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PREDICTIONS FOR THE TWENTY-FIRST CENTURY*

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It is risky to predict the future. That said, let me make a few predictions based on the social contexts in which new DNA technologies will be applied, and then provide some examples to suggest future implications for the law.

First, we can anticipate the continued importance of corporate interests and economic stakes in genomics—stakes that have already turned the body into a commodity, a valued source of genetic information and the raw material for commercial products. As cells, embryos, and human tissue are frozen, banked, placed in repositories, marketed, patented, bought and sold, this is beginning to change the way we think about the human body and human beings. The very language of genetics is permeated with a commercial language of supply and demand, contracts, exchange, and compensation.¹

For example, in a patent application sought by Baylor University for a process to genetically engineer cows to produce pharmaceutical products in their milk, there was also a request for the rights to patent genetically engineered women.² According to the patent attorney, “Someone, somewhere may decide that humans are patentable.”³ Baylor University simply wanted to protect its intellectual property. Interestingly, a British woman, angered at the mass patenting of human genes, has applied for a patent on herself, claiming she is both

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¹ See Dorothy Nelkin, *Molecular Metaphors: The Gene in Popular Discourse*, NATURE REVIEWS GENETICS, July 2001, at 1-5; see also LORI ANDREWS & DOROTHY NELKIN, BODY BAZAAR: THE MARKET FOR HUMAN TISSUE IN THE BIOTECHNOLOGY AGE (2001).

² Steve Connor, *Patent Plan for Breasts Set to Stir Passion*, THE INDEPENDENT (London), Feb. 19, 1992, at 3.

³ *Id.*

novel and useful.⁴ "It has taken 30 years of hard labour for me to discover and invent myself and now I wish to protect my invention from unauthorized exploitation"⁵ Her parody reflects a common reaction to the patenting of human body materials.

A second context to consider is the passion for data collection that is and will be increasingly characteristic of our digitalized world. Molecular biologist Leroy Hood has predicted that "within 20 years all Americans will carry credit card-type plastic strips that contain computer readouts of their personal genomes."⁶ Already, an estimated 282 million archived and identifiable tissue specimens are stored in U.S. repositories.⁷ The fact that nearly all of us have blood, biopsied tissue, or DNA samples on file has serious implications for the future of privacy and is likely to be a critical legal issue in the coming years.

The third context in which to consider the future implications of DNA research concerns the persistence of popular belief in genetic essentialism: in effect, the genome has become a secular equivalent to the soul, the basis of personhood, and a means of prediction as well as identification. This has already had a significant impact on reproduction and adoption practices and has led to expectations about predicting and controlling the characteristics of offspring.⁸ The growth of an essentially unregulated industry in assisted reproduction could lead to complex legal wrinkles. For example, one could envision a new kind of product liability suit in cases where expectations about the "perfect baby" fail to be realized.

The powerful popular belief in genetic essentialism will also lead to new social arrangements based on DNA identification. One such case is that of Ron Roberts who claims

⁴ James Meek, *Poet Attempts the Ultimate in Self-Invention Patenting Her Own Genes*, THE GUARDIAN (London), Feb. 29, 2000, at 3.

⁵ *Id.*

⁶ Laurie Garrett, *The Dots are Almost Connected Then What?: Mapping the Human Genetic Code; They've Almost Cracked the Human Genetic Code. That's the Good News. What Happens After is the Harder Part*, L.A. TIMES MAG., Mar. 3, 1996, at 49.

⁷ Nat'l Bioethics Advisory Comm'n, *Research Involving Human Biological Materials: Ethical Issues and Policy Guidelines*, REG. REP., Aug. 1999, at viii.

⁸ See DOROTHY NELKIN & M. SUSAN LINDEE, *THE DNA MYSTIQUE: THE GENE AS CULTURAL ICON* at chs. 4, 8 (1995).

to be "a half-blood Indian with a claim to Ellis Island and the right to start a casino—and he's got the DNA to prove it."⁹ In response to his claim, a representative in the Vermont State Legislature proposed state legislation that would enshrine DNA testing as conclusive proof of Native American ancestry.¹⁰ The proposed legislation is still in committee.¹¹

Meanwhile, commercial services around DNA testing are proliferating. Advertisements on taxi cabs announce "Call 1-800 DNA Type."¹² A new California company called GeneTree has a division devoted to "distance relationship testing services," including identification of ethnic heritage.¹³ One can easily envision commercial firms storing genetic profiles and selling the information to interested parties such as insurers or employers, or even contentious couples. A woman divorcing her rich husband hired a DNA testing service to prove (by analyzing bed sheets) that her ex had violated a no-cheating clause in their prenuptial agreement.¹⁴ A man taking his child to the park playground stops at a genetic testing clinic to verify that he is really the kid's dad.¹⁵ There are firms linking the funeral industry with genetic testing services that are in the business to verify inheritance claims.¹⁶

⁹ Sally Lehrman, *Drawing DNA Lines of Ethnicity*, GENELETTER, July 1, 2000, at <http://www.geneletter.com/07-05-00/features/ethnicity.html>.

¹⁰ *Id.*; see also H.R. 0809, 1999-2000 Leg. (Vt. 2000); Nokwisa Yona, *DNA Testing, Vermont H.809, and the First Nations*, THE ABOLITIONIST EXAMINER, April/May 2001, at <http://www.multiracial.com/abolitionist/word/yona-partone.html> (last visited Sept. 26, 2001).

¹¹ See Yona, *supra* note 10.

¹² These ads appear on billboards and taxicabs. They are put up by a Houston-based company called Indentigene. See generally Brian Kaberline, *Company Takes to the Streets Pitching its Paternity Tests*, THE BUSINESS JOURNAL (Kansas City), May 29, 1998, <http://kansascity.bcentral.com/kansascity/stories/1998/06/01/tidbits.html> (last visited Aug. 10, 2001); *DNA Labs Offer New Test of Family Ties*, THE AUGUSTA CHRONICLE, Mar. 18, 1997, http://www.augustachronicle.com/stories/031997-/tech_dna.html (last visited Aug. 10, 2001).

¹³ GeneTree, Inc. is located in San Jose, CA. See <http://www.genetree.com> (last visited June 4, 2001).

¹⁴ *DNA, in a New Twist, Enters Divorce Court*, N.Y. TIMES, Dec. 28, 2000, at A20. Some lawyers are advising men who are getting a divorce to get paternity testing to avoid unnecessary child support. See generally Tamar Lewin, *In Genetic Testing for Paternity, Law Often Lags Behind Science*, N.Y. TIMES, Mar. 11, 2001, at 1.

¹⁵ *Marketplace* (Minnesota Public Radio Sept. 26, 2000) (audiotape on file with author).

¹⁶ Gina Kolata, *A Headstone, a Coffin, and Now a DNA Bank*, N.Y. TIMES, Dec. 24, 1996, at C1; see also *Hike v. Long Beach Genetics*, No. 75454 (Cal. Sup. Ct. July 31,

An important context for the future use of DNA techniques is the value placed on order and social control. In his novel, *A Philosophical Investigation*, Philip Kerr describes a future society in 2013, ravaged by crime.¹⁷ Social planners have given up on schemes to improve the social environment, and instead focus their efforts on identifying those individuals who they believe are biologically predisposed to violent acts.¹⁸ All males carry identification cards with their DNA profiles.¹⁹ They are routinely screened for innate predispositions under the "Lombroso Program" ("Localization of Medullar Brain Resonations Obliging Social Orthopraxy").²⁰ The idea is to track down potential offenders before they commit crimes.²¹

Prediction and prevention—based on science and its apparent neutrality—have a certain appeal as a means to maintain social order, despite their implications for civil liberties. It is especially problematic in light of the anticipation and exaggerated expectations of our ability to predict behavioral predispositions. There is, however, the endless ingenuity shared by the perpetrators of chaos as well as by those seeking control. Rapists will wear condoms to avoid DNA identification. Or they will mess up traces by littering the scene with the blood and hair of others. And why not use DNA spray cans to blackmail one's foes? In considering future implications, the possibilities boggle the mind.

1998) (Court Reporters Transcript).

¹⁷ PHILIP KERR, *A PHILOSOPHICAL INVESTIGATION* (Farrar et al. eds., 1992).

¹⁸ *Id.* at 43-44.

¹⁹ *Id.* at 43.

²⁰ *Id.* at 44.

²¹ *Id.* at 43-44.