only on diseases they now have but the probability that they will develop an expensive disease in the future." Saltus, *supra* note 178, at 33, col. 3.

189. Capron, *Genetics and the Law: Which Ills to Bear?: Reevaluating the "Threat" of Modern Genetics*, 39 EMORY L.J. 665, 693 (1990).

190. *See, e.g.*, Kessler, *The Counselor - Counselee Relationship*, in GENETIC COUNSELING: PSYCHOLOGICAL DIMENSIONS 53, 60 (S. Kessler ed. 1979).

191. Frankel, *The Specter of Eugenics*, 57 COMMENTARY 25, 29 (1974). Critics of genetic screening cite the pervasive testing for sickle cell anemia during the 1970s as an example of a rash application of genetic technology. Elsas, *supra* note 42, at 828. Five percent of those tested were designated heterozygous carriers of the defective gene. *Id.* Many "asymptomatic adults were stigmatized" by insurance carriers and employers. *Id.* Those screened received inadequate counseling concerning reproductive choices and the potential for passing the genes on to their children. *Id.* The "premature" testing program for sickle cell anemia often dissuaded affected couples from raising families, although such drastic measures were clearly unwarranted. *Id.*

192. *See* Saltus, *supra* note 178 at 34, col. 2 (asserting that genetic screening takes the "gamble" away from providing coverage and will "require[] redefining the insurance system.").

B. Moral and Religious Arguments

1. Duty to Rescue

Moral arguments favoring the use of genetic engineering often focus on the issue of whether there is a duty to rescue when a child is in need of medical attention before birth.[193] Three facts make this question relevant: 1) the growing number of diseases for which genetic components are being discovered,[194] 2) the fact that these defects can be predicted with increasing accuracy even before conception,[195] and 3) the fact that these defects can be discovered in the fetus at progressively early stages.[196] Such screening may even be mandatory in some circumstances.[197] There is also an issue of whether a duty to treat arises when genetic defects are found.[198] One state has gone so far as to take protective custody of an endangered fetus by placing the pregnant mother in custody.[199] Such action implicates a duty to rescue.

The law, however, recognizes a duty to rescue in only limited circumstances.[200] One such situation exists where there is a special relationship between the person in danger and the person in a position to rescue,[201] such as the relationship between parent and child.[202] Because of this relationship, the state may intervene when a parent makes a medical decision which is not in the best interest of the child.[203] Relying on these arguments, supporters of genetic engineering assert that parents are morally bound to rescue their children

193. *See generally* Friedman, *Significance of Genetic Diseases*, in GENETIC SCREENING AND COUNSELING - A MULTIDISCIPLINARY PERSPECTIVE 5-13 (S. Applewhite, D. Busbee & D. Borgaonkar eds. 1981) [hereinafter GENETIC SCREENING].

194. Borgaonkar, *Clinical Cytogenetics and Counseling of Individuals with Chromosonal Disorders*, in GENETIC SCREENING, *supra* note 193, at 96.

195. *Id.*

196. Rosenkranz, *supra* note 3, at 14.

197. *See* Becker v. Schwartz, 46 N.Y.2d 401, 412-13, 386 N.E.2d 807, 813-14, 413 N.Y.S.2d 895, 901-02 (1978) (doctor liable for parents' pecuniary loss in failing to inform them of the high-risk of retardation and of the availability of tests to ascertain if their child would be born with Down's syndrome).

198. *See* CAL. PENAL CODE § 270 (West 1988 & Supp. 1991) (up to one year imprisonment and $2000 fine for failing to provide for a fetus's medical needs).

199. Dougherty, *The Right to Begin Life with Sound Body and Mind: Fetal Patients and Conflicts with Their Mothers*, 63 U. DET. L. REV. 89, 94-95 (1985) (citing Soloff, *Civil Committment and the Rights of the Unborn*, 136 AM. J. PSY. 114 (1979)). *But see In re* Steven S., 126 Cal. App. 3d 23, 29-31, 178 Cal. Rptr. 525, 528-29 (1981) (overturning juvenile court's order incarcerating pregnant woman because the fetus was not covered by child-neglect laws).

200. Rosenkranz, *supra* note 3, at 12-13.

201. Bohlen, *The Moral Duty to Aid Others as a Basis of Tort Liability*, 56 U. PA. L. REV. 217, 219 (1908).

202. *See* 67A C.J.S. *Parent & Child* § 11 (1978).

203. *See, e.g., In re* Phillip B., 92 Cal. App. 3d 796, 801, 156 Cal. Rptr. 48, 51 (1979) (parental refusal to consent to medical treatment for child results in state challenge), *cert. denied*, 445 U.S. 949 (1980).

from genetic defects and may even be morally bound to help their children make the most of their potential.[204]

Weighing against the duty to rescue is the consequentialist argument that the "end result" of a genetic rescue is different from that of other rescues because it is an attack on the source of the defect, and the rescue affects those other than the child rescued, namely the child's progeny.[205] The concern is that by eliminating certain genes through genetic engineering we may be reducing the species' capacity to adapt to a changing environment.[206]

Weighing against this argument, however, is the possibility that the genetic structure of future generations may be improved. Also, should an undesirable strain result, it will still be possible to alter genes in the future.[207] In fact, genetic engineering may *increase* the diversity of the human gene pool.[208] The issue is whether "nature's 'plan' is any better than human ingenuity."[209] Proponents of genetic engineering argue it may be more reasonable to "plan for the future even with imperfect information, than sit idly by waiting for the genetic roulette wheel to stop spinning."[210]

2. The Sanctity of Procreation

a. Arguments Against Genetic Engineering

Among the most fervent opponents to genetic engineering and its eugenic implications are Christian theologians,[211] particularly Roman

204. *See generally* Rosenkranz, *supra* note 3.

205. *Id.* at 21. The consequentialist view against genetic rescue can be compared with deontological arguments which "object to genetic engineering as a *means*, even if the ends are identical to . . . more traditional modes of treatment." *Id. See infra* notes 212-221 and accompanying text for a discussion of the deontological arguments espoused by the Roman Catholic Church.

206. Rosenkranz, *supra* note 3, at 23.

207. *Id.*

208. *Id.* (stating that "While some characteristics that we now consider 'defects' will certainly disappear from the gene pool, genetic engineering is likely to introduce other characteristics that are not currently in our gene pool.").

209. *Id.* at 24.

210. *Id.*

211. Rosenkranz, *supra* note 3, at 3 n.4. Among the more moderate is Richard A. McCormick, Notre Dame professor of Christian Ethics. *See* R. MCCORMICK, HOW BRAVE A NEW WORLD? 282 n.5 (1981). Not all writers who object to human genetic engineering are Catholic. Paul Ramsey, professor of religion at Princeton University, is a Methodist. In a letter to the President of the United States concerning genetic engineering, two other noncatholic religious leaders admonished "[t]hose who would play God." Letter from Dr. Claire Randall, General Secretary of the National Council of Churches, Rabbi Bernard Mandelbaum, General Secretary of the Synagogue Council of America, and Bishop Thomas Kelly, General Secretary of the United States

Catholics. Generally, their argument is that technology should not be employed to go beyond the limits intended by God.[212] In particular, these thinkers focus on the sanctity of marriage, lovemaking, and the purpose of sex in procreation.[213] Creating or manipulating life outside the marital relationship "violate[s] the reverence due to human life in its generation"[214] by subordinating procreation to its producers.[215] Genetic engineering reduces the status of human beings from that of God's greatest creation to that of an object.[216] Such activity is beneath human dignity.[217] Genetic engineering for any purpose, even therapeutic,[218] will inevitably undermine marriage,[219] parenthood,[220] family,[221] and eventually life itself.

Catholic Conference to President Jimmy Carter (June 20, 1980), *reprinted in* SPLICING LIFE, *supra* note 1, at 95-96.

212. Moraczewski, *Dominion, Bioethics and Pluralism*, in THE NEW TECHNOLOGIES OF BIRTH AND DEATH 6-7 (1980) [hereinafter THE NEW TECHNOLOGIES].

213. *See* May, *Reverencing Human Life in Its Generation*, in THE NEW TECHNOLOGIES, *supra* note 212, at 61-63.

214. *Id.* at 64.

215. *Id.* at 64-65. Not all moral and religious thinkers are absolutists in these arguments. Some assert that artificial insemination from the husband and *in vitro* fertilization are permissible where a married couple cannot otherwise biologically have children and where the risk of genetic mishaps is no more than the risks involved in the "natural process." *See, e.g.*, C. CURRAN, POLITICS, MEDICINE, AND CHRISTIAN ETHICS 215-19 (1973).

216. Tribe, *Technology Assessment and the Fourth Discontinuity: The Limits of Instrumental Rationality*, 46 S. CAL. L. REV. 617, 649 (1973) (asserting that "But does not that dream [of designing every detail] at least potentially entail the final transformation of man into an object - a thing to be 'engineered.' ").

217. [G]enetic manipulation of human embryos . . . [is] contrary to the human dignity proper to the embryo, and at the same time [it is] contrary to the right of every person to be conceived and to be born within marriage and from marriage. . . . Certain attempts to influence chromosomic or genetic inheritance are not theraputic but are aimed at producing human beings selected according to . . . predetermined qualities. These manipulations are contrary to the personal dignity of the human being and his or her integrity and identity. . . . Every person must be respected for himself; in this consists the dignity and right of every human being from his or her beginning.

The Vatican on Birth Science, N.Y. Times, Mar. 11, 1987, at A14, col. 4.

218. The Catholic condemnation of genetic engineering is not universal. There has been papal approval of somatic genetic engineering "when its aim is to ameliorate the conditions of those who are affected by chromosonic [sic] diseases because this offers hope for the great number of people affected by those maladies." J. AREEN, *supra* note 6, at 175 (quoting Pope John Paul II, *La Sperimentozione in Biologia Deve Contribuire al Bene Integrale Dell 'Uomo*, L'Osservatore Romano, Oct. 24, 1982, at 2). Proponents of wider use of genetic engineering argue that it is not clear why such techniques are impermissible before the child is born but are permissible after, particularly considering the Vatican's contention that a fetus is a person no different than those who are born. Rosenkranz, *supra* note 3, at 36.

219. May, *supra* note 213, at 65 (asserting that "[A]ny act of generating human life . . . non-marital[ly] . . . is in essence a destruction of marriage itself.").

220. P. RAMSEY, *supra* note 119, at 135. "[T]o be debiologized and recombined in various ways, parenthood must first be broken or removed. When the transmission of life has been debiologized, human parenthood as a created covenant of life is placed under massive assault and men and women will no longer be who they are." *Id.*

b. Arguments Favoring Genetic Engineering

Weighed against these arguments is the contention that many other aspects of childrearing, apart from procreation, can be characterized as artistic production, for example, selection of education, religious instruction, and personality development.[222] Rather than destroying the value of family, proponents argue genetic engineering would be based in "the tender and watchful care that naturally springs from affection."[223] By giving parents the responsibility to design the characteristics of their child, especially where the parents are responsible for ensuring that their child's potential is attained, would increase the value of parenting.[224]

3. Moral Relativism

A third moral/religious argument is that genetic engineering inherently involves judgments as to the relative value of different lives — a judgment which critics maintain is immoral in itself.[225] The goal of eliminating genetic "defects" is in tension with efforts to accept "defective" individuals.[226] Paul Ramsey, religion professor at Princeton University, reflecting on the progressively harmful consequences of genetic knowledge, states:

> Before us then opens up the dizzy, abysmal prospect that man can be present where the foundations of the world were laid. Piece by piece of information may destroy our sense, that for all the genetic corruption, God made the world and the human creature and they are good. We may finally lose our faith that, under God, life should always be affirmed with joy and hope beyond despair — and lose also our concern that even genetically defective lives be saved and cared for.[227]

There is also a fear that society's search for genetic perfection will serve to ostracize other less fortunate members of society such as the mentally retarded, the infirm, the disabled, or the elderly.[228]

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221. R. MCCORMICK, *supra* note 211, at 304. "The family . . . embodies the ordinary conditions wherein we . . . learn to become persons." *Id.*

222. *See* Rosenkranz, *supra* note 3, at 36.

223. *Id.* at 52 (quoting H. SIDGWICK, THE METHOD OF ETHICS 249 (7th ed. 1907)).

224. *Id.*

225. Rosenkranz, *supra* note 3, at 21.

226. Callahan, *The Meaning and Significance of Genetic Disease: Philosophical Perspectives*, in CONTEMPORARY ISSUES IN BIOETHICS 583-84 (T. Beauchamp & L. Walters eds. 1978).

227. Ramsey, *Genetic Therapy*, in THE NEW GENETICS AND THE FUTURE OF MAN 157, 175 (M. Hamilton ed. 1972).

228. *See* Jacobs, *A Religious Response to Tay-Sachs Disease Screening and Prevention*, in TAY-SACHS DISEASE: SCREENING AND PREVENTION 75, 77 (M. Kaback, D. Rimoin & J. O'Brien eds. 1977).

C. *Legal Arguments*

1. Regulating Research

Even if one accepts one or more of the arguments against the use of genetic engineering, actual attempts at limiting its use, including potential eugenic uses, will be difficult. Past efforts at regulating genetic engineering research[229] have found it all but impossible to distinguish between processes that have eugenic potential and other projects of great benefit such as cancer research.[230] Also, genetic research already has considerable momentum, driven in no small measure by the fact that it is so profitable. The United States Department of Commerce estimates, for example, that the worldwide market for genetically engineered drugs alone will reach $100 billion per year by the end of this decade.[231] Also genetic research is already being done in a worldwide community in which new information is exchanged freely and where new advances are achieved at relatively small cost. If research is limited in one country or even a group of countries, new developments will be made even more profitable to those researchers who defy the ban.

Interest in regulating fetal research began in the United States in 1973 with the Supreme Court's decision of *Roe v. Wade*.[232] As a result, the National Research Act of 1974[233] and the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research were created.[234] The Commission developed

229. Some state laws prohibit using certain genetic technologies. For example, seven states prohibit experimental gene therapy on embryos. LA. REV. STAT. ANN. § 9:122 (West Supp. 1991); ME. REV. STAT. ANN. tit. 22 § 1593 (1964); MASS. GEN. LAWS ANN. ch. 112, § 12J (West 1983); MICH. COMP. LAWS ANN. §§ 333.2685 -.2692 (West 1980); N.D. CENT. CODE §§ 14-02.2-01 to -02 (Supp. 1989); R.I. GEN. LAWS § 11-54-1 (Supp. 1990); and UTAH CODE ANN. § 76-7-310 (1990).

There are, of course, those who maintain that the fear that current research will someday lead to genetically-programmed humans "is far too insubstantial to justify stopping or not investing in gene therapies, which, if effective, have such a great potential for eliminating disease and suffering." Robertson, *Genetic Alteration*, *supra* note 50, at 117.

230. Attanasio, *supra* note 31, at 1339-40.

231. Osterlund, *Challenges to US Lead in Biotech*, Christian Sci. Monitor, Jan. 24, 1985, at 14, col. 3. There is also great profit potential in genetic screening. Regarding the marketing of a test for cystic fibrosis, Dr. Norman Fost, a geneticist and pediatrician at University of Wisconsin Medical School, noted, "This is the gold rush. . . . This is the Klondike. . . . The potential market for this screening is at a minimum a billion-dollar a year industry." Kolata, *Rush Is On to Capitalize on Testing for Gene Causing Cystic Fibrosis*, N.Y. Times, Feb. 6, 1990, at C3, col. 2.

232. 410 U.S. 113 (1973) (holding unconstitutional state criminal abortion laws that except only life-saving procedures without regard to length of pregnancy).

233. Pub. L. No. 93-348, 88 Stat. 342 (1974).

234. 40 Fed. Reg. 33,530 (1975). Recent U.S. medical history is not without its examples of medical experimentation which was detrimental to its human subjects. Between 1930 and 1970, medications were withheld or harmful agents given to better understand the natural progress of syphilis (Tuskegee Institute), infectious hepatitis (Willowbrook State School), and cancer (Jewish Chronic Disease Hospital), without

regulations and laws allowing fetal research under strict regulation.[235] The community of genetic researchers first adopted self-limits on recombinant DNA research[236] and later cooperated in imposing limited federal regulations on their studies.[237] Since that time, however, the community has resisted statutory restriction.[238] In 1982, a presidential commission recommended the establishment of a broadly representative board to oversee issues of genetic engineering. The recommendation was, however, never implemented.

While federal regulation affects some private research, most regulation concerns only federally funded projects.[239] Current federal regulation prohibits funding of any research on the pre-embryo as well as research that presents "significant" risk to the fetus at any stage of development. The National Institute of Health (NIH) Recombinant DNA Advisory Committee (RAC) subgroup on Human Gene Therapy reviews all applications for NIH funding which concern research of recombinant DNA.[240] Gene therapy projects are also reviewed by the Food and Drug Administration and the Department of Human and Health Services.[241] Before reviewing such projects, these agencies require prior approval by local review boards.[242] Section III-A-4 of the NIH guidelines requires prior approval of the RAC for any research involving "[d]eliberate transfer of recombinant DNA or DNA."[243] The RAC has indicated it will not entertain proposals under section III-A-4 for germ-line[244] alterations, but will consider approving proposals for research involving somatic gene therapy.[245]

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the informed consent of the subjects. *See* Rothman, *Were Tuskegee and Willowbrook 'Studies of Nature'?*, 12 HASTINGS CENTER REP. 5 (1982).

235. Fletcher & Schulman, *Fetal Research: The State of the Question*, 15 HASTINGS CENTER REP. 6 (1985).

236. *Id.* at 176.

237. M. ROGERS, BIOHAZARD 46 (1977).

238. L. ANDREWS, MEDICAL GENETICS: A LEGAL FRONTIER 76-78 (1987).

239. *See generally* Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. 23,302 (1986). These restrictions are directed at the subjects of the research rather than the nature. "[A]ny approach to implementing guidelines should not impede future developments in rDNA technology." *Id.* at 23,308.

240. Elsas, *supra* note 42, at 830.

241. *Id.*

242. *Id.* at 830-31.

243. National Institute of Health Guidelines on Recombinant DNA Molecules, 51 Fed. Reg. 16,960, § III-A-4 (1986).

244. *See supra* note 18 and accompanying text.

245. National Institutes of Health, *Points to Consider in the Design and Submission of Human Somatic-Cell Gene Therapy Protocols*, 50 Fed. Reg. 33, 463 (Aug. 19, 1985). *See supra* notes 16-17 and accompanying text.

Since April 1988, there has been an informal moratorium on fetal research in the United States.[246] Such a moratorium will likely be lifted in the near future, except for a number of experimental areas such as human cloning, recombinant DNA germ-line therapy, the combining of human and animal genes to create new life forms, the commercial sale of embryonic tissue and the development of artificially fertilized human eggs for research.[247]

Much of the reason for restricting research involving human embryos, fetuses and fetal tissue is the association with voluntary abortion.[248] This effect is particularly strong in the United States.[249] The ban in this country includes federal funds for research on the use of fetal tissue in treating Parkinson's disease, diabetes, epilepsy, Alzheimer's disease and spinal cord injuries.[250] Dr. John C. Wilke, president of the National Right to Life Committee, in support of the ban on fetal research, stated, "It is unworthy of us, as a nation, to kill our unborn children and then use them for spare parts. The government should *protect* unborn babies, not stripmine them."[251] Because experimenting on embryos is necessary to perfect genetic engineering techniques, this restriction affects genetic experimentation.

Arguing in favor of continued genetic research are those who assert that curbing such research implicates both the first and fourteenth amendments to the United States Constitution.[252] All scientific research, it is argued, is analogous to the freedom to publish. Therefore, there must be a "high probability" that the research will lead to harm before it may be regulated.[253] Furthermore, the

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246. Cimons, *Abortion War Snags Research*, L.A. Times, Oct. 17, 1990, at A1, col. 1.

247. *See* Dickson, *Europe Split on Embryo Research*, 242 SCIENCE 1117 (1988) (officials at the Council of Europe found there was broad agreement in Europe to prohibit these areas of research).

248. Fletcher & Wertz, *supra* note 109, at 755.

249. "Today, the United States is the only developed nation whose elected leaders, because of moral opposition to abortion, plan to reduce genetic services." *Id.* at 758.

250. Cimons, *supra* note 246, at A1, col. 1.

251. *Id.* (emphasis in original).

252. "We are dealing with the scientific process as First Amendment 'expression' *plus* privacy as an individual liberty formed by the penumbras of specific constitutional guarantees, and it is difficult to perceive a valid governmental interest which would sustain attempts to 'contract the spectrum of available knowledge.' " I. CARMEN, CLONING AND THE CONSTITUTION 30 (1985) (emphasis in original). The opposite view has been expressed:

> [D]o we want to assume the basic responsibility for life on this planet - to develop new living forms for our own purposes? Shall we take into our hands our own future evolution? . . . Perverse as it may, initially, seem to the scientist, we must face the fact that there can be unwanted knowledge.

Dixon, *Tinkering with Genes*, 235 Spectator, Aug. 30, 1975, at 289, col. 3 (quoting Dr. Robert L. Sinsheimer, then Chair of the Biology Department at the California Institute of Technology).

253. Robertson, *The Scientist's Right to Research: A Constitutional Analysis*, 51 S. CAL. L. REV. 1203, 1251-52 (1977) ("To ban research, the government would have to show a huge probability, approaching imminence, that the research would yield knowl-

government would have difficulty meeting such a test since the results of research are often unpredictable and the effects are not always fully understood.[254] Finally, there is a middle position taken by those who argue that there should be broad constitutional protection for research on genetic engineering but tight regulation on its use apart from research.[255]

2. Regulating the Use of Genetic Engineering

a. Arguments Favoring Its Use

(1). Abortion and Parental Rights

The arguments regarding regulating the use of genetic engineering, like the arguments concerning abortion, focus on privacy. Those who favor its use argue that individuals should have the freedom to choose and act free from controlling interferences that prevent meaningful choice.[256] Parents have a constitutional right to privacy in decisions concerning procreative choice,[257] contraception[258] and abortion.[259] By analogy, proponents argue that privacy rights should be extended to decisions regarding the use of genetic engineering.[260] If an infertile couple desires a child, the legislature cannot forbid the use of a reproductive technology.[261]

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edge that, if available, would very likely lead to substantial harms that the government may legitimately prevent, that no other means would as effectively reduce the harm, and that the predicted beneficial uses of the knowledge would be small.").

254. Attanasio, *supra* note 31, at 1340 n.350. *But see* Furrow, *Governing Science: Public Risks and Private Remedies*, 131 U. PA. L. REV. 1403, 1417 (1983) (even pure scientific experimentation may be regulated as action rather than speech).

255. *See, e.g.*, I. CARMEN, *supra* note 252, at 186-90.

256. *See id.* at 191-92. Dr. James Watson has suggested that laws be passed in order to protect individual privacy from the scrutinizing demands of employers, insurance companies and law enforcement officials. Hall, *James Watson and the Search for Biology's 'Holy Grail,'* SMITHSONIAN, Feb. 1990, at 48-49.

257. The Supreme Court's recognition of a right to privacy extends to procreative decisionmaking by the unmarried, Eisenstadt v. Baird, 405 U.S. 438, 454-55 (1972) (holding that statute denying contraception to unmarried persons denies constitutionally guaranteed equal protection), and perhaps minors, Carey v. Population Servs. Int'l, 431 U.S. 678, 687 (1977) (ruling that statute seeking to deny minors information regarding contraception was unconstitutional).

258. Griswold v. Connecticut, 381 U.S. 479 (1965) (holding that state statute forbidding marital use of contraception was unconstitutional violation of privacy rights).

259. Roe v. Wade, 410 U.S. 113 (1973). *See supra* note 232. *But cf.* Webster v. Reproductive Health Serv., 109 S. Ct. 3040, 3054-58 (1989) (holding constitutional a state ban on use of public facilities to perform nontheraputic abortions).

260. *See* I. CARMEN, *supra* note 252, at 191-92.

261. Robertson, *New Reproduction*, *supra* note 21, at 954-62 (advocating recognition of a right to noncoital reproduction).

The United States Supreme Court has recognized the right of procreation without state interference as "one of the basic civil rights of man . . . fundamental to the very existence and survival of the race."[262] The Constitution guarantees parents the right to provide their descendants with a healthy genome.[263] The right to procreate or, alternatively, the right to abort, indirectly affords a limited right to select and control the characteristics of offspring.[264] To overcome this right of privacy, the state would have to show compelling reasons that could not be based merely on moral or ethical distaste.[265] Advocates of privacy rights in the use of genetic engineering argue that regulating positive genetic engineering may precipitate a collision between the constitutional values of procreative liberty as well as equal opportunity.[266]

Apart from arguments dependent upon the legality of abortion, supporters of genetic engineering read Supreme Court decisions upholding parents' privacy rights in raising children as support for a right to genetically engineer their children as well. These decisions include *Stanley v. Illinois*,[267] in which the United States Supreme Court acknowledged it "has frequently emphasized the importance of the family,"[268] and held that the right to conceive and raise a family is "essential,"[269] a "basic civil right[]."[270] The Court stated, "It is cardinal with us that the custody, care and nurture of the child reside first in the parents, whose primary function and freedom include preparation for obligations the state can neither supply nor hinder."[271] Other decisions give parents considerable control in selecting their children's school,[272] influencing their children's education,[273] and choosing their children's religious upbringing.[274]

Supporters of genetic engineering even use the fear of eugenics to buttress their case. One of the most active lawyers involved in regulating genetic engineering is University of Southern California law professor Alexander Capron. He believes that "trying to ban a tech-

262. Maher v. Roe, 432 U.S. 464, 472 n.7 (1977) (quoting Skinner v. Oklahoma, 316 U.S. 535, 541 (1942)).

263. Robertson, *Genetic Alteration*, *supra* note 50, at 125.

264. *Id.*

265. *Id.*

266. Attanasio, *supra* note 31, at 1284.

267. 405 U.S. 645 (1972).

268. *Id.* at 651.

269. *Id.* (quoting Meyer v. Nebraska, 262 U.S. 390, 391 (1923)).

270. *Id.* (quoting Skinner v. Oklahoma, 316 U.S. 535, 541 (1942)).

271. *Id.* (quoting Prince v. Massachusetts, 321 U.S. 158, 166 (1944)).

272. Pierce v. Society of Sisters, 268 U.S. 510, 534 (1925) (holding statute requiring public school education unconstitutional).

273. Meyer v. Nebraska, 262 U.S. 390, 400 (1923) (statute prohibiting teaching foreign language to elementary students held unconstitutional).

274. Wisconsin v. Yoder, 406 U.S. 205, 234 (1972) (held that Amish parents did not have to comply with state compulsory education laws).

nique that will have some beneficial uses is sure to lead to a new eugenics, in which someone or some group will decide which diseases will be treated and which will not."[275] These decisions, he believes, are too sensitive to be taken from individuals and given to government. "The lesson of history that the clerics forgot was that eugenics poses no great danger until it is backed up by the power of the state, well-meaning or otherwise."[276]

Finally, it is argued that the right to abortion carries with it an inherent right to engage in negative eugenics.[277] Further, if negative eugenics is legal, then to deny the right to engage in positive eugenics through genetic engineering only encourages the admittedly crude and Draconian process of eugenics through abortion.[278] If abortion is to be legal, then the use of genetic engineering, even for admittedly eugenic purposes, should be legal.

(2). The Child's Rights

While arguments made from the prospective child's point of view are usually intended to support limiting genetic engineering, supporters of the process have also sought to consider this position. First, it is held that the needs, values and very nature of future generations may be so different from our own that it will be impossible to base today's decisions upon a notion of a future generation's own good.[279] Second is the *Roe v. Wade* argument that the fetus has no cognizable liberty interest before viability.[280] If the mother can decide to abort the child, "it follows *a fortiori* that she can choose a superior life for it."[281] Such a result, the proponents contend, certainly seems preferable for the child.[282] Such circumstances are analogous to "wrongful life" claims which many jurisdictions deny because of the inability to identify the harm.[283]

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275. Capron, *Unsplicing the Gordian Knot: Legal and Ethical Issues in the "New Genetics,"* in GENETICS AND THE LAW III 26 (A. Milinsky & G. Annas eds. 1985).

276. *Id.*

277. Attanasio, *supra* note 31, at 1300.

278. *Id.*

279. Note, *A Ghost of Christmas Yet to Come: Standing to Sue for Future Generations*, 1 J.L. & TECH. 67, 83-94 (1986).

280. 410 U.S. 113 (1973). "[T]he word 'person,' as used in the Fourteenth Amendment, does not include the unborn." *Id.* at 158.

281. Attanasio, *supra* note 31, at 1297.

282. *Id.*

283. "[T]he infant plaintiff would have us measure the difference between his life with defects against the utter void of nonexistence, but it is impossible to make such a determination." Gleitman v. Cosgrove, 49 N.J. 22, 28, 227 A.2d 689, 692 (1967) (a mal-

Furthermore, there are circumstances other than abortion in which parents have broad rights regarding their children. These include cases where parents represent their children on other questions of life and death. In *In re Quinlan*,[284] parents were allowed to decide whether to continue life support systems for their comatose teenage daughter.[285] Other examples include the Reagan Administration's unsuccessful efforts to intervene in the "Baby Doe" cases.[286] Such cases argued the supremacy of parental rights over those of the child, including the right to genetically engineer.[287] If the parents can choose life or death for a child, then it is illogical to deny them the right to decide on genetic engineering for their child.

b. Arguments Opposing the Use of Genetic Engineering

(1). Abortion and Parental Rights

Those opposing the use of genetic engineering make many of the same arguments that are used against legalized abortion. The right to privacy, they contend, should not extend to all issues of procreation.[288] Opponents note, for example, that courts have not enforced

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practice case brought on behalf of a child whose mother was not told of risks of contracting German measles during pregnancy). An examination of the child's rights in a wrongful life action also contrasts significantly to the rights of the parents in an action for "wrongful birth." The parents in a wrongful birth action seek recovery for the failure of their doctor to inform them of their fetus's genetic defects. W. KEETON, D. DOBBS, R. KEETON & D. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS 370 (5th ed. 1984). Unlike the child's rights in wrongful life claims, the courts have overwhelmingly approved the rights of parents in worngful birth claims. T. Rogers, III, *Wrongful Life and Wrongful Birth: Medical Malpractice in Genetic Counseling and Prenatal Testing*, 33 S.C.L. REV. 713, 713-14 (1982).

284. 70 N.J. 10, 355 A.2d 647 (1976).

285. *Id.* at 28, 355 A.2d at 664 (holding that the daughter's right of privacy was to be vindicated by her father as guardian because she was incompetent).

286. In these cases, the federal government attempted to regulate physician-patient decisions not to treat seriously, genetically disabled newborns. In one case the parents decided to forego corrective surgery for a child born with tracheoesophageal fistula, which blocked his digestive tract, and Down's syndrome, a nonlethal, cytogenic cause of mental retardation. The child subsequently died of complications and starvation. Comment, *"New" Rights for Handicapped Newborns: Baby Doe and Beyond*, 22 CAL. W.L. REV. 127, 132-34 (1985). *See also* Hoving, *The "Baby Doe" Cases*, 72 A.B.A. J. 50 (Apr. 1, 1986) (referring to another case where the child was born with multiple defects but lived after the parents refused surgery). President Reagan instructed the Department of Health and Human Services (HHS) that the Rehabilitation Act of 1973, 29 U.S.C. § 794, applied to handicapped newborns and required the 6,400 hospitals receiving federal aid not to discriminate against an "otherwise qualified handicapped individual solely by reason of his handicap." Discrimination Against the Handicapped by Withholding Treatment or Nourishment; Notice of Health Care Providers, 47 Fed. Reg. 26,027 (1982). The HHS rulings were challenged in Bowen v. American Hosp. Ass'n, 476 U.S. 610 (1986), which held that: 1) the mandatory sections of the HHS regulations violated state authority; 2) the regulatory actions were unauthorized; and 3) hospital treatment of minor patients without parental consent is tortious. *Id.* at 642, 646-47.

287. Attanasio, *supra* note 31, at 1301.

288. *See generally Developments in the Law, Medical Technology and the Law*, 103

surrogate-mother arrangements.[289] The right to have sex without reproduction, it is pointed out, is distinguishable from the right to have reproduction in the absence of sex.[290] In the latter circumstance, the rights of the child must be considered as well as the rights of the parents. This was the basis for the results in *In re Baby M.*, where the best interests of the child prevailed over the surrogacy agreement.[291] The same analysis may be applied to genetic engineering, depriving the parents of their privacy rights in procreation.[292]

Abortion, opponents argue, which results in the elimination of more than 1.3 million[293] lives each year, is so destructive that it is not a reasonable justification for *any* other activity, much less one that could change human life itself.[294] It should not be forgotten that procreative freedom is limited by *Roe v. Wade*, which held that the states may proscribe abortions after the child reaches viability.[295] Furthermore, the procreative liberty outlined in *Roe* may not extend to decisions beyond whether to bear a child.[296] It is a long leap between the right to bear or abort a child and the right to "create a master race."[297] The privacy protected in *Roe* concerns the process of conceiving, not the process of "fashioning a particular type of child."[298] There is a marked difference between abortion and the

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HARV. L. REV. 1519, 1523-24 (1990). "The individualized, ad hoc character of traditional medical decisionmaking is ill-suited to address the broader ethical issues implicated in modern medicine." *Id.*

289. *See, e.g., In re* Baby M., 217 N.J. Super. 313, 525 A.2d 1128 (1987), *aff'd in part and rev'd in part*, 109 N.J. 396, 451-52, 537 A.2d 1227, 1255 (1988) (finding surrogacy contracts unenforceable, but refusing to address a constitutional right to privacy). *See also* Bowers v. Hardwick, 478 U.S. 186, 190-91 (1986) (upholding state sodomy law but suggesting that the Roe v. Wade line of cases does not create a general zone of sexual privacy which is off limits to government intrusion).

290. Robertson, *Procreative Liberty and the Control of Conception, Pregnancy, and Childbirth*, 69 VA. L. REV. 405, 406 (1983).

291. *In re* Baby M., 109 N.J. at 457, 537 A.2d at 1256. For a discussion of the rights of the unborn child, see *supra* notes 239-50 and accompanying text.

292. *See* Davis v. Davis, No. E-14496, (Tenn. Cir. Ct., Sept. 21, 1989) (LEXIS, States library, Tenn. file) (rejecting procreative freedom arguments in a case involving custody of seven frozen embryos).

293. Cimons, *supra* note 246, at A1, col. 1.

294. *See* Attanasio, *supra* note 31, at 1303. There are other examples of self-interested individuals acting outside government restraint which have brought about the extermination of whole biological species, as well as tribal and other minority groups. *See, e.g.*, A. CROSBY, ECOLOGICAL IMPERIALISM: THE BIOLOGICAL EXPANSION OF EUROPE, 900-1900 267-68 (1986).

295. 410 U.S. 113, 154 (1973). *See supra* notes 232 and 259 and accompanying text.

296. Attanasio, *supra* note 31, at 1287.

297. *Id.* at 1288.

298. *Id.* at 1291.

manipulation of genetic structure in that the latter takes place outside of the mother's body.[299] This fact raises the community's interest in protection of the prospective child since such interest does not impinge on the mother's body.

Apart from the abortion arguments, opponents cite instances where the state has asserted its own interests in parental decisions, including child labor laws[300] and laws concerning child abuse and neglect.[301] Opponents assert the general principle that courts may intervene in family decisions where such intervention would serve "the best interests of the child."[302] For example, in *Prince v. Massachusetts*,[303] the United States Supreme Court held that the state's interest superseded a guardian's free exercise claim that selling religious literature was part of the child's religious duty.[304] Significantly, every jurisdiction in the United States has laws against child abuse and neglect.[305] A substantial percentage of the 150,000 to 200,000 yearly court actions in child abuse cases[306] result in separating the child from the home.[307] Moreover, many states extend their child protection laws to fetuses with sanctions that include withdrawal of parental custody, criminal penalties, and compulsory medical treat-

299. Ozar, *The Case Against Thawing Unused Frozen Embryos*, 15 HASTINGS CENTER REP. 7, 8 (Aug. 1985). *But see* Comment, *Frozen Embryos: The Constitution on Ice*, 19 LOYOLA L.A. L. REV. 267, 279-81 (1985) (arguing that *Roe v. Wade* protects the procreative right to freeze and to destroy frozen embryos).

300. Attanasio, *supra* note 31, at 1301.

301. *Id.*

302. *See generally* J. GOLDSTEIN, A. FREUD & A. SOLNIT, BEYOND THE BEST INTERESTS OF THE CHILD 3-7 (1973) (discussing the best interests test in the context of child placement). Parents do not have absolute rights over their children where the best interests of a child dictate otherwise. *See* Akron v. Akron Center for Reproductive Health, Inc., 462 U.S. 416, 440 (1983) (where Court invalidated municipal ordinance which provided that an abortion was never in the best interests of the minor, absent parental consent); *see also* Planned Parenthood of Cent. Missouri v. Danforth, 428 U.S. 52, 74 (1976) (where Court invalidated state statute imposing as a "blanket provision" the requirement of parental consent in order for an unmarried minor to have an abortion during the first 12 weeks of pregnancy).

303. 321 U.S. 158 (1944).

304. *Id.* at 170. "Parents may be free to become martyrs themselves. But it does not follow they are free, in identical circumstances, to make martyrs of their children before they have reached the age of full and legal discretion when they can make that choice for themselves." *Id.*

305. Note, *The Child's Right to "Life, Liberty, and the Pursuit of Happiness": Suits by Children Against Parents for Abuse, Neglect, and Abandonment*, 34 RUTGERS L. REV. 154, 178-79 (1981) (citing NATIONAL CENTER ON CHILD ABUSE AND NEGLECT, U.S. DEP'T OF HEALTH AND HUMAN SERVS., PUB. NO. (OMDS) 80-3091, DATA ASPECTS OF CHILD PROTECTIVE SERVICES: REPORT FROM THE FOURTH NAT'L CONFERENCE ON DATA ASPECTS OF CHILD PROTECTIVE SERVICES 1 (1980)).

306. Comment, *Lawyering for the Abused Child: "You Can't Go Home Again,"* 29 U.C.L.A. L. REV. 1216, 1217 n.10 (1982).

307. Reynolds & Lacoursiere, *Interminable Child Neglect/Custody Cases: Are There Better Alternatives?*, 21 FAM. L.Q. 239, 265 (1982-83).

ment during pregnancy.[308] The interest and power of the courts to intervene between parents and their children, particularly for the welfare of the child, should not be underestimated.

(2). The Child's Rights

Opponents of genetic engineering argue that a fetus has rights which should be upheld.[309] Citing a "capacity for moral personality,"[310] the argument is made that life begins at conception and that all constitutional rights should attend the conceived child.[311] The fact that the child is genetically different from its mother attests to its separate status.[312] The issue should not be, it is argued, whether a particular being can talk or reason, but whether it can suffer.[313] Indeed, the courts have recognized a duty to protect unborn children from prenatal injuries and have allowed the child to recover if he or she is born alive.[314]

Paul Freund and Laurence Tribe, both professors at Harvard Law School, have separately argued that the unborn have a right to random genomes. "The mystery of individual personality, resting on the chance combination of ancestral traits, is the basis of our sense of mutual compassion and at the same time, of accountability."[315]

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308. Note, *The Creation of Fetal Rights: Conflicts with Women's Constitutional Rights to Liberty, Privacy, and Equal Protection*, 95 YALE L.J. 599, 604-05 (1986).

309. Attanasio, *supra* note 31, at 1293.

310. *Id.* (citing J. RAWLS, A THEORY OF JUSTICE 504-10 (1971)).

311. *See, e.g.*, Note, *Frozen Embryos: Moral, Social, and Legal Implications*, 59 S. CAL. L. REV. 1079, 1094-95 (1986); Ashley, *Pro-Life Evangelization*, in THE NEW TECHNOLOGIES OF BIRTH AND DEATH 80, 84-86 (1980); Noonan, *Is Abortion a Private Choice*, in THE NEW TECHNOLOGIES OF BIRTH AND DEATH 98, 102-03 (1980).

312. *See* King, *The Juridical Status of the Fetus: A Proposal for Legal Protection of the Unborn*, 77 MICH. L. REV. 1647, 1675 (1979) (referring to the fetus as a "second patient").

313. *See* J. BENTHAM, AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION 138 (1970). The nervous system of a ten-week-old fetus may respond to local stimuli. Robertson, *Toward Rational Boundaries of Tort Liability for Injury to the Unborn: Prenatal Injuries, Preconception Injuries and Wrongful Life*, 1978 DUKE L.J. 1401, 1421 (questioning whether "motor reaction to stimuli amounts to pain and suffering").

314. W. KEETON, D. DOBBS, R. KEETON & D. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS 367-69 (5th ed. 1984) (noting that although not affecting the duty owed, many jurisdictions premise recovery on viability or quickening of the fetus when the harm was inflicted). The Restatement (Second) of Torts advocates recovery for injury that occurs any time after conception. RESTATEMENT (SECOND) OF TORTS § 869 comment (1)d (1977). Criminal law and inheritance law also recognize fetal rights. G. CALABRESI, IDEALS, BELIEFS, ATTITUDES, AND THE LAW 94-95 (1985).

315. Freund, *Xeroxing Human Beings*, in HUMAN GENETICS 233, 242 (T. Mertens ed. 1975).

> [A]s one's most intimate nature as a person - one's genetic basis and neurological identity - becomes increasingly subject to deliberate external manipulation and even prior determination, one's ability to conceive of oneself as a free and rational being entitled to resist various societal claims may gradually weaken and might finally disappear altogether.[316]

Essential human dignity may be compromised by the child's realization that she is the product of genetic fabrication.[317] "One's sense of 'selfhood' or 'personhood,' and the related experience of one's autonomous individuality, may depend . . . on the ability to think of oneself as neither fabricated genetically nor programmed neurologically."[318]

Finally, there is the argument that no generation has the right to make decisions for future generations as potentially cataclismic as that which might be generated through the use of genetic engineering.[319] The consequences go well beyond the fetus whose genes are engineered.[320]

> [I]f any one age really attains . . . the power to make its descendants what it pleases, all men who live after it are the patients of that power. They are weaker, not stronger: for though we may have put wonderful machines in their hands we have pre-ordained how they are to use them.[321]

Genetic engineering enables parents to "shackle" their children to a life of the parents' choosing.[322] This is a power which is absolute and it should not be exercised without restraint.

IV. EUGENICS AND ABORTION

Finally, the most hotly disputed social issue in the United States today is abortion. As indicated above, there is a considerable similarity between the issues of abortion and genetics as applied to eugenics. Perhaps because both issues concern procreation, they divide opinions sharply. The arguments on both sides of the genetic engineering issue are compelling, in many ways more compelling than the arguments surrounding abortion. Abortion pits the rights of the mother against the rights of her child. Eugenic genetic engineering juxtaposes our ability to be potentially free from disease, perhaps even to reach the highest levels of human achievement, against the rights of all future generations to live their lives free from genetic control.

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316. Tribe, *supra* note 216, at 648 (footnote omitted). "[O]ur sense of ourselves as unique, particular beings . . . would be undermined if . . . we were bred 'to order' according to some plan. The random biological hazard of our parents' mating affirms that we belong to ourselves, for no one planned us." C. FRIED, RIGHT AND WRONG 155 (1978).

317. *See* Tribe, *supra* note 216, at 648.

318. *Id.*

319. *See* Rozenkranz, *supra* note 3, at 22-23.

320. *Id.* at 22-24 (raising an ecological objection to genetic engineering).

321. C. LEWIS, THE ABOLITION OF MAN OR REFLECTIONS ON EDUCATION WITH SPECIAL REFERENCE TO THE TEACHING OF ENGLISH IN THE UPPER FORMS OF SCHOOL 36 (1947).

322. Attanasio, *supra* note 31, at 1296.

Because the issue of eugenic genetic engineering concerns more than the life and death of mere individuals, rather it concerns the future of the human race itself, genetics and eugenics will likely eclipse abortion as a social issue.[323]

V. CONCLUSION

The forces pushing us almost inexorably toward acceptance of eugenic genetic engineering are considerable.[324] We can reduce disease. We can assure our children a life of incomparable health, strength, intelligence, beauty, and longevity. In the short term we seem to have accepted most of the presumptions necessary for increased use of genetic engineering. Insurance companies can give us lower rates. Employers can reduce their costs. Corporations can make incredible amounts of money. We have accepted a society with sharp class distinctions where the rich get richer while homelessness increases. Moreover, we are pitted in a global economic battle where a country that is unwilling to do what is necessary to maintain its supremacy will surely lose its prominence. In the words of the Vatican,

> [W]hat makes opposition to the Brave New World so difficult is the seductive path that leads to it. Every new advance in human genetic engineering is likely to be heralded as a great stride forward, a boon for humankind. Everyone [sic] of the breakthroughs in genetic engineering will be of benefit to someone, under some circumstances, somewhere in society. . . . [S]tep by step, advance by advance, we human beings might well choose to trade away the spontaneity of natural life for the predictability of technological design.[325]

The issue may be where to draw the line between genetic therapy, and eugenics. This is, however, the slippery slope itself. One may posit that genetic engineering is permissible to relieve suffering. The problem becomes defining suffering. Physical pain is certainly considered suffering, but is there a threshold which must be reached before genetic engineering is permissible? What about other forms of suffering such as Down's syndrome, emotional instability, lack of ar-

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323. [A] wholly new path of evolution . . . may . . . mark the end of *human* life as we . . . know[] it. It is possible that the nonhuman life which may take our place will be superior, but I think it most unlikely and certainly not demonstrable. In either case, we are ourselves human beings; therefore, we have a proprietary interest in our survival, and our survival *as human beings.*

Kass, *New Beginnings in Life*, in THE NEW GENETICS AND THE FUTURE OF MAN 61 (M. Hamilton ed. 1972) (footnote omitted) (emphasis in original).

324. "Perhaps world conditions have become so complex and resources so valuable that society now has a compelling interest in restricting reproduction by those who . . . perpetuate human suffering by giving birth to genetically defective offspring." Smith, *Genetics, Eugenics, and Public Policy*, 1985 S. ILL. U.L.J. 435, 446.

325. Rosenkranz, *supra* note 3, at 4 n.10.

tistic skill, athletic incompetence, shortness, or freckles[?]"[326]

There are those who argue that any attempt to draw such a line is immoral. "If diabetes, sickle-cell anemia, and cancer are to be cured by altering the genetic makeup of an individual, why not proceed to other 'disorders': myopia, color blindness, left-handedness."[327] But the fact that principled distinctions are difficult to make can be argued either way: 1) we should abandon genetic research because we cannot decide where to stop, or 2) we are compelled to design every genetic trait that might be relevant to any level of "suffering."[328] The argument always comes back to values, or perhaps, faith.

In the end, parents usually act in the best interests of their children. Given the choice, it is also quite likely children would accept the superiority given them by genetic engineering[329] as quickly as they would, say, being born to wealthy parents. Perhaps the all-but-universal repulsion to the eugenic horrors of the Nazis assures us that the power of genetic engineering will not be abused. There are still some years to consider the issue, but it must be considered carefully. It will likely be the most important issue this generation will face.

JOHN R. HARDING, JR.

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326. *Id.* at 36-37

327. Cowen, 86 TECHNOLOGY REVIEW 8 (Oct. 1983) (LEXIS, Nexis library, Omni file) (quoting Jeremy Rifkin).

328. Rosenkranz, *supra* note 3, at 37.

329. Attanasio, *supra* note 31, at 1305.