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The Jurisprudence of Genetics

*Rochelle Cooper Dreyfuss**
*Dorothy Nelkin***

I. INTRODUCTION	313
II. GENETIC ESSENTIALISM	316
III. LEGAL RAMIFICATIONS	321
A. <i>Community</i>	321
B. <i>Responsibility</i>	327
C. <i>Opportunity</i>	333
IV. A LONGER VIEW	338
A. <i>Neutrality</i>	339
B. <i>Predictability</i>	342
C. <i>Certainty</i>	343
D. <i>The Invisible Hand</i>	345
V. CONCLUSION	348

INTRODUCTION

In recent years, genetic research has ascended the list of national research priorities. From among the many weighty claims on the fisc, Congress has chosen to provide significant federal support for the Human Genome Initiative, a project aimed at mapping the complete set

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of genetic instructions that form the structure of inherited attributes. Geneticists anticipate that the project will disclose important new information on human development and disease. Some go further. One influential scientist remarked that this work is "the ultimate answer to the commandment 'Know thyself.'"¹

The decision to fund this Initiative, the largest biology project in the history of science, at a time of significant budgetary constraints suggests its political currency.² Scientists have recently developed genetic tests, familiar from the diagnostic technologies used to identify genetic abnormalities in fetuses and newborn infants, to find the markers indicating predisposition to certain single-gene disorders such as Huntington's disease. This success has bred the hope that more complex conditions, such as cancer, drug dependency, and mental illness, will ultimately be predictable and has enhanced the appeal of theories that explain human behavior in biological terms.³ Expectant parents now demand chromosomal testing of their babies before they are born⁴ and infertile couples often put considerable resources into the creation of genetically-related offspring. Institutions, including employers, insurers, and educators, look to biological tests to guide placement and avoid risk.⁵

Interest in genetics is also apparent in legal discourse, which has a long and enduring tradition of using evolutionary models to explain the development of the law.⁶ More recently, however, there has been a shift from essentially metaphorical uses of genetic concepts to an incorporation of biological principles into the substance of legal doctrine. Thus, many states now mandate the use of genetic testing for conditions such as phenylketonuria (PKU) in newborn infants.⁷ Moreover, genetic information is increasingly suggested as a tool for deciding cases in a wide

1. JERRY E. BISHOP & MICHAEL WALDHOLZ, *GENOME* 218 (1990) (quoting Walter Gilbert, Professor of Biology at Harvard University).

2. The project is expected to cost approximately three billion dollars over three to fifteen years. ROBERT PROCTOR, *VALUE-FREE SCIENCE* 5 (1991).

3. James D. Watson, *The Human Genome Project: Past, Present, and Future*, 248 *SCIENCE* 44 (1990); U.S. DEP'T OF HEALTH & HUMAN SERVICES & U.S. DEP'T OF ENERGY, *UNDERSTANDING OUR GENETIC INHERITANCE; THE HUMAN GENOME PROJECT* (1990).

4. NEIL A. HOLTZMAN, *PROCEED WITH CAUTION* 107-08 (1989).

5. DOROTHY NELKIN & LAURENCE TANCREDI, *DANGEROUS DIAGNOSTICS: THE SOCIAL POWER OF BIOLOGICAL INFORMATION* 51-132 (1989); Dorothy Nelkin and Laurence Tancredi, *Classify and Control: Genetic Information in the Schools*, 17 *AM. J.L. & MED.* 51 (1991).

6. See, e.g., Oliver W. Holmes, *Law in Science and Science in Law*, 12 *HARV. L. REV.* 443 (1899); E. Donald Elliott, *The Evolutionary Tradition in Jurisprudence*, 85 *COLUM. L. REV.* 38 (1985) (providing a comprehensive survey).

7. See NATIONAL RESEARCH COUNCIL, COMMITTEE FOR THE STUDY OF INBORN ERRORS OF METABOLISM, *GENETIC SCREENING: PROGRAMS, PRINCIPLES, AND RESEARCH* 44-87 (1975); Jane E. Brody, *A Search to Bar Retardation in a New Generation*, *N.Y. TIMES*, June 7, 1990, at B9.

variety of fields, including torts,⁸ criminal,⁹ trust and estate,¹⁰ family,¹¹ and labor law.¹² Some of these applications are fairly unremarkable. In certain areas, the law has traditionally asked questions that require factual answers based on the best information that science has to offer. For example, the law has embraced the use of DNA "fingerprints" for identification.¹³ While these applications raise difficult questions, such as which scientific methods are sufficiently probative to be admissible into evidence and how courts should utilize statistical methods of reporting scientific results, these issues have received considerable academic attention.¹⁴ Accordingly, it is not our purpose to comment on this facet of the law's use of genetics. Similarly, we do not address the many important regulatory and patenting issues that fall within the accepted framework for dealing with technological change.

Rather, our focus is on the impact of genetic research on traditional legal concepts. Genetics has profoundly altered the perception of personhood within our culture. This change has, in turn, challenged many of the core principles on which current norms are based and has compelled lawmakers to reconsider the legal rules that mediate the relationships among persons and between individuals and the broader community. Thus, we see this research as influencing not only the factual answers available to the decisionmaking process, but also the questions that are framed and the terms that are used in the debate.

In some sense there is no surprise even here. No longer viewed as a self-contained discipline,¹⁵ in recent decades the law has absorbed contributions from such fields as economics,¹⁶ philosophy,¹⁷ literature,¹⁸ and physics.¹⁹ Biology's concern with the functioning of the human entity makes it a natural place for the law to look for further illumination.

8. See *infra* text accompanying notes 87-88.

9. See *infra* notes 92-108 and accompanying text.

10. See *infra* text accompanying notes 82-86.

11. See *infra* text accompanying notes 59-81.

12. See *infra* part III.C.

13. See, e.g., *People v. Wesley*, 140 Misc.2d 306, 533 N.Y.S.2d 643 (Albany County Ct. 1988) (discussing the admissibility of DNA fingerprinting).

14. See, e.g., Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197 (1980); Larry Gostin, *Genetic Discrimination: The Use of Genetically Based Diagnostic and Prognostic Tests by Employers and Insurers*, 17 AM. J.L. & MED. 109, 113-15 (1991).

15. See Richard A. Posner, *The Decline of Law as an Autonomous Discipline: 1962-1987*, 100 HARV. L. REV. 761 (1987).

16. See, e.g., GARY S. BECKER, *THE ECONOMIC APPROACH TO HUMAN BEHAVIOR* (1976); Guido Calabresi, *Some Thoughts on Risk Distribution and the Law of Torts*, 70 YALE L.J. 499 (1961).

17. See, e.g., JOHN RAWLS, *A THEORY OF JUSTICE* (1971).

18. See, e.g., Symposium: *Law and Literature*, 60 TEX. L. REV. 373 (1982).

19. See, e.g., Laurence H. Tribe, *The Curvature of Constitutional Space: What Lawyers Can Learn from Modern Physics*, 103 HARV. L. REV. 1 (1989).

But just as care must be exercised in accepting the wisdom of economists, philosophers, and literary critics, so the trend toward what we will call "genetic essentialism" deserves more study than it has received so far.²⁰

Part II begins by elucidating our notion of genetic essentialism with reference to the expectations and rhetoric of scientists. This Part demonstrates that biological assumptions have pervaded this culture's understanding of the person. Part III utilizes the concept of personhood developed in Part II to illustrate the normative sacrifices that are made as biological conceptions of personhood achieve salience within the law. Because research in human genetics is rapidly advancing, its appeal to lawmakers is unlikely to abate. Part IV examines the sources of this attraction and suggests guidelines for translating the intuition that biological advances are relevant to current problems into methods for furthering social objectives that are consistent with long-held principles of justice.

II. GENETIC ESSENTIALISM

Anthropological studies demonstrate that personhood is a socially-defined concept. That is, the understanding of what it means to be a person and what rights are associated with personhood varies from culture to culture and, within a culture, changes over time according to external circumstances. Victor Turner describes how social rituals of naming or passage, for example, establish the individual's social identity and provide "a set of templates or models which are, at one level, periodical reclassifications of reality and man's relationship to society, nature, and culture."²¹ To Clifford Geertz, the ways in which persons are defined "are not given in the nature of things—they are historically constructed, socially maintained, and individually applied."²²

Examples from cultures other than our own illustrate that the social identity of an individual is not a universal concept, but rather is defined by the community as part of its system of social relationships. Many societies perceive the person in terms of group identification. For

20. Another reason for skepticism about the manner in which the law has amalgamated biological scholarship comes from a comparison between the conceptualization of genetics found in law and popular culture on the one hand and scientific literature on the other. We believe that the legal materials tend to be dominated by popular views. Accordingly, we have some concern that the law is using a view of genetics that has already been filtered through an acculturation process with an agenda of its own. We hope to specifically address this concern in a subsequent article.

21. VICTOR W. TURNER, *THE RITUAL PROCESS* 128-29 (1969).

22. CLIFFORD GEERTZ, *THE INTERPRETATION OF CULTURES* 363-64 (1973). *See also* RICHARD A. SCHWEDER, *THINKING THROUGH CULTURES: EXPEDITIONS IN CULTURAL PSYCHOLOGY* (1991); *THE CATEGORY OF THE PERSON* (Michael Currithers et al. eds., 1985).

example, in Bali, the use of personal names is usually avoided.²³ More important are names that indicate relationships, such as birth order, status, and most commonly, familial relationships. Because a person is understood contextually, names will change in the course of a lifetime to reflect status in the family. A man is called by the name of his children, prefaced by "father-of," or "grandfather-of," or "great-grandfather-of." Thus, personhood in Bali is defined by social placement.²⁴

Most Bantu languages have no term that corresponds to the word "person."²⁵ In Bantu society, individuals have personal names but the names usually signify status in a group. The Bantu notion of person is defined by family relationships that include the unborn and the dead.²⁶ As in Bali, perpetuation of the community underlies the definition of personhood, so that women who are unable to give birth are considered nonpersons.²⁷

In contrast to cultures that perceive the person in relational terms are those that emphasize the importance of individual characteristics. In these cultures, psychological definitions emphasize the internal developmental factors that form personality and shape identity.²⁸ In western philosophy, personhood rests on the individual's ability to exercise free choice.²⁹ According to Derek Parfit: "[T]o be a person, a being must be self-conscious, aware of its identity and its continued existence over time."³⁰ Although these theoretical definitions of personhood incorporate notions of consciousness, psychological connectedness, and ability to reason or shape life in accordance with a plan, the history of slavery and of gender discrimination reflects another view. As feminist and black writers have noted, biological differences have often determined who qualifies as a person deserving of rights.³¹

23. GEERTZ, *supra* note 22, at 368-69.

24. According to Clifford Geertz, the Bali culture defines personhood as a "particular location within a persisting, indeed an eternal, metaphysical order." *Id.*

25. Willy De Craemer, *A Cross-cultural Perspective on Personhood*, 61 MILBANK MEMORIAL FUND Q. 19, 22 (1983).

26. *Id.* at 23. See also John Beattie, *Review Article: Representations of the Self in Traditional Africa*, 50 AFRICA 313 (1980).

27. De Craemer, *supra* note 25, at 24.

28. ERIK H. ERIKSON, *CHILDHOOD AND SOCIETY* (2d ed. 1963).

29. Gary Watson, *Free Agency*, 72 J. PHIL. 205 (1975); SUSAN WOLF, *FREEDOM WITHIN REASON* (1990).

30. DEREK PARFIT, *REASONS AND PERSONS* 202 (1984).

31. See, e.g., A. Leon Higginbotham, Jr. & Barbara K. Kopytoff, *Property First, Humanity Second: The Recognition of the Slave's Human Nature in Virginia Civil Law*, 50 OHIO ST. L.J. 511, 514, 525-34 (1989) (demonstrating that the human nature of slaves, and the rights of slaves, were recognized only to the extent that they did not compromise the owner's property rights); *id.* at 538 (noting that free blacks, whites, and slaves were treated and conceptualized differently); Dorothy E. Roberts, *Punishing Drug Addicts Who Have Babies: Women of Color, Equality, and the Right of Privacy*, 104 HARV. L. REV. 1419, 1438 (1991) (noting that the way in which pregnant

Modern science provides support for defining personhood biologically, according to genetic characteristics. Geneticists are uncovering the inherited qualities that influence the course of life from childhood to old age. By scanning the sequences of DNA that form the basis of our inheritance, geneticists are detecting the markers that indicate predisposition to a growing number of hereditary diseases.³² As more markers are identified, scientists anticipate that tests will be available to indicate predisposition not only to single-gene disorders, such as Huntington's disease, cystic fibrosis, and hemophilia, but also to complex conditions and behaviors, facilitating prediction of mental illness, Alzheimer's disease, hyperactivity, heart disease, certain forms of cancer, and susceptibility to alcoholism, addiction, and even violence.³³ Such tests yield only probabilistic information, for the relationship between predisposition and actual expression generally remains unknown. Yet expectations about the predictive possibilities of genetic tests have created a new category of person—the presymptomatically ill, the person “at risk.”³⁴

Research in molecular biology has revitalized those studies in psychology that have long claimed the genetic origins of intelligence, personality, and behavior.³⁵ Despite the continuing controversy over the relative influence of environment and heredity, behavioral psychologists studying identical twins and adopted children claim that heredity determines specific behaviors and personality traits.³⁶ Developmental psychologist Jerome Kagan, for example, has observed a correspondence between shyness and an inherited variation in the physiology of the brain.³⁷ He suggests that other traits, such as the sense of morality, are similarly determined through biology.³⁸ And the twin studies of Thomas Bouchard, long a proponent of biological determinism, have attained a new respectability.³⁹

women slaves were treated “serves as a powerful metaphor for the evils of a fetal protection policy that denies the humanity of the mother”); Robin West, *Jurisprudence and Gender*, 55 U. CHI. L. REV. 1, 58, 71 (1988).

32. U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, MAPPING OUR GENES 3-4 (1988).

33. HOLTZMAN, *supra* note 4, at 88-105.

34. See Sophie Alexander & Marc J.N.C. Keirse, *Formal Risk Scoring, in A GUIDE TO EFFECTIVE CARE IN PREGNANCY AND CHILDBIRTH* 28, 29 (Murray Enkin et al. eds. 1989).

35. For a review of this controversial field, including the work of A.R. Jensen, see LEON J. KAMIN, *THE SCIENCE AND POLITICS OF IQ* (1974).

36. Sandra Scarr, *Three Cheers for Behavioral Genetics: Winning the War and Losing Our Identity*, 17 BEHAVIORAL GENETICS 219-28 (1987).

37. Jerome Kagan et al. *Biological Bases of Childhood Shyness*, 240 SCIENCE 167 (1988).

38. Robert Crum, *Temperamental Research*, HARVARD MAGAZINE Jan.-Feb. 1988, at 6 (quoting Jerome Kagan).

39. Thomas J. Bouchard, Jr. et al. *Sources of Human Psychological Differences: The Minnesota Study of Twins Reared Apart*, 250 SCIENCE 223 (1990).

The public impact of genetics has been significant. Therapeutic benefits are far in the future, and scientists generally qualify assertions regarding the extent to which heredity determines complex conditions or behavior. However, they have presented their research in ways that are likely to attract considerable lay attention. According to Charles R. Scriver, president of the Society for Human Genetics, this research has made "inroads on the medical mind;"⁴⁰ Robert Pasnau, president of the American Psychiatric Association speaks of the "remedicalization of psychiatry."⁴¹ The future lies in genetic "tendencies" says the scientific director of a major biotechnology firm.⁴² In numerous public speeches and interviews geneticists have called the large scale project to map the human genome a "quest for the Holy Grail," an effort to create the "Book of Man." They talk about the "Oracle of DNA" or the "Blueprint of Life." Daniel Koshland, the editor of *Science*, has claimed the nature-nurture controversy over.⁴³ "Our fate is in our genes," says James Watson, director of the Human Genome Initiative.⁴⁴ And in public presentations, Walter Gilbert, who leads the effort to sequence the genome, pulls out a compact disk and announces to his audience, "This is you."⁴⁵

Society appropriates science to support prevailing values, sometimes extending it beyond the limits of well-accepted knowledge. Thus, the enthusiasm of some members of the scientific community draws public attention to genetic relationships. Media articles on reproductive technologies imply that women should reproduce at all costs for they will be emotionally "desperate" without their own children.⁴⁶ Those unable to conceive seek out surrogate mothers in order to have genetically related children.⁴⁷ Films and articles on parent-child relationships suggest the importance of genetic integrity, of "flesh and blood."⁴⁸ Genealogy services are flourishing as people pursue their roots. "How to"

40. Charles R. Scriver, *Presidential Address: Physiological Genetics - Who Needs It?*, 40 AM. J. HUM. GENETICS 199, 208 (1987).

41. Robert Pasnau, *Presidential Address*, NEW PHYSICIAN, April 1988, at 30.

42. Alan Smith, quoted in Christopher Joyce, *Genes reach the medical market*, NEW SCIENTIST, July 16, 1987, at 45, 50.

43. Daniel E. Koshland, Jr., *Nature, Nurture, and Behavior*, 235 SCIENCE 1445 (1987).

44. Leon Jaroff, *The Gene Hunt*, TIME, March 20, 1989, at 62, 67.

45. See, e.g., Walter Gilbert, *Current State of the H.G.I.*, Harvard Univ. Diberner Center Lecture (June 15, 1990).

46. Sarah Franklin, *Deconstructing 'Desperateness': The Social Construction of Infertility in Popular Representations of the New Reproductive Technologies*, in THE NEW REPRODUCTIVE TECHNOLOGIES 200 (Maureen McNeil et al. eds. 1990).

47. The motivation, of course, is not always genetic. People may also seek reproductive technologies because of the shortage of healthy infants and the fear of adopting drug-addicted babies.

48. See, e.g., popular articles on the desperation of adopted children, John McCormick, and Pat Wingert, *Whose Child Am I Anyway?*, NEWSWEEK 58 (Special Edition, Summer 1991).

books and articles written for adoptees stress the importance of finding one's natural or birth parents and suggest that knowing one's genetic heritage is a way to define identity.⁴⁹ The very concept of identity is defined more in biological than in social terms.

The interest in genetic identity includes a preoccupation with biological determinism.⁵⁰ Among the traits attributed to genetics are mental illness, homosexuality, aggressive personality, dangerousness, job and educational success, exhibitionism, the tendency to commit arson, stress, risk-taking, shyness, social potency, traditionalism, and even zest for life.⁵¹ These complex conditions frequently are described as directly inherited, as if they were single-gene disorders.⁵² Journalists reporting on behavioral research exhibit a growing acceptance of genetic determinism.⁵³ Scientists' speculations about genetic influences are interpreted as proof that social problems such as crime and poverty are less the by-products of destructive environments than the result of genetic endowment.⁵⁴

Reflecting similar assumptions, books and articles discuss genetics as the basis for future health, capabilities, and career choices.⁵⁵ Medical journalists advise readers to make genograms that contain all the information they can find about their relatives, or to take family health pedigrees to "zero in on hereditary diseases lurking in the future."⁵⁶ With the availability of new reproductive technologies, choosing a baby can become like catalog shopping. Fertility clinics keep computer profiles of donors correlated with a list of desirable traits. Moreover, the availability of prenatal tests has encouraged new standards of perfection. The idea that genes have power and will determine the behavior and health of one's offspring has spurred a search for "the perfect baby—every parent's dream."⁵⁷

Observing these trends, we define a concept called "genetic essentialism." Genetic essentialism posits that personal traits are predictable

49. Richard Weizel, *A Voice from the Past*, PARENTING 90 (Oct. 1991); Michael D'Antonio, *The Adoption Revolution*, 6 CHILD 118 (Nov. 1991).

50. A computer search of the *New York Times*, the *Los Angeles Times*, and the *Washington Post*, from 1984 to 1987 yielded 416 articles relating genetics to behavior. Dorothy Nelkin, *Hereditary Themes in American Popular Culture*, Proposal to National Institutes of Health (1991).

51. *Id.* at 16-17.

52. *Id.* at 17.

53. An article in *Time* reported that twin studies are "one more proof that parenting has its limits." John Leo, *Exploring the Traits of Twins*, TIME, Jan. 12, 1987, at 63.

54. JAMES Q. WILSON & RICHARD J. HERRNSTEIN, *CRIME AND HUMAN NATURE* (1985).

55. MYRA V. GORMLEY, *FAMILY DISEASES: ARE YOU AT RISK?* (1989).

56. See, e.g., Nancy Shute, *How Healthy is your Family Tree?*, HIPPOCRATES, Jan.-Feb. 1988, at 88-89; GORMLEY, *supra* note 55.

57. News documentary, hosted by Barbara Walters (ABC television broadcast June 20, 1990).

and permanent, determined at conception, "hard-wired" into the human constitution. If comprehensively known and understood these inherent qualities would largely explain past performance and could predict future behavior. Standing in sharp contrast with the relational definitions of personhood observed in some societies, this ideology minimizes the importance of social context. By stressing the importance of immutable biological qualities, genetic essentialism also differs from traditions centered on the importance of life experiences in determining behavior.

III. LEGAL RAMIFICATIONS

Scientific and legal changes are interrelated. Both the cultural beliefs that shape science and the knowledge that emerges from science are readily incorporated into legal doctrine.⁵⁸ Thus, the transformation of "personhood" into an essentially genetic concept has important consequences for legal thought. If personal identity is no longer understood in relational terms, then doctrines dealing with community—relationships among people—must be reconsidered. Because genetic essentialism is a deterministic concept, it negates assumptions about free will, thereby putting into question much of the law concerning responsibility, intent, condemnation, and punishment. Because of the limitations that genetic understanding places on human potential, essentialism challenges the principle that equivalent opportunities should be extended to all. This Part does not contain a comprehensive typology of the legal areas in which genetic themes have emerged. Rather, we have selected representative issues and cases in which essentialist arguments are applied to illustrate the normative sacrifices made when such arguments are accepted as dispositive.

A. Community

When the family was regarded as the primary setting for care, education, and emotional support, stability was one of the law's central goals; familial relationships were rarely disturbed. Divorce was difficult. Courts often resolved paternity disputes using devices such as Lord Mansfield's rule, which estopped a husband from denying that he fa-

58. See, e.g., BRUNO J. LATOUR & STEVE WOOLGAR, *LABORATORY LIFE: THE SOCIAL CONSTRUCTION OF SCIENTIFIC FACTS* (1979); KARIN D. KNORR-CETINA, *THE MANUFACTURE OF KNOWLEDGE* (1981) (noting that sociological and ethnographic studies suggest that science is a socially-constructed activity, shaped by cultural beliefs and social assumptions); ELISABETH NOELLE-NEUMANN, *THE SPIRAL OF SILENCE* 123-33 (1984); Maxwell E. McCombs & Donald L. Shaw, *The Agenda-Setting Function of the Mass Media*, 36 *PUB. OPINION Q.* 176 (1972) (suggesting that media influence plays a critical role in shaping and expressing public conceptions, setting cognitive agendas and initiating the formation of attitudes among both professional and lay persons).

thered the children born to his wife during his marriage,⁵⁹ or equitable estoppel, which prevented a mother from denying the fatherhood of a man whom she had permitted to nurture her child.⁶⁰ These estoppel rules may have originated in a nontechnological society's search for a method to determine the fact of paternity.⁶¹ But they also preserved the status quo. By assuring children continued contact with the significant persons of their lives, these rules evidenced the high value placed on social relationships.

Similar considerations motivated adoption law. The principal concerns were stability, providing the adoptee with a fresh start, and protecting the integrity of ongoing relationships.⁶² States created a shield of privacy between the family and society and fostered a legal fiction of natural birth. In a majority of jurisdictions, original birth certificates and adoption records were sealed.⁶³ Although some of these states permitted disclosure for "good cause"—principally medical or financial necessity—the test was usually stringent.⁶⁴ In some states birth parents enjoyed an absolute right to anonymity.⁶⁵

When the person is reconceptualized as a genetic entity and forging genetic relationships becomes a goal, legal protection for these social interests weakens. For example, *Johnson v. Calvert*,⁶⁶ a case the press described as "genetics vs. environment,"⁶⁷ was a dispute over the custody of a child conceived through *in vitro* fertilization (IVF). The Calverts donated their gametes (egg and sperm) to create a so-called

59. *Goodright v. Moss*, 98 Eng. Rep. 1257 (1777). Modification of the rule to permit rebuttal through blood tests has been going on for some time. *See, e.g., Kusior v. Silver*, 354 P.2d 657 (Cal. 1960).

60. *See, e.g., Brenda J. Runner, Protecting A Husband's Parental Rights When His Wife Disputes the Presumption of Legitimacy*, 28 J. FAM. L. 115 (1989-90). *Cf. Michael H. v. Gerald D.*, 491 U.S. 110 (1989) (upholding against a due process challenge a California law dating from 1872 that presumes that a child born to a married woman living with her husband is a child of the marriage).

61. That is, Lord Mansfield's rule infers fatherhood from matrimony; the estoppel argument reasons that the more contemporaneous the action, the more truthful it is likely to be. *Cf. FED. R. EVID.* 803(3) (providing that present sense impressions are exceptions to the hearsay rule because contemporaneousness is an indication of truth).

62. *See, e.g., In re Anonymous*, 390 N.Y.S.2d 779 (1976) (describing the benefits of confidentiality).

63. *See Melissa Arndt, Comment, Severed Roots: The Sealed Adoption Records Controversy*, 6 N. ILL. U.L. REV. 103, 104-05 (1986).

64. *See, e.g., In re Hayden*, 435 N.Y.S.2d 541 (N.Y. Sup. Ct. 1981) (holding that fear of exposure to DES was a sufficient justification for disclosure); *Dwyer v. Dwyer*, 10 N.E.2d 344 (Ill. 1937) (holding that biological parents remain liable to a child if the adoptive parents cannot provide for the child).

65. *See, e.g., ILL. REV. STAT.* ch. 40, § 1522.3(e) (West Supp. 1991); *TENN. CODE ANN.* § 36-1-141 (1991); *Comment, supra* note 63, at 121-23.

66. No. X 63 31 90 (Cal. Super. Ct. Oct. 22, 1990).

67. Seth Mydans, *Surrogate Denied Custody of Child*, N.Y. TIMES, Oct 23, 1990, at A14.

test tube baby. Because the wife could not sustain a pregnancy, the couple hired Johnson to carry the fertilized embryo to term in her womb. The dispute began after Johnson refused to relinquish the child, Christopher, at his birth. When genetic tests revealed a high probability that the Calverts were Christopher's biological parents, the court awarded them sole custody.

The result in *Johnson* is not remarkable; the significance of the case lies in the basis of the decision. The court could simply have enforced the contract according to its terms.⁶⁸ Alternatively, the court could have used the traditional standard of the child's best interest and weighed Johnson's claim as the person who nurtured and birthed the fetus against the value of placing Christopher in the marital home that had motivated his conception and planned for his rearing. But although the court acknowledged Johnson's arguments, it easily dismissed them.⁶⁹ Noting the tremendous need for genetically related children,⁷⁰ the court utilized the Minnesota twin studies to justify a decision for the Calverts.⁷¹ The court explained:

We know more and more about traits now, how you walk, talk and everything else, all sorts of things that develop out of your genes, how long you're going to live, all things being equal, when your immune system is going to break down, what diseases you may be susceptible to. They have upped the intelligence ratio of genetics to 70 percent now.⁷²

68. In the then-current literature on surrogacy, it was argued that such contracts were unconscionable for exploiting the surrogate. See, e.g., MARTHA A. FIELD, *SURROGATE MOTHERHOOD* (1988) (arguing that surrogacy contracts should be voidable by the surrogate); Margaret Jane Radin, *Market-Inalienability*, 100 HARV. L. REV. 1849 (1987) (stating that surrogacy is against the public interest); Patricia J. Williams, *On Being the Object of Property*, 14 SIGNS 5, 13-16 (1988) (analogizing surrogacy to slavery); Susan Frelich Appleton, *Surrogacy Arrangements and the Conflict of Laws*, 1990 WIS. L. REV. 399, 400 n.2 (citing legislative activity in the surrogacy area). However, the court could have taken the position that, since the contract met the state's formal requirements for validity, concerns for the surrogate should be left to the legislature.

69. According to the court, "there is still much disagreement as to the influence of gestational environment," *Johnson*, at 8. See also *id.* at 10 (stating that "[i]n this case, we have a family unit, all genetically related. You have Mark Calvert, Crispina Calvert and their child they call Christopher: three people in a family unit."). To its credit, the court also devoted considerable effort to advising the legislature on protections for safeguarding the interests of the surrogate.

70. *Id.* at 11.

71. *Id.* at 7.

72. *Id.* at 8.

The point of this discussion is not to imply that the court should have decided the case for Johnson, or that its suggestions that the legislature require psychological evaluation and allow only mothers to enter into surrogacy contracts were not valuable. In fact, we believe that surrogate contracts should be enforced. However, we reach that conclusion on reasoning similar to that enunciated by Marjorie Maguire Shultz, *Reproductive Technology and Intent-Based Parenthood: An Opportunity for Gender Neutrality*, 1990 WIS. L. REV. 297. Given the *Johnson* court's views on the issue of the surrogate's rights, its decision relies too heavily on the genetic relationship of the child to the Calverts.

See also *In re RLL*, 386 S.E.2d 852 (Ga. Ct. App. 1989) (debating the extent to which the genetic basis for the father's alcoholism should influence the custody determination).

Thus, the court defined the child as a genetic entity—a packet of genes—on the assumption that shared genes are the crucial basis of human relationships.⁷³

The same theme is discernable in other family law materials. Courts may speak of the problems created when long-term social relationships are broken, but the genetic tie increasingly receives emphasis.⁷⁴ For example, in *Commonwealth ex rel. Coburn v. Coburn*⁷⁵ the court dismissed an ex-husband's petition for visitation when genetic tests revealed that Angie Lee, the child he had nurtured for ten years, was not his biological daughter. Although the decision was reversed on appeal,⁷⁶ several of the justices adopted a biological perspective. Concurring opinions, one of which spoke of "knowledge of one's biological parents and hereditary history [as] crucial in ordering one's affairs and making life's decisions,"⁷⁷ approved the use of blood tests to assure the child knowledge of her biological father.⁷⁸ Apparently, the court did not consider the danger this genetic information posed to the relationship between Angie Lee and the man she considered her father.

Genetic essentialism has also affected other parental relationships. Thus, legal protection generally is not accorded to the tie between a child born to a lesbian mother and her non-gestational partner no matter how long the relationship between the parties has endured.⁷⁹ In adoption, the genetic perception of personhood is manifest in the recog-

73. The influence of genetics is highlighted by the fact—unmentioned by the court, but evident in the illustrations in the press—that the Calverts were white and Johnson was black.

74. See, e.g., *Commonwealth ex rel. Coburn v. Coburn*, 558 A.2d 548, 553 (Pa. Super. Ct. 1989). See also John Lawrence Hill, *What Does it Mean to be a "Parent"? The Claims of Biology as the Basis for Parental Rights*, 66 N.Y.U. L. Rev. 353 (1991) (contrasting genetic and gestational claims to parenthood with arguments based on the intent to conceive a child).

75. 558 A.2d 548 (Pa. Super. Ct. 1989).

76. The appellate court took into account the "chaos to the child's emotional well-being" that would occur if her relationship to the ex-husband were severed. *Id.* at 553 (Cirillo J., concurring).

77. *Id.* at 554 (Cirillo, J., concurring).

78. See *id.* (emphasizing the importance of "knowledge of one's biological parents and hereditary history"); *id.* at 555 (questioning the wisdom of denying the child the right to know her biological father) (Brosky, J., concurring).

An interesting contrast to this case is provided by *In re the Paternity of D.L.H.*, 419 N.W.2d 283 (Wis. Ct. App. 1987), in which the court held that even after an H.L.A. blood test excludes a husband as the father of his wife's child, the principle of equitable estoppel permits his paternity to be recognized if its recognition is in the best interest of the child.

79. See, e.g., *In re Alison D.*, 572 N.E.2d 27, 28 (N.Y. 1991) (denying parental rights to the former partner of a lesbian mother despite a continuous, six-year relationship with the child because she was a "biological stranger" to the child); *Nancy S. v. Michele G.*, 279 Cal. Rptr. 212 (Cal. Ct. App. 1991) (denying visitation rights to a nongestational partner, despite recognition of de facto parent status, on the theory that the natural parent is of paramount importance). See generally, Nancy D. Polikoff, *This Child Does Have Two Mothers: Redefining Parenthood to Meet the Needs of Children in Lesbian-Mother and Other Nontraditional Families*, 78 Geo. L.J. 459 (1990).

dition of claims of genealogical bewilderment.⁸⁰ Despite the disruption caused in the adoptive family, and without regard to either the biological family's reliance-based interest in confidentiality or the impact on future adoptions, the essentialist view mandates that sealed adoption records be opened. Knowing one's roots is considered a prerequisite to becoming a functional adult.⁸¹

The contrast between the essentialist and relational perspectives emerges sharply in proposals to use genetic information to craft intestate succession laws. John Beckstrom, for example, has suggested that the law governing intestate succession should be structured to give a decedent's assets to those most able to perpetuate the individual's genes. Beckstrom's argument begins with the proposition that intestate

80. See Elton B. Klibanoff, *Genealogical Information in Adoption: The Adoptee's Quest and the Law*, 11 FAM. L. Q. 185, 193 (1977).

81. See, e.g., *In re Dixon*, 323 N.W.2d 549, 550 n.2 (Mich. Ct. App. 1982) (quoting a psychiatrist's statement that "there is a generally deep-seated need on the part of adoptees to know their biological origins, regardless of the quality of family life in their adopted families").

Analogously, the Wisconsin legislature has recently required mothers seeking state aid to participate in affiliation proceedings. While it is likely that the State is partially motivated by a desire to conserve its resources, the legislative history evinces a concern for the interest of children in identifying their fathers. WIS. STAT. ANN. §§ 767.075(1)(a), 767.45 (West Supp. 1990) (making the state the real party in interest in paternity proceedings when certain applications for state aid are made).

Ignored in the quest to determine the identity of both parents is the substantial literature indicating that when parents are not united, their children's interests may be best served by giving one of the parents exclusive control. See, e.g., JOSEPH GOLDSTEIN ET AL., *BEYOND THE BEST INTEREST OF THE CHILD* (1979). Cf. Joan G. Wexler, *Rethinking the Modification of Child Custody Decrees*, 94 YALE L.J. 757 (1985) (noting problems with disrupting ongoing custody arrangements); Michael H. v. Gerald D., 491 U.S. 110 (1989) (holding that even when the natural father has an established relationship with a child, traditional perceptions of the family permit the state to presume irrebutably that the wife's husband is the child's father); *Lehr v. Robertson*, 463 U.S. 248 (1983) (holding that a biological father who lacks a relationship with his child should not be allowed to interfere with an adoption that is in the child's best interest); *In re the Adoption of Baby Boy D*, 742 P.2d 1059 (Okla. 1985) (holding that a father may not interfere with an adoption that is in the child's best interest, notwithstanding the applicability of the Indian Child Welfare Act, 25 U.S.C. §§ 1901-1963 (1988), which is specifically aimed at protecting the stability and cultural linkages of Indian tribes). But see *In re the Guardianship of Q.G.M.*, 808 P.2d 684 (Okla. 1991) (holding that a tribe has a broad right to intervene in guardianship decisions that could potentially undermine Indian family ties). See also 42 U.S.C. § 602(a)(26)(B)(i) (requiring a mother seeking benefits through the Aid to Families with Dependent Children program to divulge the name of her child's biological father). See generally, Harry D. Krause, *Child Support Reassessed: Limits of Private Responsibility and the Public Interest*, 1989 U. ILL. L. REV. 367 (arguing that social reciprocity rather than genetic reciprocity deserves greater attention).

Similar arguments can produce an opposite outcome. Emphasis on genetic identity may lead courts to leave children with their biological families under conditions that might previously have led to a termination of parental rights. See, e.g., *In re J.J.B.*, 369 N.W.2d 593 (Minn. Ct. App. 1985) (leaving a child in the custody of a schizophrenic, suicidal mother). Cf. *In re the Appeal in Cochise County Juvenile Action No. 5666-J*, 650 P.2d 459 (Ariz. 1982) (en banc) (permitting a mother who allowed one sick child to die untreated because she believed in miracles to keep her remaining children, absent a showing that the others were genetically predisposed to the condition that killed their brother).

succession laws are intended to reflect the desires of the owner of wealth: because every organism that survived the process of natural selection did so because it was "programmed"—"hard-wired"—to ensure the endurance of its specific genetic heritage, a genes-based distribution best mirrors an individual's real desires.⁸²

In societies that define personhood in relational terms, Beckstrom's argument would seem extraordinary. Even assuming that the goal of intestate succession law is to further the wishes of decedents who fail to write wills, and that genes influence those wishes, there is no special reason to believe that input from the genes would override other values. Indeed, as Beckstrom himself admits, surveys of living individuals and examinations of actual wills reveal distribution patterns that are sharply at odds with his proposal.⁸³ Although Beckstrom offers theories to explain this divergence, his explanations do not make the affirmative case that a genes-based distribution reflects actual desires. His principal argument is that other distribution schemes are culturally induced.⁸⁴ While this may be so, Beckstrom offers no reason for favoring distribution preferences based on biology over those created through socialization.

Beckstrom's assumption that the goal of fulfilling the unstated wishes of intestates entirely governs the law of intestate succession is also troubling. The Uniform Probate Code (UPC) makes this claim,⁸⁵ but even a cursory review of the UPC and state law reveals that this proposition is simplistic. Provision is made for spouses because jurisdictions consider the spousal relationship to include rights in the other's estate, for minor children because parents have legal obligations to support them, and for parents because states wish to protect their welfare systems from claims by relatives of the wealthy.⁸⁶ A scheme that ignores

82. See JOHN H. BECKSTROM, *SOCIOBIOLOGY AND THE LAW* (1985). See also EDWARD O. WILSON, *SOCIOBIOLOGY: THE NEW SYNTHESIS* (1975).

83. Similarly, state intestacy laws generally do not follow Beckstrom's proposal. For example, intestate succession laws typically do not distinguish between the children of males and females, although Beckstrom makes this distinction on the theory that males, but not females, require proof of parenthood. Similarly, state intestacy laws rarely make the distinction Beckstrom does between adopted and biological children. See BECKSTROM, *supra* note 82, at 28, 49-54. Furthermore, Beckstrom would distribute an estate to the decedent's siblings rather than parents even though most laws and wills favor the latter. *Id.* at 35-37. Yet it is likely that some people who decline to write wills do so because they are satisfied with the intestate scheme.

84. See, e.g., BECKSTROM, *supra* note 82, at 27.

85. UNIF. PROB. CODE pt.1, General Comment, 8 U.L.A. 56 (1983) (asserting that "[t]he Code attempts to reflect the normal desire of the owner of wealth as to disposition of his property at death").

86. See, e.g., UNIF. PROB. CODE pt.2, General Comment, 8 U.L.A. 73 (1983); John T. Gaubatz, *Notes Toward a Modern Wills Act*, 31 U. MIAMI L. REV. 497, 501, 510 (1977); Deborah A. Batts, *I Didn't Ask to be Born: the American Law of Disinheritance and a Proposal for Change to a System of Protected Inheritance*, 41 HASTINGS L.J. 1197, 1198-99 (1990).

these public purposes denies not only the complex etiology of personal preferences, but also significant interests of the community.

Beckstrom's handling of the tort law on emotional distress further demonstrates the tradeoffs inherent in genetic essentialism. Claims for compensation for the injury of watching another being harmed present special problems for the legal system. There is a problem in narrowing the class of cognizable claims, and there is difficulty in proof. Beckstrom suggests that both issues will be resolved if a genetic relationship between the plaintiff and the person harmed is made an element of the tort.⁸⁷ This proposal would narrow the class of potential claimants, but at the expense of ignoring the extent to which this tort is intended to recognize and protect social rather than biological connectedness.⁸⁸

B. Responsibility

Genetic essentialism would also modify legal and moral concepts of responsibility. In Beckstrom's treatment of emotional distress, the genetic connection between the plaintiff and the victim is used to define responsibility. By circumscribing the level of liability, biological attributes of the victim determine the blameworthiness of the actor.⁸⁹ Keying liability to the victim's genetic endowment may be consistent with restitutionary objectives of the law. Such a procedure, however, threat-

87. BECKSTROM, *supra* note 82, at 99-113.

88. *Cf.* Martha Chamallas & Linda Kerber, *Women, Mothers, and the Law of Fright: A History*, 88 MICH. L. REV. 814 (1990) (tracing the relationship between the tort of emotional distress and social mores).

89. *Sellers v. Hendrickson*, 360 N.E.2d 1235 (Ill. App. Ct. 1977), provides another example. In this case, the defendant's car hit a child who subsequently experienced learning difficulties. At trial, the defendant was allowed to introduce evidence on the personalities of the victim's brothers and sisters and, through the testimony of a neurologist, suggested that the victim's condition was caused by heredity rather than the incident. Although the evidence was introduced on the question of proximate cause, it is likely that the jury used it to limit the amount of damages awarded. That is, instead of assuming that the victim's future potential was unlimited, the jury used his genetic heritage to limit liability. *See also Willey v. Ketterer*, 869 F.2d 648 (1st Cir. 1989) (illustrating the extent to which a jury will use evidence of genetic diseases to exonerate an obstetrician for malpractice); *Elam v. Alcolac, Inc.*, 765 S.W.2d 42, 208-210 (Mo. App. 1988) (rejecting a claim based on increased risk of cancer because the plaintiff's genetic predisposition to cancer was not determinable); *Franklin v. Workers Compensation Appeals Board*, 145 Cal. Rptr. 22 (Cal. Ct. App. 1978) (holding that a genetic predisposition to high cholesterol reduces the extent to which a disability can be considered job-related).

As in other areas of the law, the genetic argument can work both ways in tort cases. In some cases, genetic predispositions can favor the victim. *See Starlings v. Ski Roundtop Corp.*, 493 F. Supp. 507 (M.D. Pa. 1980) (allowing the use of evidence of genetic risk of arthritis to prove that an injury was proximately caused by a skiing accident); *Mose v. Brewer*, 428 So. 2d 1212 (La. Ct. App. 1983) (finding that an accident aggravated the plaintiff's predisposition to diabetes). *Cf. Alter v. HHS*, 508 F. Supp. 888 (S.D.N.Y. 1981) (using genetic predisposition to choose an early date for the onset of a disability); *Simmons v. HHS*, 621 F. Supp. 1174 (W.D.N.Y. 1985) (holding that alcoholism is not a voluntary condition exempt from social security coverage on the basis of the claimant's genetic predisposition to alcoholism).

ens other goals. This regime would have perverse effects on the law's capacity to deter wrongdoing whenever the potential victim's biological limitations cannot be determined *ex ante*.⁹⁰ Moreover, such a process could be construed to symbolize a willingness to tolerate the victimization of people deemed genetically inferior.⁹¹

The effect of essentialism is even more stark when the focus shifts from the biological state of the victim to that of the actor. A comparison of two recent cases, *Baker v. State Bar*⁹² and *In re Ewaniszyk*,⁹³ foreshadows some of the problems that essentialism poses. Both cases were disbarment proceedings based on misappropriation of client funds; in both, the allegations of wrongdoing were uncontested and the misfeasance was attributable to substance abuse, which each petitioner had apparently learned to control. Both cases were considered by the Supreme Court of California in 1990. Yet Ewaniszyk was disbarred while Baker was merely placed on probation. The court found Baker's claims for mitigation more compelling than Ewaniszyk's because Baker "had a genetic predisposition to alcoholism."⁹⁴

Why should the genetic factor be dispositive if both attorneys

90. Cf. GUIDO CALABRESI, *THE COSTS OF ACCIDENTS* (1970); RICHARD POSNER, *ECONOMIC ANALYSIS OF LAW* 147-99 (3d ed. 1986).

Let X equal the optimum total level of care in a regime that considers all individuals equal. For simplicity, the level of damages necessary to produce that level of care is also X . Given a population of size n , the level of care theoretically directed at each individual under this regime is X/n . Now consider what happens when damages are reduced by Y because some victims are found to be genetically inferior. Actors now have three choices. First, they can maintain the former level of care. Graduating damages that consider genetic endowments will not have the salutary effect of creating the level of caretaking that is optimum for the society. Second, actors can reduce the total amount of care they take to $(X-Y)$. Under the genetic essentialist view, this is the optimum amount of care. Since genetic inferiority is not usually determinable, each individual will receive a level of care equal to $(X-Y)/n$. Hypothetically, however, certain individuals deserve the care available under the former rule— X/n . Thus, these people now receive suboptimal care. Finally, actors can attempt to use their understanding of hereditary principles to target their care. This method would permit actors' cultural stereotypes to govern caretaking even when, from a genetic perspective, such stereotypes may result in a misallocation of care.

91. See, e.g., Joel Feinberg, *The Expressive Function of Punishment in DOING & DESERVING*, *ESSAYS IN THE THEORY OF RESPONSIBILITY* 102-104 (1970). In *Payne v. Tennessee*, 111 S. Ct. 2597 (1991), which upheld the use of a victim impact statement in the sentencing phase of a murder trial, the Court distinguished between punishment and liability, asserting that even if the moral guilt attached to two separate crimes is identical, punishment can be, and usually is, graded in accordance with the assessment of harm caused by the criminal. *Id.* at 2605. However, because the Court's comparison involved different crimes, it is apposite only if taking some human lives is more acceptable than taking others. Even if there is a distinction between guilt and punishment, the public may have difficulty perceiving the subtleties. Thus, there is still a significant risk that correlating liability with the victim's genetic endowment will symbolize tolerance of the victimization of those deemed genetically inferior. Cf. *id.* at 2620 (expressing concern that victim-impact statements will distract the jurors) (Marshall, J., dissenting).

92. 781 P.2d 1344 (Cal. 1989).

93. 788 P.2d 690 (Cal. Ct. App. 1990).

94. *Id.* at 696.

posed similar dangers to their clients and demonstrated equivalent capacity for rehabilitation?⁹⁵ One response is that Baker's genetic endowment relieves him of responsibility for his actions. This use of genetic essentialism, however, is at odds with many aspects of traditional legal doctrine. In criminal law, for example, whether one takes a philosophic or economic approach, some concept of responsibility is essential to most forms of culpability. Guilt usually attaches only when an actor who has performed an act that society has decided to discourage possesses free will.⁹⁶ But if actors like Baker are "hard-wired" to perform as they do, they arguably can never be justly punished or motivated to conform. Thus, a genetic predisposition to criminality should be a full defense, much like other conditions that obviate mens rea.⁹⁷ Alternatively, the presence of a genetic disorder should mitigate the level of punishment imposed, as it did in *Baker*.⁹⁸

The court may have determined that Baker, knowing his predisposition, could more easily prevent a recurrence of his problem than could Ewaniszyk.⁹⁹ But this proposition raises other important questions. First, many of the recently developed diagnostic tests for brain dysfunction are expensive;¹⁰⁰ treatment is also likely to be costly. Thus, unless jurisdictions assure indigent parties access to the relevant technologies, permitting biological defenses creates a risk that the poor will receive less favorable treatment than the rich.¹⁰¹ Second, because research does not proceed evenly across all conditions, and because research priorities reflect social and cultural priorities, the genetic component of some disorders will be understood before that of others.¹⁰² Some actors may therefore escape punishment while others are convicted, not because of relative guilt, but because members of the

95. Of course, it is possible that Baker's acts were less serious, or his period of abstinence longer, than Ewaniszyk's. However, the court did not rely on these differences.

96. Except those regarding compensatory motives, the remarks in this section also apply in many areas of civil law.

97. See, e.g., *Commonwealth v. Brennan*, 504 N.E.2d 612 (Mass. 1987) (discussing whether a molecular biological basis for criminal activity falls within the insanity defense).

98. Other conditions function in this way. The Model Penal Code, for example, allows evidence of mental disease or defect to mitigate certain penalties, even when the disorder is not severe enough to avoid culpability. MODEL PENAL CODE § 4.02(2) (1985). See also *State v. Lawrence*, 541 N.E.2d 451 (Ohio 1989) (permitting evidence of post-traumatic stress disorder that was inadequate to prove an insanity defense to be used in mitigation at the penalty phase of a capital case).

99. See *Baker*, 781 P.2d at 1351 n.6.

100. As of 1989, Positron Emission Tomography, which produces evidence for a biological defense of brain disorder, costs \$2000-2500 per test. Nelkin & Tancredi, *supra* note 5, at 31.

101. Jurisdictions could, of course, ameliorate the problem by giving defendants the resources to avail themselves of the relevant technologies. Cf. *Ake v. Oklahoma*, 470 U.S. 68 (1985) (requiring the State to furnish an indigent defendant with a psychiatrist when the defendant's mental health is at issue).

102. On the social construction of science, see *supra* note 58.

former group suffer from problems that are better understood by the medical community,¹⁰³ A case in point is *Bowers v. Hardwick*,¹⁰⁴ in which the Supreme Court relied on traditional moral attitudes toward homosexual tendencies, which may soon prove to have biological origins.

Little should be inferred from the fact that attempts to rely on genetic predispositions have met with infrequent success. Defendants' cases generally falter on questions of proof; biological defenses have not been rejected as a matter of law.¹⁰⁵ Accordingly, as research progresses, genetic arguments can be expected to enjoy greater acceptance.¹⁰⁶

Cases like *Baker* and *Ewaniszyk* then raise another question: how will society adequately protect itself from individuals who constitute a genetic threat? Paradoxically, a strong argument can be made that the California court should have taken precisely the opposite tack. Because substance abuse was not part of Ewaniszyk's constitution, he was more capable of complete reformation than Baker, who was doomed to battle his own nature forever. Thus, genetic predisposition could support an argument for *enhancing* rather than mitigating punishment. Just as those acquitted of crimes by reason of insanity can be removed from society for longer periods of time than the maximum criminal sentence for their offenses prescribes, so may the genetically disordered be iso-

103. Larry Thompson, *The Price of Knowledge; Genetic Tests That Predict Dire Conditions Become a Two-Edged Sword*, WASH. POST, Oct. 10, 1989, at Z7 (noting that according to Norton Zinder of Rockefeller University, Chair of the NIH genome project advisory committee, "[i]f we screen 100 genes per person, we would find everyone is seriously ill").

104. 478 U.S. 186 (1986).

105. See Simon Le Vay, *A Difference in Hypothalamic Structure Between Heterosexual and Homosexual Men*, 253 SCIENCE 1034 (1991).

106. On culpability, see, for example, *Millard v. State*, 261 A.2d 227, 231 n.1 (Md. Ct. Spec. App. 1970) (finding insufficient proof that an XYY chromosome pattern made the defendant unable to conform his behavior to the law within the meaning of the state's criminal responsibility statute). See also *Commonwealth v. Brennan*, 504 N.E.2d 612 (Mass. 1987) (convicting the defendant after a jury determination that the defendant suffered from voluntary alcoholism rather than organic brain syndrome); *Mahla v. State*, 496 N.E.2d 568 (Ind. 1986) (permitting a prosecutor to argue to the jury that homosexuality is not genetically determined). See generally, Deborah Denno, *Human Biology and Criminal Responsibility: Free Will or Free Ride*, 137 U. PA. L. REV. 615 (1988); Note, *The XYY Defense*, 57 GEO. L.J. 892 (1969). See also C. RAY JEFFERY ET AL., *ATTACKS ON THE INSANITY DEFENSE: BIOLOGICAL PSYCHIATRY AND NEW PERSPECTIVES ON CRIMINAL BEHAVIOR* (1985); C. RAY JEFFERY, *CRIMINOLOGY: AN INTERDISCIPLINARY APPROACH* 166-210 (1990).

Courts reach similar results on the issue of punishment. See e.g., *Utah v. Gardner*, 789 P.2d 273 (Utah 1989), *cert. denied*, 110 S.Ct. 1837 (1990) (noting the relationship between moral responsibility and the grade of the offense); *Roach v. Martin*, 757 F.2d 1463, 1474-75 (4th Cir. 1985) (discussing the relevance of the Huntington's gene to the level of punishment that is appropriate.). There has also been some attempt to use defective brain physiology as a mitigating circumstance in criminal cases. See, e.g., *State v. Zimmerman*, 802 P.2d 1024 (Ariz. Ct. App. 1990); Matthew Heller, *Brain Scans on Criminals Create Legal Controversy*, REUTERS, Nov. 28, 1989 (LEXIS, NEXIS file, Reuter library). See also, Nora Volcow & Laurence Tancredi, *Biological Correlates of Mental Activity*, 148 AM. J. PSYCHIATRY 439-43 (1991).

lated for longer periods.¹⁰⁷ Alternatively, they may be subjected to extreme therapeutic measures such as psychosurgery. Thus, it would not be surprising if jurisdictions that base sentences on predictions of dangerousness begin to rely on genetic information.¹⁰⁸

Used in this manner, reliance on genetic endowment creates a sort of status offense. While the offender is not branded responsible for bad acts, the practical effect is that liberties are truncated and opportunities circumscribed.¹⁰⁹ If it is accepted that genetic endowment determines the propensity to commit bad acts, then hereditary traits, which often reduce to ethnic group membership, may one day be considered evidence of the commission of a crime.¹¹⁰

The impact of genetic essentialism on concepts of responsibility can be understood in yet another way. If some individuals cannot be held accountable for their own misfeasance because of genetic disorders, then responsibility for the social harm they cause may lie with those who brought these individuals into being. Now that prenatal screening and testing techniques are sophisticated enough in many cases to avoid the birth of a child with genetic anomalies, an ethic of genetic responsi-

107. In its extreme articulation, genetic determinism posits that everyone is controlled by genetic endowment; no one has sufficient free will to be held accountable for bad or good actions. Accordingly, a full acceptance of genetic essentialism would implicate rewards as well as punishment.

108. See, e.g., TEX. CODE CRIM PROC. ANN. Art. 37.071(b)(1) (West Supp. 1991) (providing that in the sentencing phase of a capital case, the jury is to consider "whether there is a probability that the defendant would commit criminal acts of violence that would constitute a continuing threat to society"). Cf. *Barefoot v. Estelle*, 463 U.S. 880 (1983) (permitting psychiatrists to testify about the probability that the defendant would be dangerous in the future).

109. Viewed as a conglomeration of genetic propensities, humans become no different than animals. Accordingly, dispositions in cases of dangerousness may begin to mirror the treatment of dangerous pets. See, e.g., *Zuniga v. San Mateo Dep't of Health Servs.*, 267 Cal. Rptr. 755, 760 (Cal. Ct. App. 1990) (holding that an American pit bull terrier is dangerous within the meaning of a city ordinance because it "constitutes a menace . . . due to . . . the inherent nature of the animal" (quoting San Mateo County Ord. § 3330.0(j)(4)); *Garcia v. Village of Tijeras*, 767 P.2d 355, 362 (N.M. Ct. App. 1988) (enforcing a statute prohibiting ownership of American Pit Bull Terriers despite proof of gentle training on the ground that these animals have inherent characteristics making them dangerous).

110. This is not a new idea. In 1911, Cesare Lombroso hypothesized that certain physical characteristics, such as low slanting foreheads and long ear lobes, indicated a disposition towards criminal behavior. *CESARE LOMBROSO, CRIME: ITS CAUSES AND REMEDIES* (1911). Nor have modern criminologists forgotten this idea. See, e.g., *JEFFERY ET AL.*, *supra* note 106 (hypothesizing that physical attributes are related to criminality); Harold P. Green, *Genetic Technology: Law and Policy for the Brave New World*, 48 *IND. L.J.* 559, 571 (1973) (suggesting that one way to combat crime would be to keep those genetically predisposed to criminal behavior under surveillance). *But cf.* *Kornegay v. State*, 329 S.E.2d 601 (Ga. 1985) (reversing a conviction because the prosecutor implied in the closing argument that certain races are hereditarily disposed to commit crime).

For the relationship between genetic endowment and ethnic group membership, see *infra* note 137.

bility is technically possible.¹¹¹

The impetus for such an ethic is discernable in the wrongful birth and wrongful life actions brought against health care practitioners who either fail to offer parents prenatal testing and screening or perform these tests negligently. Initially, such claims met with little success. As one court noted in a case brought on behalf of a child with Down's syndrome:

Whether it is better to have never been born at all rather than to have been born with serious mental defects is a mystery more properly left to the philosophers and theologians, a mystery which would lead us into the field of metaphysics, beyond the realm of our understanding or ability to solve . . . [This] cause of action . . . demands a calculation of damages dependent on a comparison between Hobson's choice of life in an impaired state and nonexistence. This the law is incapable of doing.¹¹²

Some jurisdictions have enacted statutes to bar tort actions for withholding information that would have led to the termination of life.¹¹³

Recently, however, some states have begun to recognize these torts on the ground that medical responsibility includes the duty to avoid predictable genetic problems. For example, in *Curlender v. Bio-Science Laboratories*¹¹⁴ a California court considered a tort action brought on behalf of Shauna Tamar, who was born with Tay-Sachs disease, an inheritable disorder. Because her parents were members of an ethnic group particularly vulnerable to this defect, they employed the defendant to determine whether they were carriers of the disease. The laboratory tests revealed they were not; Shauna was conceived and carried to term without prenatal testing.¹¹⁵ In reversing the lower court's dismissal of the action, the court noted the "dramatic increase . . . of the medical knowledge and skill needed to avoid genetic disaster."¹¹⁶ Finding that "a deeply held belief in the sanctity of life" and "metaphysics" are not

111. In fact, the medical literature has sketched the contours of an ethic of genetic responsibility. See, e.g., Ellen E. Wright, Note, *Father and Mother Know Best: Defining the Liability of Physicians for Inadequate Genetic Counseling*, 87 YALE L.J. 1488 (1978); Sumner B. Twiss, Jr., *Ethical Issues in Genetic Screening: Models of Genetic Responsibility*, in ETHICAL, SOCIAL AND LEGAL DIMENSIONS OF SCREENING FOR HUMAN GENETIC DISEASE 245 (Daniel Bergsma ed., 1974).

112. *Speck v. Finegold*, 408 A.2d 496, 508 (Pa. Super. Ct. 1979). The seminal case adopting this view was *Gleitman v. Cosgrove*, 227 A.2d 689 (N.J. 1967). The court found it impossible to evaluate the difference between life with defects and the "utter void of nonexistence." *Id.* at 692.

113. For example, a Minnesota statute provides: "No person shall maintain a cause of action or receive an award of damages on behalf of that person based on the claim that but for the negligent conduct of another, the person would have been aborted." MINN. STAT. § 145.424 (1) (1989). This statute was upheld against constitutional challenge in *Hickman v. Group Health Plan*, 396 N.W.2d 10 (Minn. 1986).

114. 165 Cal. Rptr. 477 (Cal. Ct. App. 1980).

115. The record in the case does not indicate whether accurate prenatal testing would have led the parents to avoid conceiving any child, or instead to abort a fetus afflicted with the disease.

116. 165 Cal. Rptr. at 487.

universally accepted as bases for legal rules,¹¹⁷ the court remanded the case for trial. Although the court rejected the view that damages could be assessed by comparing the value of a normal life, which was unattainable for Shauna, with the value of the life Shauna had, it instructed the trial court to evaluate the pecuniary losses attributable to her condition and the pain and suffering she would endure during her actual life span.¹¹⁸

C. Opportunity

In some respects, *Curlender* tracks black letter law. Medical malpractice actions encourage health professionals to take care in the performance of their duties. Furthermore, the decision safeguards the integrity of procreative choices, thereby furthering the constitutional interests recognized in *Griswold v. Connecticut*¹¹⁹ and its progeny. At the same time, however, the court radically changed the way that the law viewed people like the Curlenders. Shauna, the bearer of a genetic disease, and her parents, who carry the traits for her disorder, were reconceptualized as persons at risk, people whose physical condition removed them from the class of normalcy.¹²⁰

The special legal attention given the Curlenders may be a two-edged sword. By rejecting the "sanctity of life" principle, the court legitimated the central thesis of genetic essentialism that persons are defined by their genetic qualities. While this provided the Curlenders with a right to relief, it also implied a willingness to treat wrongful life as,

117. *Id.* at 486.

118. *Id.* at 489. See also *Berman v. Allan*, 404 A.2d 8 (N.J. 1979) (overruling portions of the *Gleitman* case discussed in note 112, *supra*); *Garrison v. Medical Center of Delaware, Inc.*, 581 A.2d 288 (Del. 1990) (recognizing parents' wrongful birth action, but not a child's wrongful life claim); *Gallagher v. Duke University*, 638 F. Supp. 979 (M.D.N.C. 1986).

119. 381 U.S. 479 (1965).

120. Abby Lippman argues that "[d]isorders and disabilities are not merely physiological or physical conditions with fixed contours. Rather, they are social products with variable shapes and distributions." Abby Lippman, *Prenatal Genetic Testing and Screening: Constructing Needs and Reinforcing Inequities*, 17 AM. J.L. & MED. 15, 17 (1991). To demonstrate the point, Lippman notes that the decision to abort a genetically imperfect fetus depends on social context: whether the anomaly was visualized on ultrasound, whether the parents were counseled by an obstetrician or a geneticist, and whether the interval between testing and diagnosis counseling was long or short. *Id.* at 36. See also *id.* at 23; *supra* note 89; *Trupin v. Sortini*, 643 P.2d 954 (Cal. 1982); Adrienne Asch & Michelle Fine, *Introduction Beyond Pedestals and Shared Dreams: A Left Perspective on Disabling Rights and Reproductive Rights*, in *WOMEN WITH DISABILITIES, ESSAYS IN PSYCHOLOGY, POLICY AND POLITICS* 15 and 297 (Adrienne Asch & Michelle Fine eds., 1988) (noting the overwhelmingly negative attitudes and bias that the nondisabled display toward those they regard as disabled); John Robertson, *Procreative Liberty and Human Genetics*, 39 EMORY L.J. 697 (1990); Robert Destro, *Guaranteeing the "Quality" of Life Through Law: The Emerging Right to a "Good" Life*, in *GUARANTEEING THE GOOD LIFE* 229, 244 (Richard John Neuhaus ed., 1990); Barry Werth, *How Short is Too Short*, N.Y. TIMES, June 16, 1991, § 6, at 14.

indeed, wrongful: irrevocably bound by biology, unsuited to normal opportunities and life experiences.¹²¹

If widely accepted, this essentialist perspective may provide the impetus for the adoption of a wide variety of screening practices, creating a genetic underclass consisting of individuals whose genes have marked them for the "nowhere track." In fact, one health insurer has already attempted to refuse coverage for a child born with birth defects when the mother was warned through prenatal testing, but failed to abort.¹²² Other insurance companies may lower premiums for those individuals unlikely to suffer from hereditary diseases by incorporating genetic testing into their underwriting methodology.¹²³ In the workplace, adoption of the essentialist perspective could mean that application procedures will include genetic tests to choose those employees whose biology makes them most likely to stay healthy and perform well.¹²⁴ Schools could use genetic screening for tracking so that the students who receive expensive educational programs, such as upper-level mathematics courses and musical training, are those most suited to benefit from them.¹²⁵

121. Willingness to treat certain lives as wrongful is, of course, not a new practice. *See, e.g.*, *Buck v. Bell*, 274 U.S. 200, 207 (1927) (upholding the application of a sterilization statute because "[t]hree generations of imbeciles are enough") (Holmes, J.). Nor is this a practice that has largely disappeared. Some states, for example, retain sterilization statutes. *See* Richard A. Estacio, *Sterilization of the Mentally Disabled in Pennsylvania: Three Generations Without Legislative Guidance Are Enough*, 92 DICK. L. REV. 409, 417-28 (1988). *See also* *Muller v. Oregon*, 208 U.S. 412, 420 (1908) (sustaining a law limiting the working hours of women on the ground that a "woman's physical structure . . . justif[ies] special legislation"); *Bradwell v. Illinois*, 83 U.S. (16 Wall.) 130, 141 (1873) (upholding a statute barring women from the practice of law on the ground that "[t]he natural and proper timidity and delicacy which belongs to the female sex evidently unfits it for many of the occupations of civil life" and because "the paramount destiny and mission of woman are to fulfil the noble and benign offices of wife and mother") (Bradley, J., concurring).

122. Thompson, *supra* note 103.

123. *Cf.* *Life Ins. Ass'n v. Commissioner of Ins.*, 530 N.E.2d 168 (Mass. 1988) (allowing insurance underwriters to exclude from coverage persons identified as HIV-infected and therefore likely to contract AIDS); *Health Ins. Ass'n v. Corcoran*, 551 N.Y.S.2d 615 (N.Y. App. Div. 1990) (same); Benjamin Schatz, *The AIDS Insurance Crisis: Underwriting or Overreaching?*, 100 HARV. L. REV. 1782 (1987); Katherine Brokaw, *Genetic Screening in the Workplace and Employers' Liability*, 23 COLUM. J.L. & SOC. PROB. 317, 327 n.49 (1990) (citing cases in which genetic diseases have been excluded from coverage as "pre-existing conditions").

124. *See* U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, *GENETIC MONITORING AND SCREENING IN THE WORKPLACE 10-12* (1990) [hereinafter *GENETIC MONITORING*] (noting the existence of fifty diseases that make individuals susceptible to occupational diseases and suggesting that genetic tests ultimately will be developed to identify workers with the predisposition toward these diseases); Richard Severo, *DuPont Defends Genetic Screening*, N.Y. TIMES, Oct. 18, 1981, § 1, at 31; Constance Holden, *Air Force Challenged on Sickle Trait Policy*, 211 SCIENCE 257 (1981); Mark A. Rothstein, *Employee Selection Based on Susceptibility to Occupational Illness*, 81 MICH. L. REV. 1379 (1983).

125. *See, e.g.*, *Larry P. by Lucille P. v. Riles*, 793 F.2d 969 (9th Cir. 1986) (holding that absent a showing that an IQ test is inaccurate, tracking children according to their scores does not violate the Education for All Handicapped Children Act, 20 U.S.C. §§ 1401-1491 (1988)). *See also*

Ironically, the scientific developments that make these practices possible come at a time when mainstreaming has become the subject of significant legislative activity.¹²⁶ Although recent enactments seem to offer safeguards, such legislative action may not adequately circumscribe many uses of genetic information. The purpose of this type of legislation is apparently to protect individuals from bias, not to implement a social commitment to spend the resources needed to extend opportunities broadly to disabled individuals. Thus, as long as a decisionmaker, such as an employer, educator, or insurance company, can persuasively argue that biological differences matter, discrimination may not be actionable. This view was, perhaps, first enunciated in *Gen-*

NELKIN & TANCREDI, *supra* note 5; Constance Holden, *Female Math Anxiety on the Wane*, 236 SCIENCE 660, 661 (1987) (quoting a statement of Susan F. Chipman of the U.S. Office of Naval Research that "people are just *too* interested" in whether women have inherently less cognitive ability in mathematics).

Many states currently screen newborns for PKU deficiencies in order to treat those afflicted. See *supra* note 7. Jurisdictions have occasionally considered other mass screenings. See Green, *supra* note 110, at 561 & 568 (arguing that a constitutional challenge to mass screenings would probably be rejected on the authority of *Jacobson v. Massachusetts*, 197 U.S. 211 (1905)). See also *Meracle v. Children's Serv. Soc'y of Wisconsin*, 437 N.W.2d 532 (Wis. 1989) (involving a suit against an adoption agency for failing to identify a child as genetically disposed to Huntington's disease).

126. See, for example, the Americans with Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 327 (1990) (codified at scattered sections of 42 U.S.C.), which became effective in 1992. The Act prohibits employers from discriminating "against a qualified individual with a disability because of the disability of such individual in regard to job application procedures, the hiring, advancement, or discharge of employees, employee compensation, job training, and other terms, conditions, and privileges of employment." 42 U.S.C.A. § 12112(a) (West Supp. 1991). The Act also bars "medical examination . . . as to whether such applicant is an individual with a disability." *Id.* § 12112(c)(2)(A). However, a substantial question as to how this measure will affect those with genetic predispositions to disease remains. Such individuals are not currently impaired, and therefore do not fit squarely within the statutory category of persons protected. See GENETIC MONITORING, *supra* note 124, at 115. Further, the interpretive guidance to the regulations promulgated by the EEOC exclude "predisposition to illness or disease" from the definition of impairment. Equal Employment Opportunity for Individuals with Disabilities, 56 Fed. Reg. 35,726 (1991) (to be codified at 29 C.F.R. § 1630). Even if genetic disorders were covered, an employer may argue that such a condition is "job-related," 42 U.S.C. § 12112(c)(2)(B), or within the "business necessity" defense, *id.* §§ 12112(c)(4)(A) and 12113(a). But see 136 CONG. REC. H4627 (daily ed. July 12, 1990) (statement of Rep. Waxman) (stating that "I should not[e] that the employment protections of the ADA will be important, as well, for people who are identified through new genetic tests as being carriers of a disease-associated gene. . . . [A] carrier of [a] disease-associated gene is protected in employment as long as such individual is qualified for the job in question. The determination . . . may not be based on speculation and predictions regarding the person's ability to be qualified for the job in the future.").

Other provisions that arguably protect individuals with genetic problems include the Rehabilitation Act of 1973, Pub. L. No. 93-112, 87 Stat. 355 (1973) (codified at 29 U.S.C. §§ 701-794 (1988)); the Education for All Handicapped Children Act of 1975 (recently renamed the Individuals with Disabilities Education Act of Oct. 30, 1990), Pub. L. No. 94-142, 89 Stat. 773 (1975) (codified in scattered sections of 20 U.S.C.); the Fair Housing Amendments Act of 1988, Pub. L. No. 100-430, 102 Stat. 1619 (1988) (codified, in part, at 42 U.S.C. §§ 3601-3614a (1988)).

eral Electric Co. v. Gilbert¹²⁷ and Geduldig v. Aiello.¹²⁸ In these cases the Supreme Court found that insurance programs that excluded pregnancy and childbirth from coverage did not violate Title VII of the Civil Rights Act of 1964¹²⁹ or the Constitution because they did not discriminate against women. Although this result was modified by the Pregnancy Discrimination Act of 1978 (PDA),¹³⁰ the genetic essentialist's focus on raw biology continues to dominate the interpretation of equal protection legislation.

Both the Seventh Circuit and Supreme Court opinions in *UAW v. Johnson Controls*¹³¹ illustrate current assumptions. Citing Title VII and the PDA, the plaintiffs in this case challenged a battery manufacturer's policy of excluding fertile women—all women under age seventy who were not demonstrably incapable of bearing children—from manufacturing positions involving lead products and from the jobs that would lead to promotion to such positions. The employment policy was sustained by the court of appeals. Because the lead in the batteries endangered fetuses, the court reasoned that the bona fide occupational qualification or business necessity defense applied. According to the court, innate physical differences between people justify disparate treatment.¹³²

The Supreme Court reversed the Seventh Circuit, but its decision may not assure adequate protection for those with genetic disorders. The Court, noting that lead also affects the male reproductive system, invalidated the company's policy for being less neutral than it appeared,¹³³ leaving open the possibility that genetic policies lacking this underinclusive aspect will be upheld. More importantly, the Court devoted considerable attention to the wider ramifications of a particular fertile female's decision to work with lead. It noted that the defendant would probably not be liable to the fetus for lead exposure caused by its mother's occupational choice.¹³⁴ In addition, the Court expressly ap-

127. 429 U.S. 125 (1976).

128. 417 U.S. 484 (1974).

129. Pub. L. No. 88-352, 78 Stat. 241, 255 (1964) (codified at 42 U.S.C. § 2000e-2 (1988)).

130. Pub. L. No. 95-555, 92 Stat. 2076 (1978) (codified at 42 U.S.C. § 2000e(k) (1988)).

131. 886 F.2d 871 (7th Cir. 1989), *rev'd*, 111 S. Ct. 1196 (1991).

132. *Johnson Controls*, 886 F.2d at 895. The court also noted that "more is at stake than the individual woman's decision" to risk her own safety:

The risks to the unborn child from lead are also shared by society in the form of government financed programs to train or maintain a handicapped child in non-institutional or institutional environments and to provide the child with the training necessary to overcome the mental and physical harm attributable to lead exposure.

Id. at 897-98.

133. *Johnson Controls*, 111 S. Ct. at 1203.

134. *Id.* at 1208.

proved *Dothard v. Rawlinson*¹³⁵ and other cases that upheld biological discrimination aimed at limiting risks to third persons.¹³⁶

Many potential uses of genetic information have economically useful consequences, such as minimizing the costs of making the workplace safe, conserving limited educational resources, or containing the cost of insurance, and therefore are likely to survive challenges similar to those mounted in *Johnson Controls*.¹³⁷ Of course, this projection may be overly pessimistic. As more genetic disorders are identified, the "normal" population may be reduced to the point at which genetic discrimination becomes unfeasible. Furthermore, legislative clarifications similar to the PDA may be forthcoming.¹³⁸ In addition, state laws may help limit the reach of essentialist reasoning. Indeed, some legislatures have already demonstrated interest in curbing genetic discrimination in the workplace.¹³⁹ But no matter how finely drawn the legislation, if per-

135. 433 U.S. 321 (1977) (upholding minimum height and weight requirements for prison guards, reasoning that the impact on women was justified by security considerations).

136. *Johnson Controls*, 111 S. Ct. at 1205. See also Regulations to Implement the Equal Employment Act Provisions of the Americans with Disabilities Act, 56 Fed. Reg. 35,734, 35,738 (1991) (to be codified at 29 C.F.R. § 1630.15(b)(2)) (permitting employers to require as a qualification standard that an individual not "pose a direct threat to the health or safety of the individual or others in the workplace").

137. Equal protection legislation like Title VII, which enumerates the groups targeted for protection, is also unlikely to be helpful. Although genetic disorders are immutable, a Court that prefers to rely on the plain meaning of statutes is unlikely to regard them as covered by the legislation. Cf. *West Virginia Univ. Hosps, Inc. v. Casey*, 111 S. Ct. 1138, 1148-49 (1991) (Marshall, J., dissenting) (accusing the lower court of using "the implements of literalism to wound, rather than to minister to, congressional intent" when holding that the term "reasonable attorneys fees" in 42 U.S.C. § 1988 (1988) does not include expert witness fees). Thus, these statutes are usually at issue only because the genetic problem is coterminous with membership in an expressly protected class. While people generally select partners who share their ethnicity so that many genetic diseases are confined to specific groups (American Blacks for the sickle-cell trait; Blacks, Mediterranean Jews, Greeks, and Sardinians for glucose-6-phosphate dehydrogenase (G-6-PD) deficiency), not all genetic problems are confined to specific ethnic groups. For example, because Huntington's disease and colon cancer shorten work lives, they may become the subject of screening, but their incidence is wide. See GENETIC MONITORING, *supra* note 124, at 84; Michael R. Hayden et al., *Predictive Testing for Huntington's Disease Using Linked DNA Markers*, 319(9) NEW ENG. J. MED. 583 (1988); Mark Leppert et al., *Genetic Analysis of an Inherited Predisposition to Colon Cancer in a Family With a Variable Number of Adenomatous Polyps*, 322(13) NEW ENG. J. MED. 904 (1990).

138. For example, testing aimed at excluding from the workplace individuals who are genetically hypersusceptible to contaminants may be motivated by the Occupational Safety and Health Act's requirement that employers maintain a workplace "free from recognized hazards." 29 U.S.C. § 654(a)(1) (1988). The Act was created "to assure . . . every working man and woman in the Nation safe and healthful working conditions." *Id.* at § 651(b). See Ellen R. Peirce, *The Regulation of Genetic Testing in the Workplace—A Legislative Proposal*, 46 OHIO ST. L.J. 771, 822 (1985). Congress could amend this measure specifically to protect these workers from job loss. It could, for instance, require employers to provide such employees with equivalent employment or impose a high burden of proving that the workplace could not, at reasonable expense, be made safe for hypersusceptible workers.

139. New Jersey, for example, prohibits employment discrimination based on an "atypical hereditary cellular or blood trait," N.J. STAT. ANN. § 10:5-12 (West Supp. 1991), which includes

sons are conceptualized as aggregates of physical attributes and genes-transmitting agents, the law may make biology dispositive of opportunity.

IV. A LONGER VIEW

The previous Part demonstrated that genetic essentialism, by altering the perception of the person, has challenged core legal precepts. We do not, however, mean to imply that biologically-oriented reasoning is always inappropriate. In certain respects, the essentialist perspective is fundamental to the American ethos, related to ideologies of progress and perfection and to the focus on the individual. More generally, in its promises of neutrality, predictability, and certainty, science holds extraordinary appeal for the legal system. Indeed, because this Nation has profited so profoundly from scientific advances, its reliance on science as a source for law is almost inevitable.

Yet Part III demonstrated certain systematic problems with the way that lawmakers respond to science-based claims. In the cases reviewed, genetic reasoning tended to pervade the decisionmaking process, preempting discussion of other values at stake. In the rush to incorporate recent research into law, the norms inherent in customary law often were obscured and ultimately ignored. Once biological arguments were made, their relevance was rarely challenged; rather, the proceedings tended to shift to questions about the validity and representative nature of the scientific information proffered.

In our view, this approach is simplistic. Certainty and predictability have particular meanings within science that are not easily transferred to the legal arena. Furthermore, the assumption that science is value-neutral bears close scrutiny. Thus, although science-based arguments are worthy of careful consideration, they are not intrinsically dispositive. This Part analyzes the sources of the intuition that law should incorporate science in general, and biology in particular, in order to clarify the questions that ought to be asked whenever science is brought to bear on legal issues. We do not, and cannot, offer universal guidelines, for the relevance of scientific input varies according to the nature of the controversy, the interests involved, and the limits of the scientific inquiry that has yielded the information at issue.

traits for sickle cell, hemoglobin C, thalassemia, Tay-Sachs, and cystic fibrosis. OFFICE OF TECHNOLOGICAL ASSESSMENT, 98TH CONG., 1ST SESS., *THE ROLE OF GENETIC TESTING IN THE PREVENTION OF OCCUPATIONAL DISEASE* 128 (Comm. Print 1983). Florida, Louisiana, and North Carolina all bar discrimination on the basis of sickle cell trait. See FLA. STAT. ANN. § 448.075 (West 1981); LA. REV. STAT. ANN. § 23:1002 (West 1982); N.C. GEN. STAT. § 95-28.1 (1975).

A. *Neutrality*

The extraordinary deference paid to science is based, in part, on assumptions about its value neutrality. Science is considered uncontaminated with political values and therefore an objective arbiter of truth. Because of its perceived value neutrality, science has been a political resource—a way to define and legitimize governmental actions as impersonal, rational, and value-free.¹⁴⁰ As philosopher Stephen Toulmin argues, society accepts ideas about nature not only for their explanatory power, but for the legitimacy they provide for the political and social system.¹⁴¹ In a society in which fundamental values are the source of considerable debate, an apparently neutral basis for law is highly seductive.

But the image of neutrality—the claim that facts can be separated from values—is largely a myth, originating in the efforts of scientists to maintain autonomy in the face of pressures from the church and from the state. In fact, the history of science and numerous contemporary studies suggest that the choice of research topics, the nature of scientific theories, and the representation of research results are socially constructed, shaped by cultural forces, and defined to reflect the priorities and assumptions of particular societies at particular times.¹⁴² Furthermore, scientific information is interpreted and applied in a political context and is filtered through social lenses. Defining what is “natural,” science is readily appropriated as a way to conform individuals to institutional values and existing social or political conventions.¹⁴³

The history of the nature/nurture dispute is illustrative of the extent to which the appeal of scientific claims rests more on social and ideological value than on scientific validity.¹⁴⁴ In *The Origin of Species*,¹⁴⁵ Charles Darwin explained the evolution of species using a theory of natural selection in which the fittest, or the most adaptable, survived long enough to reproduce. Darwinian concepts of natural selection were quickly adopted in the late nineteenth century as “Social Darwinism,” a biological defense of the changing forces of industrialization: Social Darwinism was “conceived in and dedicated to an age of steel and steam engines, competition, exploitation, and struggle.”¹⁴⁶ These con-

140. See YARON EZRAHI, *THE DESCENT OF ICARUS: SCIENCE AND THE TRANSFORMATION OF CONTEMPORARY DEMOCRACY* (1990).

141. See STEPHEN TOULMIN, *COSMOPOLIS: THE HIDDEN AGENDA OF MODERNITY* (1990).

142. See PROCTOR, *supra* note 2. See also *supra* note 58.

143. See MARY DOUGLAS, *HOW INSTITUTIONS THINK* (1986).

144. DANIEL J. KEVLES, *IN THE NAME OF EUGENICS* (1985).

145. CHARLES DARWIN, *THE ORIGIN OF SPECIES* (1858).

146. Richard Hofstadter, *The Vogue of Spencer*, in *DARWIN* 489, 490 (Philip Appleman ed., 1970).

cepts were tools for explaining the persistence of poverty and inequity: those best fitted to cope survive.¹⁴⁷

By the early twentieth century the genetic theories of Gregor Mendel and the eugenic ideas of Francis Galton were being used to prove that deviant behavior and low IQ were hereditary, and to justify eugenic programs that would encourage more prolific breeding among those deemed superior and discourage reproduction among the socially disadvantaged.¹⁴⁸ Concerns about the economic dislocations and political upheavals caused by industrialization, immigration, and the changing ethnic composition of cities created a need for categorization and classification. Genetic labels satisfied this need.¹⁴⁹

This pre-War interpretation of the significance of genetics changed after the Holocaust, not because science was rejected as a basis for law-making, but because Nazi policies had dramatized the social implications of eugenics.¹⁵⁰ At the same time, the optimism of the 1950s and 1960s encouraged the ascendancy of nurture over nature, and the corresponding belief that if environmental conditions were optimized, individuals could assert plenary control over their own destinies. In the criminal context, rehabilitation was favored over punishment;¹⁵¹ in the social sphere, the home environment was considered essential to the formation of the individual;¹⁵² in schools, all children were regarded as equally educable: learning deficiencies were attributed to problems in the family or the environment.¹⁵³ The economic programs of the Great Society represented the panacea. Crude Mendelian explanations for behavior were supplemented by scientific theories that emphasized the effects of environment and opportunity as the government assumed a significant role in securing prosperity for every individual.¹⁵⁴

The recent reemergence of a genetic perspective should be seen, then, as stemming not only from dramatic advances in biomedical research, but also from a desire to utilize scientific explanations to justify a reorientation of social policy. As Part II of this Article demonstrated,

147. See CARL N. DEGLER, *IN SEARCH OF HUMAN NATURE* (1991).

148. KEVLES, *supra* note 144.

149. BENNO MULLER-HILL, *MURDEROUS SCIENCE* (1988); STEPHEN J. GOULD, *THE MISMEASURE OF MAN* (1981).

150. See ROBERT N. PROCTOR, *RACIAL HYGIENE: MEDICINE UNDER THE NAZIS* (1988).

151. See JAMES B. JACOBS, *STATESVILLE: THE PENITENTIARY IN MASS SOCIETY* (1977) (demonstrating the changing relationship between prison and the larger society); DAVID GARLAND, *PUNISHMENT AND MODERN SOCIETY: A STUDY IN SOCIAL THEORY* (1990).

152. See JOSEPH VERNOFF ET AL., *THE INNER AMERICAN: A SELF PORTRAIT FROM 1957 TO 1976* (1981).

153. See PAULO FREIRE, *PEDAGOGY OF THE OPPRESSED* (1974); IRVING HARRIS, *EMOTIONAL BLOCKS TO LEARNING: A STUDY OF THE REASONS FOR FAILURE IN SCHOOL* (1962).

154. See DANIEL P. MOYNIHAN, *MAXIMUM FEASIBLE MISUNDERSTANDING: COMMUNITY ACTION IN THE WAR ON POVERTY* (1969).

many definitions of "personhood" are possible; the biological definition guiding the cases reviewed in Part III represents not a value-neutral choice, but a normative decision, one that emanates from the social problems of this era just as reliance on eugenics reflected the social concerns of other times. Genetics has provided a rationale for repudiating the objectives of the post-War period and shifting responsibility for personal welfare from society back to the individual.

That scientific arguments are not completely value-neutral is not, of course, a reason to reject them. Rather, this lack of value neutrality means that science-based claims must be parsed with care before they are incorporated into the fabric of the law. Their appeal reflects popular views on contemporary policy; their factual dimensions set the parameters of debate over current controversies. But normative components must be recognized as such and the distortions caused by the politics of agenda-setting should be taken into account.

Consider, for example, employment practices such as the one challenged in *Johnson Controls*.¹⁵⁵ Research into the cause of birth defects holds promise for securing a healthy population, because only by understanding the causes of disease can methods of prevention be devised. However, basing employment decisions on the fruits of that research requires more than mere verification of the validity of the scientific findings. Thus, before women were excluded from the workplace on the basis of the research at issue in *Johnson Controls*, it would have been useful to know whether similar studies were conducted on men or whether cultural stereotyping led scientists to look only to mothers for the source of fetal harm. Even if studies determined that only maternal exposure was harmful, the question remains whether the best solution would be to burden one relatively less powerful segment of society or to make the workplace safer.¹⁵⁶ Scientific research may contribute to the resolution of this question by identifying the number of people afflicted with biological vulnerability to a work environment and by quantifying the costs of cleanup. But the fact that research has revealed a predisposition to workplace problems should not by itself drive exclusionary policies.

155. See *supra* text accompanying notes 131-36.

156. Similarly, the distinction between cases like *Baker v. State Bar*, 781 P.2d 1344 (Cal. 1989), and *Bowers v. Hardwick*, 478 U.S. 186 (1986), may turn on the greater attention that scientists pay to problems such as alcohol abuse, which affect the middle class, rather than problems like homosexuality, which are perceived as afflicting the less powerful.

B. Predictability

At the very least, science seems to promise predictability. In a society that perceives itself as threatened by both man-made and natural dangers, methodologies of prediction are highly valued. Such methodologies seem to secure a measure of control over the environment, creating foreknowledge if not choice. Thus, we observe the recent development of many new fields—technology assessment, risk analysis, social forecasting—focused on prediction and control. For the law, the predictability of science is especially seductive. Influencing future behavior is, after all, the crux of lawmaking. Furthermore, applying rules in particular cases would certainly be easier if decisionmakers could know in advance the effects of particular dispositions.

Again, it is important to parse the content of the science under consideration. This is particularly difficult in law because the vocabulary of scientists and lawyers is so different. Thus, scientists speak of correlation, a statistically-driven concept that lawyers tend to reduce to "cause," thereby losing the probabilistic feature of the scientific claim. In the genetic context, the terms used are "predisposed" and "at risk." In science, these mean that the individual is vulnerable to a disease that may or may not be expressed in the future. In law, however, the terms seem to define current status. Courts may regard an individual whom science deems "at risk" as deserving differential treatment even before it is known whether the risk will materialize, as the *Curlender* and *Johnson Controls* courts did. Thus, people diagnosed as predisposed to hereditary disease may find themselves treated as if they were carriers of disorders certain to achieve expression, even when the relationship between genetic defects and their manifestations in behavior or disease is conditional.¹⁵⁷

The problems associated with the use of statistical information in law are too well rehearsed to require discussion here.¹⁵⁸ Techniques like the genetic screening that employers and schools use should be recognized as another form of stereotyping, albeit in a technologically sophisticated guise. Treating people according to genetic makeup is not unreasoned in the sense that bigotry is unreasoned. However, decision-

157. See NELKIN & TANCREDI, *supra* note 5, at 87-105 (noting that some of the workers excluded from the workplace because of genetic hypersusceptibility to certain chemicals, congenital back problems, and the sickle-cell trait were asymptomatic and that in many cases, there was no assurance that the worker identified would ever become sick as a result of working conditions).

158. See, e.g., Randolph N. Jonakait, *When Blood is Their Argument: Probabilities in Criminal Cases, Genetic Markers, and, Once Again, Bayes' Theorem*, 1983 U. ILL. L. REV. 369; Lea Brilmayer & Lewis Kornhauser, *Review: Quantitative Methods and Legal Decisions*, 46 U. CHI. L. REV. 116 (1978); Laurence Tribe, *Trial by Mathematics: Precision and Ritual in the Legal Process*, 84 HARV. L. REV. 1329 (1971).

making based on predisposition has the same effect as prejudice: it deprives individuals of opportunities because of group characteristics that they may not actually share.¹⁵⁹ Thus, if the nation's commitment to equality is understood as more than merely a prohibition against bigotry, genetic information ought not be considered dispositive of opportunity.

Another strategy for using genetic information appropriately may be to distinguish between predictive uses and explanatory applications. Predictions of future dangerousness, ineducability, or occupational disease, for example, emphasize the immutability of physical attributes and create self-fulfilling prophecies by labeling asymptomatic individuals as "predisposed." In contrast, explanatory uses of biological information can often be helpful. Once the root of a manifest disability is diagnosed, notions of culpability can be revised as they were in *Baker* or discarded as perhaps they should be in the case of homosexual sodomy laws. Moreover, the environment can, if necessary, be altered to accommodate those with biological susceptibilities.

C. Certainty

The appeal of scientific explanations in law also reflects a need to reduce ambiguity. Science seems precise, and appears to avoid subjectivity and to limit the role of interpretation. In particular, genetic research offers seemingly definitive answers at a time of frustration with the vagueness of other disciplines, and it provides apparently concrete information in the face of demands for efficiency and accountability.¹⁶⁰ The search for certainty and efficiency has encouraged lawmakers to define problems as technical, as resolvable by expertise. Concerned with reducing ambiguity, decisionmakers tend to define issues in the apparently rigorous terms of science rather than in social or political terms.¹⁶¹

It is critical not to conflate the certainty of scientific findings with the legal relevance of research results. Scientists can define their problems and control their experiments to produce definitive answers. Because the universe in which the findings are applied is not so neat, however, science can rarely offer complete answers to real world

159. See, e.g., *City of Los Angeles v. Manhart*, 435 U.S. 702 (1978); *Arizona Governing Comm'n v. Norris*, 463 U.S. 1073 (1983) (per curiam) (invalidating pension fund plans that treated women differently from men because, statistically, women live longer than men). See also LAURENCE TRIBE, *AMERICAN CONSTITUTIONAL LAW* 1579-1580 (2d ed. 1988) (stating that "[i]mplicit in these decisions is the recognition that gender sometimes denotes, as a valid statistical generalization, biological differences which in certain contexts put women as a group at a disadvantage that women as individuals should not be forced to suffer").

160. See, e.g., NELKIN & TANCREDI, *supra* note 5, at 106-132.

161. See *CONTROVERSY: POLITICS OF TECHNICAL DECISIONS* (Dorothy Nelkin, ed., 3d ed. 1992).

problems. Accordingly, it is wrong to allow science to preempt debate on the continuing validity of long-accepted principles.

Indeed, in many instances, lawmakers appear to use scientific research in a manner that scientists would not contemplate. Scientists are slow to credit new findings or to embrace new theories that contradict common intuitions and accepted paradigms.¹⁶² In the cases reviewed in Part III, however, courts readily abandoned enduring precepts captured in customary law in the face of recent research. A better approach would be to scrutinize challenges to fundamental legal concepts as rigorously as scientists would question observations that undermine equivalently central scientific principles. Thus, in cases like *Baker*, where the deterministic elements of modern biology conflict with deeply seated notions about the relationship between culpability and free will, the strategy ought to be one of harmonization, of finding concepts of responsibility that acknowledge that individuals differ in their capacity to conform to rules.¹⁶³

Furthermore, as Laurence Tribe observed in another context, it is important to keep in mind the tendency of quantifiable parameters to swamp more diffuse interests.¹⁶⁴ The role of DNA testing in family law provides an illustration of the inherent dangers here. The family courts may have greeted DNA testing with such enthusiasm because unambiguous identification of a child's paternity apparently allows judges to avoid the difficult task of examining the complex psychology of an Anna Johnson or an Angie Lee Coburn and permits them to resolve custody disputes with alacrity. In this regard, the use of DNA tests in family disputes appears to mirror their application in criminal identification. In neither situation is the identity of the "perpetrator" subject to serious dispute once a genetic linkage is established.

In fact, the issues are not comparable. A criminal trial centers on a past event: the central question is who committed the crime. In custody cases, however, the focal point is the continuing responsibility for raising a child. Granted, it can be difficult to determine what is in that child's best interest; courts can and often do err. But the capacity of modern biology to determine the historical question of who created a child represents only one of the factors to be considered in choosing

162. THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* (1962). See also Geoffrey Joseph, *Interpretation in the Physical Sciences*, 58 S. CAL. L. REV. 9 (1985).

163. See, e.g., WOLF, *supra* note 29. See also *infra* text accompanying notes 170-71.

164. Laurence H. Tribe, *Ways Not To Think About Plastic Trees: New Foundations for Environmental Law*, 83 YALE L.J. 1315 (1974). Cf. Herhert Hovenkamp, *Positivism in Law & Economics*, 78 CAL. L. REV. 815, 845 (1990) (noting that other social sciences have not had the impact of law and economics because they have not come nearly "as far in providing quantifiable justifications for legal rules").

custodial arrangements. A child with a manifest genetic disease may be better off raised by a parent who suffers from the same disorder. Or, genetic information may help the custodial parent avoid situations that will aggravate a condition to which the child is genetically predisposed. But as long as current standards prevail, and the child's best interest governs, values like stability, privacy, and parental autonomy remain important. Biology does not offer a determinative answer, only an easy one.

Nor is it always true that science offers unambiguous answers within its own sphere. For example, many molecular biologists object to the direction in which behavioral psychologists have taken genetic analysis.¹⁶⁵ Although the behaviorists now emphasize the influence of nature, the biologists argue that even if the human genome is completely mapped, the nature/nurture question will remain indeterminant; that identifying a genetic predisposition reveals little about the extent to which environmental interactions will affect its expression.¹⁶⁶ Because lawmakers lack the facility to decide which group of scientists is correct, the focus of the law should not be on devising rules to reflect the winning side, but instead, on finding ways to incorporate scientific findings into law in a manner that reflects the duality of environment and biology. Thus, it is appropriate to acknowledge the contribution of genetics in exposing the theoretical flaw of cultural determinism, which tended to treat individuals as exactly alike. At the same time, however, recognizing differences in human potential does not resolve the central debate over Great Society programs. Science may be able to quantify the resources necessary to create an environment that compensates for biological differences, but it cannot resolve questions about whether and where these resources should be expended.

D. *The Invisible Hand*

For the purposes of this Article, it is also important to consider the special appeal of biological research. An interesting aspect of the legal theory that draws on genetic concepts is its striking similarity to some of the law and economics literature. Free market economics postulates the existence of utility maximizers whose individual choices guide the economy to generate the goods society needs at prices near the cost of production. Similarly, the genetic model posits the existence of individuals genetically endowed to behave in a manner that generates a cus-

165. Paul R. Billings et al. *The Genetic Analysis of Human Behavior: A New Era?*, Soc. Sci. & MED. (forthcoming 1992).

166. Many psychologists also make this point. See Douglas Wahlsten, *Insensitivity of the Analysis of Variance to Heredity-Environment Interaction*, 13 BEHAV. & BRAIN SCI. 109 (1990).

tomary law governing the social order at low cost.¹⁶⁷ These theories are attractive because they make external control, whether over the economy or the social order, appear counterproductive. Both seemingly justify a retreat from the difficult task of social planning and both legitimate the dominance of those who have, be it property or breeding, over those who have not.

This parallel, although not perfect, is helpful because it offers another approach for refining essentialist theory. Economists recognize that their models only approximate reality, that the consumer is not always rational and does not always know how to maximize utility. They also realize that some of the parameters used are poorly understood.¹⁶⁸ Accordingly, before theoretical conclusions are applied to concrete cases, economists generally attempt to modify their models in light of these uncertainties. The task for genetic essentialists is no different. It would be interesting to see, for example, what genetic essentialism would look like if it included not only reciprocal altruism and selfishness as biologically determined, but also the possibility that genes are programmed for wider forms of cooperation and a taste for living under a regime of culturally-determined rules.¹⁶⁹

Similarly, now that a genetic model has been proposed, its assumptions could be relaxed to better account for the etiology of complex human behavior and disease. Economic models do not derive their powerful heuristic capacity from reductionism alone. Rather, they work because they retain enough of the characteristics of the real world to be recognizable. In contrast, the simplifications of biological determinism often confound common intuitions and established practices.¹⁷⁰ We saw, for example, how the focus on genetic predisposition to crime seems to negate the moral basis essential to just punishment. Enriching the model would therefore be helpful. Once again the approach of those philosophers who argue that determinism is compatible with free will is useful, for it creates an understanding of personal responsibility that

167. Early legal theorists used a Darwinian metaphor slightly differently: they substituted judges for market participants, and asked whether the common law would evolve through these judges' individual decisions. Elliott, *supra* note 6. But the emphasis was nevertheless on the ability of society to generate what it needs without centralized decisionmaking.

168. See, e.g., RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 15-17 (3d ed. 1986); WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* 9-24 (1987).

169. Cf. Herbert A. Simon, *A Mechanism for Social Selection and Successful Altruism*, 250 *SCIENCE*, 1665 (1987) (hypothesizing that there may be natural selection for docility because it enables individuals to learn, adapt, and accept the imposition of values that are good for society as a whole). See also Richard A. Epstein, *A Taste for Privacy? Evolution and the Emergence of a Naturalistic Ethic*, 9 *J. LEGAL STUD.* 665 (1980).

170. See, e.g., Peter Strawson, *Freedom and Resentment*, in *FREE WILL* 59, 62-64 (Gary Watson ed., 1982).

takes biological endowment into account.¹⁷¹ This approach would, in addition, more accurately reflect scientific reality, for recent studies demonstrate the complexity with which genetic disorders interact with other physical factors and environmental circumstances.¹⁷²

Finally, genetic essentialists tend not to look beyond their model. Beckstrom, for example, would distribute estates according to a genetic plan without regard for acculturated values. Most free market economists, in contrast, are not so doctrinaire. There is, for instance, general agreement that market failures occur and should be corrected externally, even if there is sharp debate over the definition of failure and the direction that correction should take. If genetic essentialists participated in the same level of discussion, there would be less cause for concern.

Even if the genetic model cannot furnish a source of positive law, it makes a valuable contribution by emphasizing the natural constraints within which the law must operate. Thus, Beckstrom sometimes speaks of sociobiology as facilitative of lawmaking, arguing that it is crucial for lawmakers to be aware of humankind's tendencies so they can understand the conditions under which rules are likely to be obeyed.¹⁷³ This approach adopts the wisdom offered by science without using it normatively to justify policies with profound implications for accepted values. This pragmatic usage has an important legal pedigree of its own. For example, the constitutional separation of powers scheme was intended to exploit natural human inclinations.¹⁷⁴ Biological insights could also be applied to antitrust law, where behavioral modalities are clearly at issue,¹⁷⁵ environmental protection, where the survival of the species and

171. See, e.g., WOLF, *supra* note 29.

172. Alcoholism, for example, has been the subject of several such studies. See, e.g., Karen M. Abram, *The Effect of Co-occurring Disorders on Criminal Careers: Interaction of Antisocial Personality, Alcoholism, and Drug Disorders*, 12 INT'L J.L. & PSYCHIATRY 133 (1990); C. Robert Cloninger et al., *Effects of Changes in Alcohol Use Between Generations on Inheritance of Alcohol Abuse*, in ALCOHOLISM: ORIGINS AND OUTCOME 49 (Robert M. Rose & James E. Barrett, eds. 1988).

173. See, e.g., JOHN H. BECKSTROM, *EVOLUTIONARY JURISPRUDENCE* 17-18 (1989). Using child support as an example, Beckstrom argues that because people are programmed to perpetuate their own genes, support is more likely to be forthcoming if orders requiring males to support children are linked to proof of paternity. *Id.* at 48-53.

174. See, e.g., THE FEDERALIST No. 51 (James Madison). Constitutional interpretation reflects this realization as well. See *INS v. Chadha*, 462 U.S. 919, 946-51 (1983); *Buckley v. Valeo*, 424 U.S. 1, 120-24 (1976) (per curiam); *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 593-94 (1952) (Frankfurter, J., concurring); *Myers v. United States*, 272 U.S. 52, 292-95 (1926) (Brandeis, J., dissenting).

175. See, e.g., John S. Wiley, Jr., *Reciprocal Altruism as a Felony: Antitrust and the Prisoner's Dilemma*, 86 MICH. L. REV. 1906 (1988); ROBERT M. AXELROD, *THE EVOLUTION OF COOPERATION* (1984); Peter Huber, *Competition, Conglomerates, and the Evolution of Cooperation*, 93 YALE L.J. 1147 (1984).

the role of humans in the biosphere are in question;¹⁷⁶ and that branch of privacy law that seeks to protect personal dignity.¹⁷⁷

V. CONCLUSION

Research in molecular biology is yielding important genetic information that may well be appropriately utilized in the law. Current scientific advances offer the legal system useful information, reducing ambiguity in many areas and defining meaningful constraints in others. But given the cultural appeal of science, and particularly genetic assumptions, as neutral information, the tendency is to apply these assumptions beyond the point of actual demonstration and beyond their relevance to particular situations. Lawmakers are attracted by the apparent certainty and predictions promised by a genetic "map." But there are also risks. In the rush to incorporate new scholarship, the highly complex and poorly understood relationship between genetics and environment, between nature and nurture, may be grossly oversimplified. With the desire to find unambiguous solutions, more traditional values, such as equal opportunity, personal privacy, and individual and family autonomy, may be obscured. In this Article, we argued that genetic assumptions must be examined skeptically before they are allowed to alter concepts such as personhood, normalcy, responsibility, and culpability that are fundamental to the law.

In recent years, medicine has begun to assess the appropriate use of new technologies. The law must also deal with such advances, for scientific information should not be indiscriminately applied. Analyzing the way in which scientific findings are brought to bear on legal questions is an issue that we are only beginning to grapple with today. Identifying the criteria for utilizing these powerful new conceptualizations in jurisprudence will surely occupy the next generation of legal scholars.

176. See, e.g., Richard A. Epstein, *Justice Across the Generations*, 67 TEX. L. REV. 1465 (1989); Jared des Rosiers, Note, *The Exemption Process under the Endangered Species Act: How the "God Squad" Works and Why*, 66 NOTRE DAME L. REV. 825, 828-30 (1991).

177. See, e.g., *Anderson v. Fisher Broadcasting Co.*, 712 P.2d 803 (Or. 1986); Diane L. Zimmerman, *Requiem for a Heavyweight: A Farewell to Warren and Brandeis's Privacy Tort*, 68 CORNELL L. REV. 291, 332-35, 350 (1983); Jack Hirshleifer, *Privacy: Its Origin, Function, and Future*, 9 J. LEGAL STUD. 649 (1980).