

Essay

RECLAIMING “ABANDONED” DNA: THE FOURTH AMENDMENT AND GENETIC PRIVACY

*Elizabeth E. Joh**

I. INTRODUCTION.....	857
II. “ABANDONED” DNA AS AN INVESTIGATIVE TECHNIQUE	860
III. THE REGULATION OF ABANDONED DNA.....	862
A. <i>From Trash to Genes</i>	863
B. <i>Finding Analogues</i>	868
IV. THE IMPLICATIONS OF ABANDONED DNA	874
V. RESTRICTING COVERT INVOLUNTARY SAMPLING.....	880
VI. CONCLUSION.....	882

I. INTRODUCTION

“If you’ve ever handled a penny, the government’s got your DNA.
Why do you think they keep them in circulation?”

—*The Simpsons, Who Shot Mr. Burns?*¹

“When you’ve licked a stamp on your tax return you’ve sent the gov-
ernment a DNA sample.”

—Victor Weedn, Head of Armed Forces DNA
Identification Laboratory²

* Acting Professor of Law, University of California, Davis (eejoh@ucdavis.edu); B.A., Yale University; J.D., Ph.D., New York University. Thanks to Troy Duster, Ed Imwinkelried, Orin Kerr, John Muenster, Charles Reichmann, and Carl Schmid for their advice and comments; to Andrea Bjorklund, Jennifer Chacon, Chris Elmendorf, Carlton Larson, Al Lin, Rob Mikos, Angela Onwuachi-Willig, Donna Shestowsky, and the participants at the 2005 Law and Society Association panel at which this Essay was presented for their helpful discussions; to Stanley Powell (’07) and the staff of the U.C. Davis law library, especially Erin Murphy, for research assistance; to the staff of the *Northwestern University Law Review* for their fine editorial work; and to Dean Rex Perschbacher, Associate Dean Kevin Johnson, and the U.C. Davis Academic Senate for providing financial and institutional support. I was a law clerk for Judge Stephen Reinhardt while he was a member of the panel opinion in *United States v. Kincaide*, 345 F.3d 1045 (9th Cir. 2003), cited within this Essay, but all views expressed herein are mine alone.

¹ *The Simpsons: Who Shot Mr. Burns? (Part 2)* (Fox television broadcast Sept. 17, 1995).

We leave traces—skin, saliva, hair, and blood—of our genetic identity nearly everywhere we go.³ Should the police be permitted, without restriction, to target us and to collect the DNA that we leave behind? In a growing number of instances, the police, unburdened by criminal procedure rules, seek this “abandoned DNA” from criminal suspects in hopes of resolving otherwise unsolvable cases.⁴ Successful DNA matches of identity are virtually conclusive of guilt.⁵ What are the consequences of allowing this investigative method to remain unregulated? In stark distinction to the growing body of commentary⁶ on the compulsory collection of DNA samples from prisoners and parolees for state and federal DNA databases,⁷ little attention has been paid to this backdoor method of DNA collection.⁸

² See Dorothy Nelkin & Lori Andrews, *DNA Identification and Surveillance Creep*, 21 SOC. HEALTH & ILLNESS 689, 693 (1999).

³ Pamela Sankar, *DNA-Typing: Galton's Eugenic Dream Realized?*, in DOCUMENTING INDIVIDUAL IDENTITY: THE DEVELOPMENT OF STATE PRACTICES IN THE MODERN WORLD 273, 282 (Jane Caplan & John Torpey eds., 2001) [hereinafter DOCUMENTING INDIVIDUAL IDENTITY] (“Anyone who stays in one place for a time or is involved in intense physical activity will almost certainly leave behind some trace of DNA.”); Rachel Ross, *A Trail of Genetic Evidence Follows Us All*, TORONTO STAR, Feb. 2, 2004, at D03 (“Everywhere we go, doing anything we do, we leave behind a trail of genetic evidence: cells that are naturally shed over time. Hair falls out, blood drips and cheek cells are gradually washed away by saliva, only to stick to the rim of a cup, utensil or drinking straw.”).

⁴ One of the earliest uses of this technique is attributed to Boston detectives, who in 1996 collected DNA from a suspect by offering him a cigarette. See Richard Willing, *Police Dupe Suspects into Giving up DNA*, USA TODAY, Sept. 11, 2003, at A3; see also Elizabeth M. Gillespie, *Need for Greed Ends with “Cold Case” Arrest*, L.A. TIMES, June 1, 2003, at A20 (reporting that police around the country have “put suspects under surveillance in hopes that they might discard a cigarette or wad of gum from which DNA could be drawn”).

⁵ While all persons share more than ninety-nine percent of the same genetic information, everyone is unique in the remaining fraction of their nucleotide bases (with the exception of identical twins). See Genetics 101: Human Genome Project Information, http://www.ornl.gov/sci/techresources/Human_Genome/project/info.shtml (last visited Nov. 18, 2005). Readers unfamiliar with the basic science of deoxyribonucleic acid (“DNA”) and its use in criminal cases might consult NAT’L COMM’N ON THE FUTURE OF DNA EVIDENCE, U.S. DEP’T OF JUSTICE, THE FUTURE OF FORENSIC DNA TESTING (2000); NORAH RUDIN & KEITH INMAN, AN INTRODUCTION TO FORENSIC DNA ANALYSIS (1997). This Essay assumes that DNA collected in the examples discussed here is analyzed in accordance with currently accepted methods. Problems in DNA analysis regarding contaminated samples or human error are beyond the scope of this discussion. For a concise summary of how samples are obtained from federal offenders and then stored in the national database, the Combined DNA Index System (“CODIS”), see *United States v. Kincaid*, 379 F.2d 813, 816–20 (9th Cir. 2004).

⁶ A search using Westlaw, for instance, finds more than fifty articles citing CODIS, the federal DNA database index, and the Fourth Amendment. (Search completed Feb. 14, 2005 on JLR database.)

⁷ Today DNA samples from suspects are matched against DNA profiles collected in CODIS, which was established by the federal government but is supplied with samples from both the federal government and the states. See 42 U.S.C. § 14132 (2000).

⁸ Existing discussions of abandoned DNA are largely brief citations of it as a phenomenon to watch. See, e.g., Robert A. Curley, Jr. & Lisa M. Caperna, *The Brave New World Is Here: Privacy Issues and the Human Genome Project*, 70 DEF. COUNS. J. 22, 27 (2003) (noting that with regard to “abandoned DNA,” “the law may need to address previously unthought of privacy concerns”). The most extensive discussion of the issue thus far has been presented by Ed Imwinkelried and D.H. Kaye, who identify “abandoned DNA” as one of many “emerging or neglected” issues in legal analysis of DNA sampling.

This Essay discusses why the government's collection of "abandoned DNA" is a problem worthy of serious attention.⁹ But first, a definition is necessary: "Abandoned DNA" is any amount of human tissue capable of DNA analysis and separated from a targeted individual's person inadvertently or involuntarily, but not by police coercion.¹⁰ We can distinguish this method of DNA retrieval from samples obtained by force (by drawing blood)¹¹ or by consent (for exoneration purposes). Abandoned DNA collection is also distinct from the acquisition of a suspect's DNA sample pursuant to a court-issued warrant.¹²

Deciding whether DNA might ever be "abandoned"—and with the DNA, an individual's legitimate expectations of privacy—is important because abandoned DNA provides the means to collect genetic information from anyone, at any time. Currently, the rules of criminal procedure appear to pose no restrictions on the police when collecting this evidence.¹³ Not only does "abandonment" affect police behavior, it raises basic questions about the changing nature of identity in the genetic age. How should we characterize the relationships between our physical bodies and our identities now that nearly any "body particle"¹⁴ can reveal entirely our genetic infor-

See Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413 (2001). The authors conclude, contrary to the suggestions made here, that "the better course is to treat human cells left in public places like fingerprints in deciding what expectation of privacy is reasonable." *Id.* at 440.

⁹ This Essay argues that such DNA ought not to be considered "abandoned" in most cases. The word "abandoned" is used here, however, because this particular phrase, "abandoned DNA," already has developed some currency.

¹⁰ Defined in this way, abandoned DNA does not include situations in which police collect DNA evidence from crime scenes in which they have no initial idea to whom the DNA evidence belongs. These efforts are "quite different from the practice of following an individual already suspected of a crime to pick up that person's DNA. In the former situation, the involvement of a magistrate would be pointless, for there is nothing for a magistrate to consider." Imwinkelried & Kaye, *supra* note 8, at 438 n.138. On the other hand, legal protections could be accorded to the targeted person before DNA samples are taken.

¹¹ All fifty states and the federal government now forcibly collect DNA samples from convicted offenders, retain the profiles analyzed from these samples, and compare the database profiles with those found at crime scenes. SETH AXELRAD, AM. SOC'Y OF LAW, MED., AND ETHICS, SPECIAL REPORT: SURVEY OF STATE DNA DATABASE STATUTES (2005), www.aslme.org/dna-04/grid.index.php. Fourth Amendment challenges by inmates and parolees to the forced contribution of their DNA for the federal criminal DNA database, CODIS, have been consistently rejected by state and federal courts. See, e.g., *United States v. Kincade*, 379 F.3d 813, 830–31 (9th Cir. 2004) (citing representative cases).

¹² See D.H. Kaye & Michael E. Smith, *DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage*, 2003 WIS. L. REV. 413, 424 (citing representative cases).

¹³ In this respect, this Essay contributes to a broader debate about the limits of criminal procedure analysis with regard to new technologies. Similarly, Orin Kerr has argued for statutory restrictions on government investigation of computer crimes. See Orin Kerr, *Digital Evidence and the New Criminal Procedure*, 105 COLUM. L. REV. 279 (2005).

¹⁴ Cf. Eileen H. Richardson & Bryan S. Turner, *Bodies as Property: From Slavery to DNA Maps*, in *BODY LORE AND LAWS* 29, 39 (Andrew Bainham, Martin Richards & Shelley Day Sclater eds., 2002) (suggesting that the ownership of the human body will turn on the legal treatment of "body particles" such as gametes).

mation? The final part of this Essay proposes first steps towards addressing this problem, but the Essay's primary task is to show the need to reframe the debate over *covert involuntary DNA sampling* (a more fitting label for what I will otherwise refer to as "abandoned DNA" throughout this Essay) and to make the case for "genetic exceptionalism."

The discussion that follows has four parts. First, Part II describes why the collection of abandoned DNA is an appealing investigative technique for the police. What is more, as Part III.A demonstrates, the collection of abandoned DNA is virtually unregulated, largely because abandoned DNA has been likened to trash. One important step in resolving any future restrictions on this practice should address the question of whether more appropriate analogies to abandoned DNA exist other than trash. As Part III.B considers, is it useful to compare abandoned DNA to fingerprints, human waste, organs, or the body itself? Further, as Part IV explains, it is imperative that we find an appropriate means for handling this issue because the implications of a DNA-collection method that police can use but which is unregulated and can be applied to anyone challenges our privacy in ways that have not been adequately addressed by current case law or legislation. Given the limitations of criminal procedure rules, future restrictions on abandoned DNA collection are unlikely to arise from federal constitutional law. Part V considers other sources for such restrictions and offers some suggestions regarding what restrictions on covert involuntary DNA sampling might require.

II. "ABANDONED" DNA AS AN INVESTIGATIVE TECHNIQUE

As a practical matter, why do police choose to collect abandoned DNA when looking for incriminating evidence? The simple answer is that it is easy to collect.¹⁵ These DNA samples are available from anyone and can be collected without the targeted person's knowledge and, therefore, without any objection or resistance.

Some police act as passive collectors, waiting for a suspect to discard a smoked cigarette or to spit on the floor.¹⁶ Because current techniques used

¹⁵ While easy to collect, the actual analysis of the samples can be costly, depending on the difficulty of the case. Analysis for a murder case may cost upwards of \$10,000, as compared to \$500 in a rape case. See Richard Willing, *DNA's Success in Crime-Fighting Spread Unevenly*, USA TODAY, Oct. 6, 2002, at A1.

¹⁶ See, e.g., *People v. Ayler*, N.Y.L.J., Oct. 1, 2004, at 19 (denying defendant's motion to suppress DNA evidence procured from cigarettes offered to defendant in a police interview); Tony Gordon, *DNA Sample Links Man to Burglary*, CHI. DAILY HERALD, July 3, 2001, at 5 (describing defendant's conviction of car burglary after officer saved cigarette discarded during police interview); see also, e.g., Christopher Francescani, *Sex Fiend Admits He Killed 5 in Brooklyn*, N.Y. POST, Mar. 10, 2001, at 11 (reporting on defendant linked to five murders after police collected saliva on the ground outside of police station, and after defendant refused to provide DNA sample); William Rashbaum, *Man Cleared by DNA Tests Led Police to Murder Suspect*, N.Y. TIMES, Aug. 8, 2001, at 12 (same). For further examples, see Richard Willing, *As Police Rely More on DNA, States Take a Closer Look*, USA TODAY, June

by forensics labs require only a small amount of saliva, blood, or hair, the police need only obtain a minute tissue sample.¹⁷ In one case, Los Angeles police detectives solved a decades-old series of murders by retrieving DNA from the recently used coffee cup of Adolph Laudenberg, a man they had long suspected, but from whom they had been unable to obtain other evidence.¹⁸ The saliva taken from Laudenberg's cup matched that of bodily fluid that had been found with the victims.¹⁹

Other police have turned to more creative approaches.²⁰ Imagine that police detectives suspect a person in a homicide investigation, and physical evidence from the crime scene yields the DNA sample of an unknown person. Perhaps the police have no more than a hunch about the suspect—that is, they lack a basis to obtain a warrant to collect the DNA—or they have limited resources to conduct a detailed investigation. Or perhaps the police suspect someone in a "cold" case, in which the crime occurred years, perhaps decades, ago and in which a prior investigation had proven unsuccessful.

Facing all three obstacles, Seattle police devised a clever ruse to obtain a DNA sample from John Athan, whom they long suspected in the 1982 murder of a thirteen-year-old girl. Writing on the stationery of a fictitious law firm, the police sent a letter in 2003 to Athan, then living in New Jersey, asking him to join a class action lawsuit to recover overcharged traffic fines.²¹ Athan complied, and by licking the return envelope, he provided the detectives with the DNA sample they needed.²² Athan's DNA matched

6, 2000, at 1A (reporting on abandoned DNA cases in St. Petersburg, Florida, Boston, and New York City). See also Elizabeth Gosch, *Great-Grandmother's Killer Caught by Cigarette DNA*, AUSTRALIAN, Feb. 16, 2005, at 5, available at 2005 WL 73997998 (describing a defendant linked to murder after police collected a used cigarette discarded during police custody).

¹⁷ DNA is contained in blood, semen, skin cells, tissue, organs, muscle, brain cells, bone, teeth, hair, saliva, mucus, perspiration, fingernails, urine, and feces. See NAT'L COMM'N ON THE FUTURE OF DNA EVIDENCE, U.S. DEP'T OF JUSTICE, WHAT EVERY LAW ENFORCEMENT OFFICER SHOULD KNOW ABOUT DNA EVIDENCE 2 (1999) (noting that "only a few cells can be sufficient to obtain useful DNA information"); see also Ross, *supra* note 3 (reporting that 500 picograms to one nanogram is sufficient for a "good" DNA sample).

¹⁸ See Jason Van Derbeken, *How Alleged Serial Killer Fell into Trap*, S.F. CHRON., Sept. 21, 2003, at A1.

¹⁹ See Andrew Blankstein & Richard Winton, *Man Is Charged in 1972 Murder*, L.A. TIMES, Sept. 10, 2003, at B3.

²⁰ See, e.g., Ray Delgado, *How Cop Got DNA to Nail Rapist*, S.F. CHRON., Aug. 14, 2001, at A1 (reporting on defendant tied to two rapes after a police officer met him at a Taco Bell and retrieved the defendant's soda straw).

²¹ See Gillespie, *supra* note 4.

²² Vanessa Ho, *Man Is Sentenced in '82 Killing DNA Solved*, SEATTLE POST-INTELLIGENCER, Mar. 6, 2004, at B1; see also Tracy Johnson, *N.J. Man Convicted of 1982 Murder*, SEATTLE POST-INTELLIGENCER, Jan. 22, 2004, at B1.

that found at the crime scene, and in 2004 he was convicted of second-degree murder.²³

These examples illustrate some fundamental differences between traditional police work and “abandoned DNA” collection. In more conventional police investigations, the Fourth Amendment poses clear restraints on police investigation. In most circumstances they must obtain a warrant, for example, to enter one’s home,²⁴ even if only to read the newspaper inside.²⁵ In cases involving “abandoned DNA,” however, the police have been able to retrieve the most detailed genetic information, without being subject to the criminal procedure rules that normally apply to searches and seizures.

III. THE REGULATION OF ABANDONED DNA

[W]e can’t go anywhere without leaving a bread-crumbs trail of identifying DNA matter. If we have no legitimate expectation of privacy in such bodily material, what possible impediment can there be to having the government collect what we leave behind, extract its DNA signature and enhance CODIS to include everyone?

—Judge Alex Kozinski, dissenting in *United States v. Kincaid*²⁶

Unlike conventional searches and seizures, the collection of abandoned DNA is not restricted by criminal procedure rules. In fact, Fourth Amendment analysis is poorly suited to control police behavior in this setting. As this Part discusses, legal discussion is hampered by a misleading analogy between abandoned DNA and garbage.

²³ See Johnson, *supra* note 22. In Athan’s criminal prosecution, *neither* side disputed that “one’s cells sloughed in public in the normal course of daily living are not entitled to constitutional protection.” See *State v. Athan*, No. 03-1-06338-6, slip op. at 4 (Wash. Super. Ct. Nov. 17, 2003) (order on defendant’s motion to suppress DNA evidence) (on file with author). Rather, Athan argued that the police here violated his rights under the Washington Constitution, which provides greater privacy rights than does the Fourth Amendment of the Federal Constitution. The trial court rejected these claims. See *id.* Athan’s case is currently pending before the state supreme court. See Telephone Interview with John Muenster, defense attorney for John Athan (Oct. 5, 2004) (notes on file with author).

²⁴ See, e.g., *Kyllo v. United States*, 533 U.S. 27, 31 (2001) (“With few exceptions, the question whether a warrantless search of a home is reasonable and hence constitutional must be answered no.”).

²⁵ See Kerr, *supra* note 13, at 297 (using this example and citing *Soldal v. Cook County*, 506 U.S. 56, 69 (1992) (“[T]he reason why an officer might enter a house or effectuate a seizure is wholly irrelevant to the threshold question whether the [Fourth] Amendment applies. What matters is the intrusion on the people’s security from governmental interference.”); Harold J. Krent, *Of Diaries and Databanks: Use Restrictions Under the Fourth Amendment*, 74 TEX. L. REV. 49, 69 (1996) (offering a similar example); see also *Arizona v. Hicks*, 480 U.S. 321, 325 (1987) (“It matters not that the search uncovered nothing of any great personal value to respondent A search is a search, even if it happens to disclose nothing [of importance].”).

²⁶ 379 F.3d 813, 873 (9th Cir. 2004) (Kozinski, J., dissenting).

A. From Trash to Genes

Constitutional law offers virtually no protection to suspects who are targeted for their abandoned DNA. The Supreme Court has not yet specifically considered this type of evidence collection, but existing Fourth Amendment law is ill-suited to the facts of abandoned DNA collection. As this section explains, the Fourth Amendment focuses more on the physical boundaries of persons and places than it does on the quantity of information that may be found within them.

The Fourth Amendment's prohibition on unreasonable searches and seizures²⁷ requires a court first to determine whether a search or seizure has taken place at all. In *Katz v. United States*, Justice Harlan articulated the "reasonable expectation of privacy" test that provides our modern analytic framework.²⁸ Police activity constitutes a "search" for Fourth Amendment purposes only if the person claiming an illegal search exhibits both an actual expectation of privacy and one that "society is prepared to recognize as 'reasonable.'"²⁹

Likewise, the Supreme Court has stated that police collection of physical evidence constitutes a "seizure" if it is a "meaningful interference with an individual's possessory interests in that property."³⁰ The acquisition by force of a person's blood or urine, too, is considered by the courts a seizure because it is "a meaningful interference with [one's] possessory interest in his bodily fluids."³¹

In contrast, where suspects "knowingly expose" items to public view, the Court has held that collection of such evidence by the police falls outside the Fourth Amendment's protections.³² In such cases, police involvement is neither a search nor a seizure for Fourth Amendment purposes.³³ In *California v. Greenwood*, for example, the Court held that that the defendants possessed no reasonable expectation of privacy in trash bags they had left at the curb, which contained incriminating evidence of their narcotics

²⁷ U.S. CONST. amend. IV.

²⁸ See *Katz v. United States*, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

²⁹ *Id.*

³⁰ *United States v. Jacobsen*, 466 U.S. 109, 113 (1984).

³¹ *Skinner v. Ry. Labor Executives Ass'n*, 489 U.S. 602, 618 n.4 (1989). In *Skinner*, however, the Court noted that it was "not necessary . . . to characterize the taking of blood or urine samples as a seizure of those bodily fluids, for the privacy expectations protected by this characterization are adequately taken into account by our conclusion that such intrusions are searches." *Id.*; see also *Schmerber v. California*, 384 U.S. 757, 767 (1966) ("[T]he administration of the blood test in this case was [not] free of the constraints of the Fourth Amendment. Such testing procedures plainly constitute searches of 'persons' and depend antecedently upon seizures of 'persons,' within the meaning of that Amendment.").

³² *Katz*, 389 U.S. at 351.

³³ See, e.g., *Abel v. United States*, 362 U.S. 217, 241 (1960) (finding that government collection of items left in hotel room wastepaper basket was permissible because to defendant such items were "bona vacantia," or ownerless goods).

trafficking.³⁴ Even though police intercepted garbage intended for city collection, Greenwood could not complain because he had left his items in a place “particularly suited for public inspection.”³⁵ Anyone could delve through this abandoned trash:

It is common knowledge that plastic garbage bags left on or at the side of a public street are readily accessible to animals, children, scavengers, snoops, and other members of the public Moreover, respondents placed their refuse at the curb for the express purpose of conveying it to a third party, the trash collector, who might himself have sorted through respondent’s trash or permitted others, such as the police, to do so.³⁶

Whatever Greenwood’s personal intentions, where there is no objectively reasonable expectation of privacy, a Fourth Amendment search does not exist.³⁷

Where the government *forcibly* obtains DNA from an individual, however, the *Greenwood* analysis is inapplicable.³⁸ As a result, the Fourth Amendment clearly applies to the collection of DNA samples by blood extraction or by the buccal swabs that are collected from prisoners and parolees for inclusion into state and federal DNA databanks.³⁹ This DNA is not “knowingly exposed” when government officials, like the Bureau of Prisoner officials who take blood samples from federal offenders, intrude upon the physical boundaries of the body to retrieve it. Thus, even in cases in which challenges to DNA collection by the government ultimately have been found to be “reasonable” (and therefore constitutional) for Fourth Amendment purposes, the analysis assumes that a penetration of the human body to obtain tissue samples is a search.⁴⁰

³⁴ 486 U.S. 35 (1988).

³⁵ *Id.* at 40–41 (internal quotations omitted).

³⁶ *Id.* at 40.

³⁷ See *Illinois v. Caballes*, 543 U.S. 405, 408 (2005) (“Official conduct that does not ‘compromise any legitimate interest in privacy’ is not a search subject to the Fourth Amendment.” (quoting *United States v. Jacobsen*, 466 U.S. 109, 123 (1984)); *Kyllo v. United States*, 533 U.S. 27, 33 (2001) (“We have [held] that a Fourth Amendment search does *not* occur . . . unless the individual manifested a subjective expectation of privacy in the object of the challenged search, and society [is] willing to recognize that expectation as reasonable.” (internal quotation marks omitted)).

³⁸ See *United States v. Dionisio*, 410 U.S. 1, 8 (1973) (“[T]he obtaining of physical evidence from a person involves a potential Fourth Amendment violation at two levels—the ‘seizure’ of the ‘person’ necessary to bring him into contact with government agents, and the subsequent search for and seizure of evidence.” (internal citations omitted)).

³⁹ See, e.g., *United States v. Kincade*, 379 F.3d 813, 836–39 (9th Cir. 2004) (assuming that compulsory blood tests for DNA data banking implicate Fourth Amendment interests).

⁴⁰ *Skinner v. Ry. Labor Executives Ass’n*, 489 U.S. 602, 616 (1989) (“In light of our society’s concern for the security of one’s person, it is obvious that this physical intrusion, penetrating beneath the skin, infringes an expectation of privacy that society is prepared to recognize as reasonable. The ensuing chemical analysis of the sample to obtain physiological data is a further invasion of the tested employee’s privacy concerns.” (internal citations omitted)).

In cases where police must penetrate the body, the *quantum* of evidence obtained is an important factor in approving the constitutionality of DNA collection.⁴¹ While intrusive, forced retrieval of DNA by the police requires only the smallest amount of tissue: usually a blood sample. It is the "minimally intrusive" nature of most DNA collection—a needle prick—that plays a decisive factor in permitting forced extractions for DNA evidence.⁴²

With abandoned DNA, existing Fourth Amendment law appears not to apply at all.⁴³ It may be that an individual harbors an actual expectation of privacy in his genetic information. The few reported cases involving abandoned DNA have followed *Greenwood's* analysis, though, and have concluded that there is no objective expectation of privacy in saliva—and the DNA contained within it—that is left behind on a coffee cup or on a smoked cigarette.⁴⁴ If these objects are "knowingly exposed" to the public, so too, in this perspective, is the genetic information left in them.⁴⁵ If penetrating the body, as in the case of blood extraction, or observing potentially embarrassing activities, such as urination,⁴⁶ implicates Fourth Amendment

⁴¹ See *Schmerber v. California*, 384 U.S. 757, 771 (1966) (finding blood extraction from drunk driving suspect reasonable because "[s]uch tests are a commonplace in these days of periodic physical examination and experience with them teaches that the quantity of blood extracted is minimal, and that for most people the procedure involves virtually no risk, trauma, or pain").

⁴² In the *Kincade* case, Judge Kozinski noted in dissent that the plurality's identification of a needle-prick as the most serious intrusion was misplaced and referred to the millions of samples of blood drawn for medical and other purposes: "By glomming onto blood already extracted for other purposes, the government would have eliminated what the plurality identifies as the most serious negative factor—the piercing of the skin." 379 F.3d at 872 (Kozinski, J., dissenting).

⁴³ Others have made similar observations. See, e.g., Imwinkelried & Kaye, *supra* note 8, at 439 ("Courts may find it a small step to conclude the warrantless collection of inadvertently abandoned DNA does not violate the Fourth Amendment.").

⁴⁴ See, e.g., *State v. Wickline*, 440 N.W.2d 249, 253 (Neb. 1989) (rejecting defendant's argument that the police were required to obtain a warrant before collecting and testing his cigarettes left at the police station because he "abandoned these items and sufficiently exposed them to the officer and the public to defeat his claim to fourth amendment protection"); *State v. Buckman*, 613 N.W.2d 463, 474 (Neb. 2000) (citing *Wickline* to reject defendant's claim that the police should have obtained a warrant before collecting his smoked cigarettes).

⁴⁵ Where the police have tricked a suspect into handing over his genetic material, it may be that such DNA collection might be justified not only by the *Greenwood* analysis but also by the "false friend" line of cases, such as *Hoffa v. United States*, 385 U.S. 293 (1966), and *United States v. White*, 401 U.S. 745 (1971). Where a person willingly reveals information to someone who later turns out to be a police informant or an undercover officer, that person, according to the Court, has assumed the risk that a confidant will be working for the government. The Fourth Amendment offers no protection to such "misplaced confidence." *Hoffa*, 385 U.S. at 302.

But as with the trash analogy, the questions are (1) whether one ought to be protected in voluntarily exposing something to the public (2) without losing privacy rights over *genetic* information thereby inadvertently revealed. The Court has answered the first question with a "no"; the second question is distinct and remains unresolved.

⁴⁶ *Skinner v. Ry. Labor Executives Ass'n*, 489 U.S. 602, 617 (1989) ("There are few activities in our society more personal or private than the passing of urine. Most people talk about it by euphemisms if they talk about it at all. It is a function traditionally performed without public observation; indeed, its

concerns, abandoned DNA represents a nonviolent, though involuntary, separation of tissue from the body, often in the most public of places.⁴⁷

What matters in Fourth Amendment analysis is the means by which police gain access to the tissue that happens to contain DNA; whether the DNA within the tissue ought to be considered “public” or “private” thereafter is irrelevant.⁴⁸ The Fourth Amendment query focuses on the item left behind—usually of no concern to the person targeted—rather than the genetic information contained within it.⁴⁹

Thus, because it is grounded in physical boundaries, the Fourth Amendment fails to protect genetic privacy adequately.⁵⁰ This inadequacy arises at a time when the boundaries of individual identity are undergoing dramatic changes.⁵¹ A wide variety of technologies have multiplied the ways in which individual identities arise: genetic (DNA), informational (public records),⁵² and digital (cyberspace)⁵³ identities are but a few examples. It may be that traditional Fourth Amendment analysis is poorly suited for a world in which “the body itself may become a rather antiquated way of defining the individual.”⁵⁴ While the Fourth Amendment continues to

performance in public is generally prohibited by law as well as social custom.” (quoting *Nat’l Treasury Employees Union v. Von Raab*, 816 F.2d 170, 175 (5th Cir. 1987)).

⁴⁷ See Imwinkelried & Kaye, *supra* note 8, at 439.

⁴⁸ See Kerr, *supra* note 13, at 297 (making this same point with regard to computer crimes and the difficulty of applying Fourth Amendment law); see also Krent, *supra* note 25, at 69 (observing that some “types of subsequent governmental use of information may intrude upon privacy far more than the initial seizure itself, just as the chemical analysis of blood and urine samples may constitute a greater intrusion into privacy than the collection of the sample”).

⁴⁹ Cf. *United States v. Kincade*, 379 F.3d 813, 872 (9th Cir. 2004) (Kozinski, J., dissenting) (“[B]lood is taken from us from the day we are born pretty much until the day we die, and on many days in between. What exactly happens to that blood after it leaves our veins? Most of us don’t know or care, presuming (if we consider it at all) that whatever isn’t used for testing is discarded. But what if Congress were to require medical labs to submit the excess blood for DNA fingerprinting so it can be included in CODIS?”).

⁵⁰ See, e.g., *id.* at 873. Judge Kozinski cites *Greenwood* and notes with regard to a Fourth Amendment challenge to forced DNA collection:

Arguably we have no more reasonable expectation of privacy in blood turned over to third parties than we do in our trash cans or bank records. And without a reasonable expectation of privacy, there isn’t even a “search” for Fourth Amendment purposes. Which is why it is important to recognize that the Fourth Amendment intrusion here is not primarily the taking of the blood, but seizure of the DNA fingerprint and its inclusion into a searchable database.

Id. (internal citations omitted).

⁵¹ See Gary T. Marx, *Identity and Anonymity: Some Conceptual Distinctions and Issues for Research*, in DOCUMENTING INDIVIDUAL IDENTITY, *supra* note 3, at 311, 320.

⁵² See Daniel Solove, *Digital Dossiers and the Dissipation of Fourth Amendment Privacy*, 75 S. CAL. L. REV. 1083, 1138 (2002) (arguing that Fourth Amendment law inadequately protects governmental access to vast repositories of personal information—“digital dossiers”—held by private third parties).

⁵³ See, e.g., Jerry Kang, *Cyber-Race*, 113 HARV. L. REV. 1130, 1135 (2002) (arguing that malleability of identity in cyberspace challenges conventional notions of race and provides new opportunities to conceptualize race).

⁵⁴ See SIMON A. COLE, SUSPECT IDENTITIES: A HISTORY OF FINGERPRINTING AND CRIMINAL IDENTIFICATION 310 (2001); Marx, *supra* note 51, at 326 (“Identities are becoming relatively less uni-

protect, as sociologist Gary Marx colorfully observes, our "meat space,"⁵⁵ it fails to protect aspects of our genetic privacy once separated from that sphere.

Of course, the case that "abandoned DNA" has indeed been abandoned is not conclusive. Do we *intend* to renounce our actual expectations of privacy with respect to this genetic material when we shed our DNA?⁵⁶ The volition that is implied in abandonment is simply unrealistic here. Courts may readily find that criminals have clearly intended to renounce all privacy claims to bags containing illegal firearms or to packages of drug paraphernalia when fleeing the police,⁵⁷ but we hardly have a realistic choice in shedding DNA. One can shred private papers or burn garbage so that no one may ever delve into them, but leaving DNA in public places cannot be avoided.⁵⁸

Nor is it clearly established that this DNA evidence, when viewed from a property-rights perspective, lacks Fourth Amendment privacy protection. While *Katz* eliminated the necessity of property rights analysis from Fourth Amendment privacy claims,⁵⁹ property rights nevertheless have continued relevance when courts determine what "society is prepared to recognize as

tary, homogenous, fixed and enduring, as the modernist idea of being able to choose who we are continues to expand, along with globalization processes and increased integration.").

⁵⁵ See Marx, *supra* note 51, at 325. Even commentators who argue for greater Fourth Amendment protections would condition enhanced restrictions only on government *coercion*, vis-à-vis the penetration of the body. For instance, Harold Krent, who has argued for use restrictions on otherwise permissible searches and seizures by the government, restricts his own proposals to the "acquisition of information obtained through government coercion," rather than extending his proposals to "information obtained through other means," because such a line is "normatively attractive." See Krent, *supra* note 25, at 76.

⁵⁶ See, e.g., *United States v. Thomas*, 864 F.2d 843, 846 (D.C. Cir. 1989) ("To determine whether there has been abandonment in the fourth amendment sense, the . . . court must focus on the intent of the person who is alleged to have abandoned the place or object.").

⁵⁷ See, e.g., *id.* at 847 (holding that no search or seizure had occurred where the police had taken a gym bag left in an apartment entryway); *City of St. Paul v. Vaughn*, 237 N.W.2d 365 (Minn. 1975) (holding that no search or seizure had occurred when the police retrieved eyeglass case that defendant had left under store counter).

⁵⁸ See Imwinkelried & Kaye, *supra* note 8, at 438.

⁵⁹ *Katz v. United States*, 389 U.S. 347, 353 (1967) (Harlan, J., concurring) (stating that "the premise that property interests control the right of the Government to search and seize has been discredited" (quoting *Warden v. Hayden*, 387 U.S. 294, 304 (1967))); see also *Thomas*, 864 F.2d at 845 ("The test for abandonment in the search and seizure context is distinct from the property law notion of abandonment: it is possible for a person to retain a property interest in an item, but nonetheless to relinquish his or her reasonable expectation of privacy in the object."); *United States v. Colbert*, 474 F.2d 174, 176 (5th Cir. 1973) ("The issue is not abandonment in the strict property-right sense, but whether the person prejudiced by the search had voluntarily discarded, left behind, or otherwise relinquished his interest in the property in question so that he could no longer retain a reasonable expectation of privacy with regard to it at the time of the search.").

Harold Krent observes that this decoupling of privacy from property rights also happens to have "enhanced the power of law enforcement authorities" because they are "no longer cabined by the possibly superior possessory interests of targets." See Krent, *supra* note 25, at 58.

‘reasonable.’”⁶⁰ For instance, a number of state legislatures, in efforts to preserve genetic privacy and to protect against genetic discrimination, have passed legislation declaring genetic information the property of the individual.⁶¹

Nevertheless, the Fourth Amendment’s protections appear to fall short of providing a constitutional basis from which to challenge abandoned DNA collection. No court has held police collection of abandoned DNA to be illegal. Once DNA is considered abandoned or knowingly exposed, the Fourth Amendment does not apply at all. By contrast, even those classes of persons who have been required to submit DNA samples according to state and federal DNA database laws have the benefit (albeit on the losing end thus far) of the Fourth Amendment’s balancing of interests between their individual rights and the legitimate interests of government.⁶² One can hardly fault the police for taking advantage of this distinction. Like all workers in complex organizations, the police work with the incentives and rules as they best understand them.⁶³ In these situations, Fourth Amendment law permits and legitimizes their collection of this evidence.

B. *Finding Analogues*

Fourth Amendment law fails to protect the information contained in abandoned DNA largely because of this analogy to trash. But are other

⁶⁰ *Katz*, 389 U.S. at 361 (Harlan, J., concurring); *see also* *United States v. Stevenson*, 396 F.3d 538, 546 (4th Cir. 2005) (“The proper test for abandonment is not whether all formal property rights have been relinquished, but whether the complaining party retains a reasonable expectation of privacy in the [property] alleged to be abandoned.” In making that determination, however, it is still relevant to consider a defendant’s property interest.” (quoting *United States v. Haynie*, 637 F.2d 227, 237 (4th Cir. 1980))).

⁶¹ *See Imwinkelried & Kaye*, *supra* note 8, at 438; Sonia M. Suter, *Disentangling Privacy from Property: Toward a Deeper Understanding of Genetic Privacy*, 72 GEO. WASH. L. REV. 737, 744 (2004) (noting that “a number of legislatures have enacted legislation or drafted bills that . . . declare that genetic information (and less commonly genetic samples) are the ‘unique’ or ‘exclusive’ property of the individual to whom the information pertains.”). For examples of such laws, see, for example, COLO. REV. STAT. § 10-3-1104.7(1)(a) (2005) (“Genetic information is the unique property of the individual to whom the information pertains.”); FLA. STAT. § 760.40(2)(a) (2005) (declaring results of genetic testing “exclusive property of the person tested”); GA. CODE ANN. § 33-54-1(1) (2005) (“Genetic information is the unique property of the individual tested.”); LA. REV. STAT. ANN. § 22:213.7(E) (2004) (describing genetic information as “property” of the person tested); OR. REV. STAT. § 192.537(1) (2003) (“[A]n individual’s genetic information *and* DNA sample are private and must be protected, and an individual has a right to the protection of that privacy.” (emphasis added)).

⁶² State and federal courts have repeatedly rejected Fourth Amendment challenges to the forced collection of DNA samples for inclusion in CODIS, the federal DNA database. *See, e.g.*, *United States v. Kincade*, 379 F.2d 813, 830–32 (9th Cir. 2004); *see also* *Green v. Berge*, 354 F.3d 675, 676 (7th Cir. 2004) (“Challenges to these statutes as a whole and to their subparts have almost uniformly been unsuccessful.”).

⁶³ *See* JEROME SKOLNICK, JUSTICE WITHOUT TRIAL: LAW ENFORCEMENT IN DEMOCRATIC SOCIETY 174 (3d ed. 1994) (observing that the response of detectives to clearance rates can be explained by the following insight: “workers always try to perform *according to their most concrete and specific understanding of the control system*”).

analogies regarding the human body more appropriate? Does the legal characterization of other types of human tissue help in the consideration of DNA? Three analogical possibilities come to mind: fingerprints, body parts, and human waste. As the following sections explain, however, each fails to capture what is important about genetic information. Collectively they make the case for "genetic exceptionalism":⁶⁴ that DNA is a unique category, incapable of abandonment (and perhaps of sale or patent), and warranting its own analysis without reference to other body parts or to trash.

1. Fingerprints.—Most commonly, commentators have drawn an analogy between DNA and fingerprints; genetic analysis is often described as "DNA fingerprinting."⁶⁵ The analogy is appealing because we leave abandoned DNA, like fingerprints, nearly everywhere we go. Until DNA profiling was introduced, fingerprinting was the primary form of criminal identification, replacing earlier attempts to systematize criminal identification, including photographic "rogues' galleries" and Alphonse Bertillon's anthropometric method that recorded measurements of an offender's body.⁶⁶

If the analogy holds, then abandoned DNA is properly characterized as lacking Fourth Amendment protection. While detaining a person solely in order to obtain their fingerprints must meet Fourth Amendment requirements,⁶⁷ the Supreme Court has stated in much-quoted dicta that the taking of the fingerprints themselves would not be afforded Fourth Amendment protection.⁶⁸ Fingerprints, in this view, lack Fourth Amendment protections because they are constantly exposed to public scrutiny,⁶⁹ and therefore one

⁶⁴ Thanks to Troy Duster for suggesting this phrase to show why genetic information ought to be considered categorically unique in its capacity to provide personal information.

⁶⁵ See, e.g., NAT'L COMM'N ON THE FUTURE OF DNA EVIDENCE, U.S. DEP'T OF JUSTICE, USING DNA TO SOLVE COLD CASES 5 (2002) (comparing DNA to fingerprint evidence); Richard Willing, *White House Seeks to Expand DNA Database*, USA TODAY, Apr. 16, 2003, at 13A (quoting assistant U.S. Attorney General Deborah Daniels as saying that "DNA is to the 21st century what fingerprinting was to the 20th").

⁶⁶ As early as the 1840s, French and British police began taking daguerreotypes of prisoners. Bertillon's system was much more elaborate than photographing, involving eleven separate measurements taken by specially trained "Bertillon operators." See COLE, *supra* note 54, at 32–49.

⁶⁷ See *Davis v. Mississippi*, 394 U.S. 721 (1969). In *Davis*, the defendant and twenty-four other African American men were subjected to questioning and fingerprinting regarding a rape investigation. Rejecting the state's claim, the Court held that the Fourth Amendment applied to detentions conducted for the sole purpose of obtaining fingerprints. See *id.* at 727; see also *Cupp v. Murphy*, 412 U.S. 291 (1973) (holding that, upon probable cause, police could forcibly obtain fingernail scrapings from defendant).

⁶⁸ See *United States v. Dionisio*, 410 U.S. 1, 15 (1973) (noting that fingerprinting "itself involves none of the probing into an individual's private life and thoughts that marks an interrogation or search" (internal quotations omitted)).

⁶⁹ This rationale has been extended to hair samples as well. See *Coddington v. Evanko*, 112 Fed. Appx. 835, 836 (3d Cir. 2004) (holding that "the cutting of one's hair for the purpose of obtaining a sample does not constitute a search under the Fourth Amendment"). *Coddington* relied upon the Third Circuit's prior precedent in *Mills*, in which the court concluded "that there is no greater expectation of

cannot hold any reasonable expectation of privacy with regard to such publicly available knowledge.⁷⁰

Yet unlike DNA, fingerprints have a limited identification value. By themselves, fingerprints cannot reveal any more information about the person from whom they have been collected (other than a prior criminal record). It may be, then, that the closeness of fit between fingerprints and abandoned DNA turns on two considerations.⁷¹

First, discussions of DNA databanks usually refer not to tissue samples but to the results of their analyses. DNA databases hold computer profiles, not the actual tissue samples. These profiles record preselected sites on the human genome known to be variable within the population, but do not, under current understanding, refer to any stigmatizing information.⁷² The defense that current DNA sampling techniques target only “junk” DNA, and thus cannot reveal medical information,⁷³ should not assuage privacy concerns, however, as some markers now thought to be meaningless may be (and have been) found to contain predictive medical information as the science progresses.⁷⁴ By contrast, while they can inform the police about a

privacy with respect to hair that is on public display than with respect to voice, handwriting or fingerprints.” *In re Grand Jury Proceedings (Appeal of Mills)*, 686 F.2d 135, 139 (3d Cir. 1982). *But see* Sherry Colb, *Is Your Scalp a Constitution-Free Zone?*, FINDLAW’S WRIT, Nov. 17, 2004, <http://writ.news.findlaw.com/colb/20041117.html> (arguing that *Coddington* and *Mills* are “wrong as a matter of logic” and that *Coddington* “misinterprets” Fourth Amendment law).

⁷⁰ See Kaye & Smith, *supra* note 12, at 432 (“If the Constitution allows the police to keep a fingerprint or a photograph as a biometric identifier . . . then it is hard to see why they cannot keep a DNA profile if it is properly limited to ‘vacuous’ loci.”); *cf.* *Patterson v. State*, 742 N.E.2d 4, 10 n.3 (Ind. Ct. App. 2000) (“The view that DNA analysis is no different than traditional fingerprinting is becoming less palatable. DNA analysis provides unprecedented access into an individual’s future physical and psychological health, the health of close relatives, and insight into paternity issues.”).

⁷¹ It is possible, however, to extract DNA from fingerprint material, and so the distinction may be indeed difficult to draw. See PAUL GIANELLI & EDWARD IMWINKELRIED, *SCIENTIFIC EVIDENCE* 5 (3d ed. Supp. 2004).

⁷² Indeed, much of the argument made by Kaye and Smith for a population-wide DNA database necessarily turns on the assumption that DNA databanks will continue to use, as the federal database does, “the thirteen core STR [Short Tandem Repeats] loci used in current criminal offender databases [that] are noncoding, nonregulatory loci that are not linked to any genes in a way that would permit one to discern any socially stigmatizing conditions.” See Kaye & Smith, *supra* note 12, at 431.

⁷³ Kaye and Smith argue, for instance, that such a profile is no different than a Social Security number. See *id.*

⁷⁴ See Clive Cookson, *Regulatory Genes Found in “Junk DNA,”* FIN. TIMES, June 4, 2004, at 11 (“Molecular biologists are beginning to find that the long stretches of the genome previously dismissed as a genetic wasteland or ‘junk DNA’ actually perform some important functions.”); W. Wayt Gibbs, *The Unseen Genome: Gems Among the Junk*, SCI. AM., Nov. 2003, at 46, 49–50. Gibbs quotes the director of the Institute for Molecular Bioscience at the University of Queensland as saying: “I think [junk DNA] will come to be a classic story of orthodoxy derailing objective analysis of the facts . . . [It] may well go down as one of the biggest mistakes in the history of molecular biology.” *Id.*; see also Justin Gillis, *Genetic Code of Mouse Published: Comparison with Human Genome Indicates “Junk DNA” May Be Vital*, WASH. POST, Dec. 5, 2002, at A1 (reporting that “new discoveries were likely to force [scientists] to abandon the term ‘junk DNA’ and send them back to the drawing board”); see also Nelkin

suspect's prior brushes with the law, fingerprints lack the potential to provide the same, deeply personal information that DNA does.

Second, states are left to determine what to do with the tissue samples, which may harbor all kinds of personal information regarding heredity and disease.⁷⁵ Because they contain an individual's entire genome, tissue samples retained by the government threaten privacy interests the most, yet they receive less attention than the computer profiles contained within DNA databases. Even though CODIS, the federal DNA database, restricts its DNA profiles primarily to those who have been convicted, or charged in an indictment or information, federal law remains silent as to what must be done with the biological samples themselves.⁷⁶ Most states have not set forth clear guidelines on the retention or destruction of samples that can be stored virtually indefinitely.⁷⁷ Fingerprints do not promise this potential for yielding vast amounts of genetic information for government use, forever. Thus, while they provide an appealing comparison, fingerprints are an inappropriate analogy to DNA.

2. *The Body and Its Organs.*—Another possible analogy might lie between DNA and the human body or its parts. In assessing the ownership rights over human tissue and cells, the Congressional Office of Technology Assessment once asked whether an analogy between cells and body parts would be fruitful.⁷⁸ Of course, one cannot, practically speaking, abandon one's liver or body while alive, but what of corpses and donated or excised organs?

Here the law is not well settled. Items from the human body like livers, hearts, lungs, and skin "lie in a legal limbo."⁷⁹ Such body parts often

& Andrews, *supra* note 2, at 692 (voicing skepticism regarding the defense of "junk DNA"); Sankar, *supra* note 3, at 285 (same).

⁷⁵ See Michell Hibbert, *DNA Databanks: Law Enforcement's Greatest Surveillance Tool?*, 34 WAKE FOREST L. REV. 767, 796 (1999) ("Although many statutes make it a crime to misuse information in the databank itself, the [DNA] samples, which contain an unlimited amount of information about the offender, receive little, if any protection."). Indeed, the FBI encourages the states to *retain* portions of the evidence samples from which the analysis is taken. See FBI, Standards for Forensic DNA Testing Labs, <http://www.fbi.gov/hq/lab/codis/forensic.htm> (last visited Nov. 28, 2005) (requiring with Standard 7.2 that "[w]here possible, the laboratory shall retain . . . a portion of the evidence sample or extract").

⁷⁶ See 42 U.S.C. § 14132 (2000).

⁷⁷ See AXELRAD, *supra* note 11, at 4–5. Only Wisconsin's DNA law requires the destruction of all offender samples after analysis has been performed. See WIS. STAT. ANN. § 165.77(3) (West 2004). On the other hand, Washington explicitly provides for the retention of samples. See WASH. REV. CODE ANN. § 43.43.754(2) (2004). Twenty-eight states are silent on the issue. See AXELRAD, *supra* note 11, at 5.

⁷⁸ See OFFICE OF TECH. ASSESSMENT, U.S. CONGRESS, NEW DEVELOPMENTS IN BIOTECHNOLOGY: OWNERSHIP OF HUMAN TISSUES AND CELLS 87 (1987), available at <http://www.wws.princeton.edu/ota/disk2/1987/8719/8719.pdf>.

⁷⁹ Radhika Rao, *Property, Privacy and the Human Body*, 80 B.U. L. REV. 359, 375 (2000). On the other hand, the ability to sell human eggs, sperm, blood, teeth, and hair has been widely recognized.

have been characterized in terms of quasi-property rights. Body parts may be designated for donation, although federal law forbids their outright sale.⁸⁰ Corpses, too, have been accorded quasi-property rights.⁸¹ One may donate one's body to science, for instance, and one's heirs may have quasi-property rights superior to those of others in order to dispose of the corpse.⁸²

Where disputes arise not out of ordinary treatment but rather because of alleged mistreatment of corpses and body parts, courts also have recognized the applicability of tort law.⁸³ Because the perceived harm is an emotional one rather than an interference with the corpse per se, the cause of action here accrues to the survivor rather than to the decedent or his estate.⁸⁴ Thus, if rights to control over this human tissue exist when the body is dead, certainly one can make the case that there ought to be some control over genetic information in tissue separated from the body while one is alive. These existing uses of property and tort law suggest that advocates for the protection of abandoned DNA may need to look outside of the Fourth Amendment to support the restriction of the collection of the abandoned DNA.

3. *Human Waste*.—A third possibility in our search for the best existing analogy to abandoned DNA is human waste. How useful an analogy human waste will prove, though, depends on whether we focus on the waste itself or on the human activity involved in expelling that waste, to which the Court has afforded privacy protection. In *Skinner v. Railway Labor Executives Association*, the Court, while ultimately finding suspicionless drug testing of railroad employees to be reasonable, nevertheless noted that required urine testing implicated the Fourth Amendment because its analysis, “like that of blood, can reveal a host of private medical facts” and because “the process of collecting the sample . . . itself implicates privacy inter-

See, e.g., S. Gregory Boyd, *Considering a Market in Human Organs*, 4 N.C. J.L. & TECH. 417, 461 (2003) (noting accepted categories of marketable bodily products).

⁸⁰ *See* Rao, *supra* note 79, at 375–76. The National Organ Transplant Act makes it a crime to “transfer any human organ for valuable consideration for use in human transplantation if the transfer affects interstate commerce.” *See* 42 U.S.C. § 274e(a) (2000).

⁸¹ *See* Rao, *supra* note 79, at 387 (“[I]f individuals own the bodies of the dead, it is only as quasi-property—a category that encompasses the right to possession and the right to exclude, but not the right to transfer to others.”).

⁸² *See id.* at 382–87.

⁸³ *See* RESTATEMENT (SECOND) OF TORTS § 868 (1979) (recognizing tort liability for “interference” with a corpse).

⁸⁴ *See id.* (“One who intentionally, recklessly or negligently removes, withholds, mutilates or operates upon the body of a dead person or prevents its proper interment or cremation is subject to liability to a member of the family of the deceased who is entitled to the disposition of the body.”); OFFICE OF TECH. ASSESSMENT, U.S. CONGRESS, GENETIC WITNESS: FORENSIC USES OF DNA TESTS 72–73 (1990), available at <http://www.wvs.princeton.edu/cgi-bin/byteserv.prl/~ota/disk2/1990/9021/902107.PDF>. (comparing property and tort law treatments of corpses).

ests.”⁸⁵ Because *Skinner* involved nonconsensual testing, the Court did not address whether the privacy interests would remain in the samples if government coercion were absent from their production.⁸⁶

One state court has discussed a version of this question, asking whether there is a privacy interest in human waste not obtained by coercion. In *Venner v. State*, a Maryland appellate court rejected the defendant’s claims that he possessed a reasonable expectation of privacy in his excrement, which the police had taken from his hospital room in order to remove balloons of hashish oil contained within it.⁸⁷ The court conceded that it was

not unknown for a person to exert a continuing right of ownership, dominion, or control . . . over such things as excrement, fluid waste, secretions, hair, fingernails, toenails, blood, and organs or other parts of the body, whether their separation from the body is intentional, accidental, or merely the result of normal body functions.⁸⁸

Nevertheless, citing “universal human custom and human experience,” the *Venner* court found that “such things are discarded—in a legal sense, abandoned—by the person from whom they emanate.”⁸⁹

Such analysis closely tracks the characterization of “abandoned DNA.” An important distinction between the human waste sought only as evidence of drugs, as in the *Venner* case, and waste obtained for genetic information lies in the sheer quantity of information that can be obtained. Custom may suggest that we intend to abandon human waste, but the assumption that we do so, and thus implicitly authorize DNA analysis on the same waste, is hardly a widely accepted part of our social experience.

4. *The Case for Genetic Exceptionalism.*—In the absence of appropriate analogues, abandoned DNA should be considered its own analytic category. The variety of doctrines applied to human tissue surely reflects profound ambiguity about legal conceptions of the body.⁹⁰ No less unset-

⁸⁵ 489 U.S. 602, 617 (1989). While the Court discussed the urine testing in terms of a search, it noted that taking the urine sample itself also could be viewed as a seizure. See *id.* at 617 n.4; see also *Vernonia Sch. Dist. 47J v. Acton*, 515 U.S. 646, 658 (1995) (noting that with required urine testing there are two privacy concerns: “the manner in which production of the urine sample is monitored” and “the information it discloses concerning the state of the subject’s body”); *Nat’l Treasury Employees Union v. Von Raab*, 489 U.S. 656, 671 (1989) (stating that requiring urine samples from certain classes of Treasury employees interferes “with individual liberty”).

⁸⁶ See also *Imwinkelried & Kaye*, *supra* note 8, at 439 (distinguishing abandoned DNA from urinalysis because the latter is “a much more extensive intrusion into privacy”).

⁸⁷ 354 A.2d 483 (Md. Ct. Spec. App. 1976).

⁸⁸ *Id.* at 498.

⁸⁹ *Id.* at 498–99; see also *United States v. Cox*, 428 F.2d 683, 687 (7th Cir. 1970) (“We conclude . . . that in this case, the ‘seizure’ did not occur when the hair was cut but when the Government preserved and appropriated the clippings which defendant had voluntarily abandoned.”).

⁹⁰ Disagreement over how to conceptualize the body transcends many disciplines. See, e.g., Caroline Bynum, *Why All the Fuss About the Body?: A Medievalist’s Perspective*, 22 *CRITICAL INQUIRY* 1, 5

tled is the characterization of DNA, and thus the status of DNA that is involuntarily separated from us on a continual basis. This conceptual muddiness has had practical consequences. Unable to look beyond the metaphor of involuntarily discarded DNA as trash, courts have created a means whereby the police may gather much more information than an ordinary interview or even a conventional search may yield, with none of the constitutional restrictions associated with them.

More importantly, genetic information is beyond analogy to the human tissue that contains it. It can be obtained without doing violence to the human body, and even the smallest penetration of the body will yield the entirety of a person's genetic information. A skin swab or blood test for DNA analysis is much less like a fingerprint, corpse, or a urine sample than it is, for instance, like a microchip containing an entire library's worth of information.⁹¹ Indeed, computer technology provides a more apt analogy to genetic information because there, too, the quantum of material has little to do with the quantity of information that may be retrieved.

IV. THE IMPLICATIONS OF ABANDONED DNA

The case for special consideration of abandoned DNA is made stronger when we consider the potential uses of this information. Although it has not yet been realized in practice, this particular DNA collection technique permits the collection of genetic information from virtually anyone;⁹² it is a backdoor to population-wide data banking. If criminal procedure law imposes virtually no restrictions over the collection of abandoned DNA, the police may collect it from anyone about whom they have only a vague suspicion, or none at all. While discretion is an inevitable aspect of police work, the risk of discriminatory treatment or harassment by the police surely increases when no legal justification for their actions is required.

Collection is only the first place where unbounded discretion presents a problem, for as anthropologist Pamela Sankar notes, "[o]nce DNA samples

(1995) ("[D]espite enthusiasm for the topic, discussions of the body are almost completely incommensurate—and often mutually incomprehensible—across the disciplines.").

⁹¹ In microelectronics, "Moore's law" holds that the number of transistors on a computer chip doubles about every two years, permitting ever greater amounts of information to be stored within smaller amounts of chip space. See Lee Gomes, *Cellphones Get Smarter as Flash Memory Gets Cheaper, Better*, WALL ST. J., Apr. 26, 2004, at B1; see also Kerr, *supra* note 13, at 302 ("Digital evidence alters the relationship between the size of the space to be searched and the amount of stored information inside it."); Eric Berger, *Library of Congress in Your Palm*, HOUSTON CHRON., Jan. 25, 2005, at 2 (reporting on a National Science Foundation grant to aid the development of a high density computer memory project that would permit storage of the "entire Library of Congress" on a Palm Pilot).

⁹² Currently, CODIS permits the banking of DNA profiles from persons who have been "convicted of crimes," "charged in an indictment or information with a crime," or "whose DNA samples are collected under applicable legal authorities." 42 U.S.C. § 14132(1) (2000). At first glance, this third category might appear to cover abandoned DNA collection, but given that the statute is explicit in excluding those who have been arrested but not charged and those who voluntarily submit DNA "solely for elimination purposes," abandoned DNA would arguably count among the excluded categories. See *id.*

exist, it is difficult to restrain their use."⁹³ Once the abandoned DNA is collected, what *should* happen to the sample? To what uses *could* the sample be put? The answer to the second question almost certainly will change as science evolves, but the answer to the first requires some law and policy decisions in an area already riddled with uncertainty.

First, once the police lawfully collect DNA for one investigation, the Fourth Amendment permits reanalysis of that sample for a wholly separate investigation.⁹⁴ At least one lower court has decided that any further DNA analysis on a tissue sample already obtained for investigating a separate crime does not constitute a search, even if the initial collection of the tissue implicated the defendant's Fourth Amendment rights.⁹⁵ Thus, assuming its collection is constitutionally proper, an abandoned DNA sample can be analyzed as many times as the police wish.

Second, the Fourth Amendment does not appear to restrict the initial collection of abandoned DNA for *any* reason. Current uses of abandoned DNA suggest that the police seek a suspect's DNA only to match it against DNA evidence found at a crime scene, but this limitation is generated by the police themselves. Little oversight exists regarding the intentional or accidental inclusion⁹⁶ of such DNA evidence into CODIS, regardless of

⁹³ Sankar, *supra* note 3, at 289.

⁹⁴ Because courts are not likely to deem the collection of abandoned DNA a Fourth Amendment search and seizure, the recent Supreme Court cases scrutinizing the programmatic purpose of suspicionless searches under "special needs" analysis are inapplicable here. The Court's most recent statements in this area include *Illinois v. Lidster*, 540 U.S. 419 (2004) (upholding a highway checkpoint designed to question citizens of a recent crime), *City of Indianapolis v. Edmond*, 531 U.S. 32 (2000) (invalidating a roadside checkpoint designed to discover illegal drug activity), and *Ferguson v. City of Charleston*, 532 U.S. 67 (2001) (invalidating a public hospital's nonconsensual drug testing of pregnant patients).

⁹⁵ See *People v. Baylor*, 118 Cal. Rptr. 2d 518, 521 (Ct. App. 2002) (observing that "there is no constitutional violation or infringement of privacy when the police in one case use a DNA profile, which was lawfully obtained in connection with another case"); *State v. Hauge*, 79 P.3d 131, 144 (Haw. 2003) (noting that "a number of jurisdictions have held . . . that once a blood sample and DNA profile is lawfully procured from a defendant, no privacy interest persists in either the sample or the profile"); *Patterson v. State*, 742 N.E.2d 4, 11 (Ind. Ct. App. 2000) (holding that while initial DNA sampling and analysis taken from defendant constituted a search, "the reuse of his validly obtained DNA sample in a subsequent unrelated criminal investigation did not trigger Fourth Amendment protections"); *Wilson v. State*, 752 A.2d 1250, 1272 (Md. Ct. Spec. App. 1999) ("Once an individual's fingerprints and/or his blood sample for DNA testing are in lawful police possession, that individual is no more immune from being caught by the DNA sample he leaves on the body of his rape victim than he is from being caught by the fingerprint he leaves on the window of the burglarized house or the steering wheel of the stolen car. . . . No new Fourth Amendment intrusion is involved.").

⁹⁶ Federal law itself restricts the use of DNA records contained within CODIS, but it is not obvious why such restrictions would apply to abandoned DNA, which is not addressed directly by the statute, nor by any of the state statutes. See 42 U.S.C. § 14132(b)(3) (limiting disclosure of DNA analysis to "law enforcement identification purposes," in "judicial proceedings," "for criminal defense purposes," and "for a population statistics database" on an anonymous basis). The American Society for Law, Medicine and Ethics publishes a valuable fifty-state survey of DNA database laws. See AXELRAD, *supra* note 11.

whether a positive match is made between the collected sample and existing forensic evidence.⁹⁷ Nor do state laws appear to address explicitly how police ought to treat these tissue samples and DNA profiles in relation to *state* databanks.⁹⁸

In sum, the Fourth Amendment fails to protect citizens from having their identities—including their sensitive genetic information—revealed through the collection and analysis of abandoned DNA. Under this analysis, “identification” proves to be an elastic concept. Courts often note, for instance, that convicted persons lose their legitimate expectations of privacy in their identity.⁹⁹ But what are the boundaries of “identity” in a world of genetic analysis? Of course, fingerprints themselves, by linking a biometric identifier to a name, provide a window into that person’s past, vis-à-vis her criminal history.¹⁰⁰ By linking a tissue sample to a criminal history and to personal medical information, a DNA profile looks both forwards and backwards in time.

Not only can DNA provide nearly unassailable evidence of identity, it may one day be used to identify and segregate those who possess a “crime gene.” The possibility of finding genetic causes for antisocial behavior is the most widely publicized research of “behavioral genetics.”¹⁰¹ (To explore that connection, the National Institutes of Health in 1992 funded a controversial conference to discuss the genetic basis of criminal behavior.)¹⁰² The discovery of a “crime gene”¹⁰³ could provide justifications for

⁹⁷ Rather than a single centralized source, CODIS is a three-tiered structure of information sharing. All profiles originate from local laboratories (“LDIS”). The states then collect this information for their state-wide databases (“SDIS”). As the highest level of this hierarchy, CODIS is the National DNA Index System (“NDIS”) and permits states participating in the CODIS program to compare samples at a national level. All fifty states, the federal government, Puerto Rico, and the U.S. Army participate at the national level. To aid in criminal investigation, CODIS has two indices: one containing DNA profiles of individuals, and the other containing unidentified DNA from crime scenes. See FBI, THE FBI’S COMBINED DNA INDEX SYSTEM PROGRAM (2000), available at <http://www.fbi.gov/hq/lab/codis/brochure.pdf>; *NDIS Participants*, FBI.GOV, Sept. 2005, <http://www.fbi.gov/hq/lab/codis/partstates.htm>.

⁹⁸ This relates to the larger problem of storing and controlling access to collected DNA samples. See *supra* note 75 and accompanying text.

⁹⁹ See, e.g., *United States v. Kincade*, 379 F.2d 813, 837 (9th Cir. 2004) (noting that once convicted of a felony an offender’s identity becomes a matter of “state interest”).

¹⁰⁰ It was once hoped that fingerprints would reveal as much as DNA does. In the late nineteenth century, Francis Galton studied fingerprints for hereditary details and hoped to use that information to foster a program of preventing marriages in order “to reverse the alleged degeneration of the English population.” See Sankar, *supra* note 3, at 274; see also Jonathan Kimmelman, *Risking Ethical Insolvency: A Survey of Trends in Criminal DNA Databanking*, 28 J.L. MED. & ETHICS 209, 209 (2000) (contending that properties of DNA “qualitatively distinguish DNA samples and profiles from fingerprints and militate against convenient analogies to fingerprints”).

¹⁰¹ Dorothy Nelkin, *Behavioral Genetics and Dismantling the Welfare State*, in BEHAVIORAL GENETICS: THE CLASH OF CULTURE AND BIOLOGY 156, 158 (Ronald A. Carson & Mark A. Rothstein eds., 1999).

¹⁰² Organizers cancelled the 1992 conference after public objections from African American community leaders, but it was reorganized successfully in 1995 at the University of Maryland as “The

preventive detentions or other means of social control for those identified as genetically predisposed to criminality.¹⁰⁴ Even if today an individual police officer or a department possesses "little incentive to probe areas of the genome that would determine characteristics not discernible to individuals acquainted with a suspect,"¹⁰⁵ more expansive DNA analysis would justifiably serve crime control purposes if science identifies markers for criminogenic behaviors,¹⁰⁶ such as high levels of aggression, or for mental illness.¹⁰⁷ For any of these diagnoses, only a single DNA sample would be required.

Overly deterministic explanations of criminality also could be used to bolster race-based genetic classifications. An emerging field in molecular genetics uses DNA information from groups, initially classified by race, to correlate multiple genetic differences among the groups and to test the groups' responsiveness to drug treatments.¹⁰⁸ In February 2005, the Per-

Meaning and Significance of Research on Genetics and Criminal Behavior." See Wade Roush, *Conflict Marks Crime Conference*, SCIENCE, Sept. 29, 1995, at 1808–09.

¹⁰³ See, e.g., Sally Lehrman, *Prisoners' DNA Database Ruled Unlawful*, NATURE, Aug. 27, 1998, at 818 (citing Massachusetts state senator James Jajuga for the suggestion that DNA databanks might "yield a 'criminal' DNA profile that could help predict which parolees or probationers were likely to commit further crimes, and identify how to use education, drug therapy or counseling as preventive measures").

¹⁰⁴ See Lori B. Andrews, *Predicting and Punishing Antisocial Acts: How the Criminal Justice System Might Use Behavioral Genetics*, in BEHAVIORAL GENETICS: THE CLASH OF CULTURE AND BIOLOGY, *supra* note 101, at 116, 117; see also Nelkin, *supra* note 101, at 160 ("Given the pressures of cost and time that currently plague the criminal justice system, genetic explanations of violent behavior conveniently fit with current ideologies about prison reform."). And, as Troy Duster has pointed out, the search for genetic explanations for differences in human behavior, such as intelligence and mental illness—a search reaching back to nineteenth-century eugenics arguments—can serve political and ideological interests. Genetic explanations hold the potential to identify (and stigmatize) a genetic "underclass." See generally TROY DUSTER, *BACKDOOR TO EUGENICS* (2003).

¹⁰⁵ Imwinkelried & Kaye, *supra* note 8, at 440. But see Kimmelman, *supra* note 100, at 212 (noting that the pool of banked criminal DNA "might also provide an epidemiological resource for behavioral geneticists to assess the frequency of a particular genetic allele among offender sub-populations" and that the program manager of the FBI's Federal Convicted Offender DNA Program has refused to rule out this possibility).

¹⁰⁶ The prospect of linking DNA to criminal behavior is no different from the early twentieth-century hope, however surprising to a contemporary audience, that fingerprints would indicate the same information. In his history of fingerprinting, Simon Cole observes that all criminal identification techniques, in order to become widely accepted, must at least "gesture" toward three claims: (1) that they can identify an individual criminal ("forensic identification"); (2) that they can help create a criminal record of recidivism ("archival identification"); and (3) that they can yield clues that would someday eradicate criminality itself by revealing the biological predisposition to crime ("diagnostic identification"). See COLE, *supra* note 54, at 305. DNA analysis, like fingerprinting, offers such promises.

¹⁰⁷ More than a decade ago, the Congressional Office of Technology Assessment, an agency tasked with providing Congress with analyses on scientific and technological issues, raised this very concern. One report warned that "the possibility exists to test DNA acquired specifically for identification purposes for disease information in a database" and that "[t]his option may become more attractive over time, especially as the number and types of probes for genetic disorders increase." See OFFICE OF TECH. ASSESSMENT, *supra* note 84, at 132.

¹⁰⁸ See Lila Guterman, *Scientists Reveal Map of Human Genetic Variation and Warn That It Does Not Reflect Racial Differences*, CHRON. OF HIGHER ED., Feb. 18, 2005, available at

legen Company announced it had constructed such a genetic diversity map.¹⁰⁹ One troubling byproduct of this research, as sociologist Troy Duster argues, is the mistaken presumption that a genetic basis for race actually exists.¹¹⁰ The possibility of a racial genetic map renders it “not at all unreasonable” to expect a project proposing to identify race-based genetic variation among sex offenders or violent felons.¹¹¹ Such an ability would permit the criminal law not only to be reactive, but predictive, by identifying would-be offenders on the basis of their genetic make-up.

The rapidity of scientific research in this area makes prediction about what will be possible difficult.¹¹² The very idea of sequencing the human genome, for instance, was unthinkable a generation ago,¹¹³ but the recent completion of the Human Genome Project means that sequencing of an individual’s genome will be possible soon.¹¹⁴ After having retrieved your abandoned DNA, could the government sequence your genes?¹¹⁵ Technology, not the Fourth Amendment, provides the only obstacle.

<http://lists.paleopsych.org/pipermail/paleopsych/2005-April/002638.html>; *All Things Considered: Drafting a Genetic Map of Human Diversity* (NPR radio broadcast Feb. 17, 2005), available at <http://www.npr.org/templates/story/story.php?storyId=4503527>.

¹⁰⁹ See Guterman, *supra* note 108.

¹¹⁰ As Duster observes, racial groups are used by scientists as one category of variability for reasons of convenience because cell and tissue repositories categorize their own samples by race. Troy Duster, *Race and Reification in Science*, SCIENCE, Feb. 18, 2005, at 1050–51. Genetic variability, however, can be found between any two categories of groups. See Guterman, *supra* note 108. Guterman quotes Duster as saying, “If you took a group of people from the East Coast and the West Coast . . . you’d find differences You wouldn’t conclude there were genetic differences between the two coasts. But with race or ethnicity, people are preprogrammed at a cognitive level to think in terms of these genetic categories.” *Id.*

¹¹¹ See Duster, *supra* note 110, at 1051.

¹¹² Scientific limitations preclude the possibility, however, of using abandoned DNA for human cloning, ethical considerations aside. While abandoned DNA samples are usually sufficient for forensic DNA analysis, cloning requires undamaged cellular nuclei, which are usually not present in shed saliva or other similar tissue. See Telephone Interview with Dr. Carl Schmid, Professor of Chemistry and Molecular Cell Biology, Univ. of Cal., Davis (Jan. 26, 2005) (notes on file with author).

¹¹³ See *id.*

¹¹⁴ Completed in 2003, the Human Genome Project was an international effort to determine the sequence of the base pairs making up human DNA and to identify the approximately 35,000 genes in human DNA. For further information on the Human Genome Project, see ORNL.org, Human Genome Project Information, http://www.ornl.gov/sci/techresources/Human_Genome/home.shtml (last visited Nov. 28, 2005).

¹¹⁵ Because they are not “state actors,” private individuals are not restricted by the Fourth Amendment. But should we restrict them by other means? To demonstrate what they see as the futility of protection against private action, Kaye and Smith ask: “If I am struck by an automobile on a public street and bleed on the crosswalk, then does that mean that I can prevent everyone else from taking a few drops or demand that the blood be returned by the street sweeper who wipes it up?” See Kaye & Smith, *supra* note 12, at 436.

The example is not as absurd as Kaye and Smith suggest. With the increased availability of cheap surveillance technology such as cell phone cameras, a “democratization of surveillance” has arisen. One response by the federal government has been to pass the 2004 Video Voyeurism Prevention Act, which criminalizes taking photographs of “a private area of an individual, without their consent, and knowingly

If such projection sounds like an Orwellian fantasy, historical experience has proven how "function creep" has altered and expanded the uses of other identification practices. The Social Security number is the most prominent example of an identifier now used for purposes not originally intended.¹¹⁶ Although originally meant solely to track the contributions of working Americans in order to calculate retirement benefits, the Social Security number today is a de facto substitute for a national identity card.¹¹⁷ Even fingerprinting, the dominant method of criminal identification in the twentieth century, was originally intended as a system of recordkeeping for civil, not criminal, purposes.¹¹⁸

DNA collection already has experienced its own function creep. When the U.S. military began collecting mandatory DNA samples from soldiers in 1992, the Department of Defense announced that the use of the samples would be restricted to the identification of dead or injured soldiers.¹¹⁹ By 1996, proposals had already been made to extend the use of these samples for medical research.¹²⁰ Today all DNA samples collected from the military are included in CODIS.¹²¹

Finally, while there may be little public objection to the inclusion of convicted offenders and other "suspect" classes for DNA data banking, the public may feel quite differently when it is *their* DNA that is subject to systematic collection.¹²² Reports of pervasive resistance to the most recent

[doing] so under circumstances in which the individual has a reasonable expectation of privacy." Video Voyeurism Prevention Act of 2004, Pub. L. No. 108-495, 118 Stat. 3999, 3999 (2004) (codified at 18 U.S.C. § 1801 (Supp. 2005))The Act applies in "circumstances in which a reasonable person would believe that a private area of the individual would not be visible to the public, regardless of whether that person is in a public or private place." *Id.* at 3999-4000; *Move Over, Big Brother*, *ECONOMIST*, Dec. 4, 2004, at 31 (describing "democratization of surveillance" as a "mixed blessing"). Thus, while few Americans would think it intrusive to take pictures of faces on public streets, there has been sufficient outcry over photography of highly personal areas of body, even in nominally "public" spaces, such that new legislation has been passed. That someone might collect abandoned DNA for their own purposes raises similar concerns.

¹¹⁶ See David A. Petti, *An Argument for the Implementation of a Biometric Authentication System*, 80 J. PAT. & TRADEMARK SOC'Y 703, 726-27 (1998) (describing expanding uses of Social Security numbers).

¹¹⁷ See OFFICE OF TECH. ASSESSMENT, *supra* note 84, at 115 (describing the Social Security number as "de facto national identifier," although its current uses "were certainly not anticipated when the social security system was devised").

¹¹⁸ The idea of fingerprinting as a system of recordkeeping can be attributed to two men working in two separate fields. In the 1850s, William Herschel proposed first handprints and then fingerprints as a method of recordkeeping over colonial subjects in British India. In 1880, Henry Faulds proposed to the journal *Nature* that fingerprinting might be used to identify criminals. Francis Galton later developed a system of classifying fingerprints, and it was adopted by the British in the early twentieth century over the Bertillonage system of bodily measurements. See COLE, *supra* note 54, at 60-96.

¹¹⁹ See Nelkin & Andrews, *supra* note 2, at 691.

¹²⁰ See Sankar, *supra* note 3, at 287-88.

¹²¹ See *supra* note 97.

¹²² Compare Question USYANKP.98015Q22A, Roper Center for Public Opinion Research (1998) (reporting that sixty-six percent of respondents answered "yes" to the question, "Do you think the police

census questionnaire and to proposals for national identification cards after the September, 11, 2001 terrorist attacks, for example, suggest widely felt concerns about the government's collection of personal information from ordinary citizens.¹²³

Even if public resistance exists towards the practice, the police now need no legal justification to collect abandoned DNA. True, the police have not gone so far as to propose, for instance, that we tattoo¹²⁴ persons identified as carrying a "criminality" gene. And true, a population-wide database is yet only a topic of policy debates. But it would be unwise to wait until the harms of technological innovation are actually visited upon us to consider the appropriate responses when the legal means to do so exist now.

V. RESTRICTING COVERT INVOLUNTARY SAMPLING

Given the considerations outlined above,¹²⁵ greater restrictions than exist now on the collection of abandoned DNA are advisable. If courts have been comfortable in rejecting challenges to mass DNA collection because its targets are convicts or parolees, abandoned DNA removes the distinction between offenders and the general public. In deciding such a legal challenge, it is possible that a court may yet find that collecting abandoned

should or should not be allowed to collect DNA information from suspected criminals—similar to how they take fingerprints?"), with Question USYANKP.98015Q21, Roper Center for Public Opinion Research (1998) (reporting that ninety-five percent of respondents answered "no" to the question, "Do you think employers should or should not be able to obtain access to employees' genetic record, or DNA, without their permission?"), and Question USYANKP.98015Q20, Roper Center for Public Opinion Research (1998) (reporting that ninety-four percent answered "no" to the question, "Do you think insurance companies should or should not be able to obtain access to a person's genetic record, or DNA, without his or her permission?"). One distinction that might be drawn in these responses is that respondents change their opinions based upon who asks for the information, i.e., government or private employers. Another inference that might be drawn here, however, is the distinction the public might make between themselves and those they believe have forfeited certain rights to privacy.

¹²³ See Kimmelman, *supra* note 100, at 216 (drawing comparison between DNA privacy concerns and those related to census); see also Steven A. Holmes, *Returns of Long Census Forms Lag: Bureau Cites Privacy Fears*, N.Y. TIMES, Apr. 15, 2000, at A18 (noting "concern among census officials" that privacy worries would lead to refusals to complete census forms); Haya El Nasser, *Census Shaken by Grumbling*, USA TODAY, Apr. 10, 2000, at A4 (noting widespread privacy concerns regarding 2000 Census fifty-three-question "long form" survey).

¹²⁴ Public identification of genetic disorders is not itself farfetched. In a 1968 law review article, Nobel Prize winning scientist Linus Pauling suggested this application for those carrying the gene for phenylketonuria, an inherited disease that results in severe mental retardation:

Should not all young people be tested [for this gene]? . . . The test . . . is an extremely simple one, involving only one drop of blood. . . . I have suggested that *there should be tattooed on the forehead* of every young person a symbol showing possession of the sickle-cell gene or whatever other similar gene, such as the gene for phenylketonuria, that he has been found to possess in a single dose. . . . It is my opinion that legislation along this line, compulsory testing for defective genes before marriage, and some form of public or semi-public display of this possession, should be adopted.

Linus Pauling, *Reflections on the New Biology: Foreward*, 15 UCLA L. REV. 267, 269 (1968) (emphasis added).

¹²⁵ See discussion *supra* Part IV.

DNA is a Fourth Amendment search, and thus require either a warrant or at least some degree of Fourth Amendment scrutiny. Such an outcome seems unlikely, though, given the current state of Fourth Amendment jurisprudence.¹²⁶ If greater protection is to be accorded to abandoned DNA, it is unlikely to arise from Fourth Amendment law.¹²⁷

Instead, legislatures can offer flexibility and greater protection where judicial interpretation of the Fourth Amendment falls short.¹²⁸ The most obvious limit might be to require, in the absence of consent, a warrant whenever police seek abandoned DNA from a targeted person.¹²⁹ This burdens the police no more than in cases where they must seek a DNA sample directly from a suspect by means of blood or saliva, but does provide, at a minimum, notice to a suspect that he is a target. An even more modest but still desirable regulatory improvement would be for legislatures to clarify the applicability of DNA database laws, both federal and state, to the collection of abandoned DNA.¹³⁰ Because the law has been ambiguous on this point, greater restrictions on the access to and retention of *all* DNA samples (as opposed to merely their profiles) must be addressed. Finally, if a legislature decides that a population-wide databank is desirable for criminal justice purposes, we still must pay careful attention to privacy protections. Such protections should not only restrict the access of private insurers and employers to this data but should also restrict the government itself. While DNA evidence has an important role in police investigation, its use in criminal prediction should be prohibited until the underlying scientific bases and ethical issues are fully resolved.

Recognizing the need to address these issues, residents of the Australian state of Victoria have called for laws banning "covert DNA sampling" by Victoria police, who admitted to using the same tactics that have been described here to confirm or eliminate suspects in their investigations.¹³¹

¹²⁶ See discussion *supra* Part III.A.

¹²⁷ See Kaye & Smith, *supra* note 12, at 437 ("[U]nder existing doctrine, the Fourth Amendment is quite porous to determined efforts by police to acquire the DNA of specific individuals and of large classes of individuals."). The Court itself has shown some concern about the "power of technology to shrink the realm of guaranteed privacy." See *Kyllo v. United States*, 533 U.S. 27, 33–34 (2001).

¹²⁸ Indeed, in a thoughtful article about the legal characterizations of body parts and tissue from a British perspective, Jean McHale urges that "the legal regulation of bodily products is a matter which should *not* be left for resolution to *ad hoc* judicial determination." See Jean McHale, *Waste, Ownership and Bodily Products*, 8 HEALTH CARE ANALYSIS 123, 133 (2000) (emphasis added).

¹²⁹ Kerr notes that in the realm of computer crime, Congress now places greater statutory restrictions on police efforts to obtain customer information from Internet service providers than what is called for under the Fourth and Fifth Amendments. See Kerr, *supra* note 13, at 309–10.

¹³⁰ For all kinds of DNA samples, genetic privacy would be further protected by use restrictions that are spelled out before the actual seizure of the sample itself. Cf. Krent, *supra* note 25, at 77–93 (arguing for such Fourth Amendment use restrictions even where the initial search and seizure is reasonable).

¹³¹ Patrick Murphy, *Call for Ban on Covert DNA Sampling*, AUSTRALIAN, Nov. 23, 2004, at 6, available at 2004 WL 98613968. Some police departments outside of Victoria are using the technique as well. See Evelyn Yamine, *How a Hand-Rolled Cigarette Led Police to a Murder Charge*, DAILY

Using the “everyday items found in the home,” Victoria police would obtain DNA from “coffee cups, cigarettes and clothing.”¹³² A DNA match found as a result of such sampling would prompt Victoria police to file a formal application to obtain a sample.¹³³ Police officials conceded that no protocols existed to regulate the collection, storage, or accidental inclusion of these DNA samples into the national DNA databank.¹³⁴ In response to public outcry by legal and privacy advocates, Victoria’s attorney general has recently promised to examine the “legal loophole” and to review the lack of safeguards on the practice.¹³⁵

The Australian example suggests how the debate might be changed by a simple change of terminology. Given all that is associated with “abandonment”—i.e., an intent to abandon, a surrender of all reasonable expectations of privacy—this investigative technique ought to be renamed “covert involuntary DNA sampling.” In the field of Internet law, commentators have suggested that the label of cyberspace as a “place” has led to disastrous public policy consequences.¹³⁶ Likewise, in the collection of DNA evidence, our labeling and framing of the issue matters. Using the phrase “covert involuntary sampling” eliminates the implied volition that is absent when DNA is collected after it has been shed with a person’s knowledge or consent.

VI. CONCLUSION

The collection of abandoned DNA by police threatens the privacy rights of everyone. The law permits it, and the police seek it. Advances in molecular genetics will permit ever greater exploitation of that personal information once it is acquired.

First, while Fourth Amendment law may not appear to protect a privacy interest in the human tissue left behind as the detritus of our daily lives, it is far from obvious that people do not harbor a privacy expectation

TELEGRAPH (Sydney, N.S.W., Austl.), Sept. 24, 2004, at 15, *available at* WL 93516026 (describing police collection of suspect’s cigarette butt that matched sample at murder scene).

¹³² See Australian Associated Press, *Police Are Secretly Taking DNA Samples*, AAP NEWS, Nov. 22, 2004, *available at* 2004 WL 99745156.

¹³³ See Murphy, *supra* note 131.

¹³⁴ See, e.g., Tanya Giles, *Secret DNA Tests: Innocent People’s Samples Collected*, HERALD-SUN (Melbourne, Vict., Austl.), Nov. 22, 2004, at 3, *available at* 2004 WL 100154163 (noting police concession that no protocols existed for covert DNA collection); Tanya Giles, *Tighter DNA Laws*, HERALD-SUN (Melbourne, Vict., Austl.), Nov. 23, 2004, at 14, *available at* 2004 WLNR 12090697 [hereinafter Giles, *Tighter DNA Laws*] (noting that there are no regulations to prevent samples from “being mistakenly registered on the DNA database for criminals”).

¹³⁵ See Tanya Giles, *Tighter DNA Laws*, *supra* note 134.

¹³⁶ See, e.g., Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 CAL. L. REV. 439, 519 (2003) (suggesting that “[w]e may already be past the point where we can do anything about” the cyberspace as place metaphor); Mark Lemley, *Place and Cyberspace*, 91 CAL. L. REV. 521, 542 (2003) (observing that cyberspace as place metaphor “will serve its purpose only if we understand its limitations”).

in genetic information that "society is prepared to recognize as reasonable."¹³⁷ While it may be difficult to sympathize with the offenders who are convicted as a result of their shed saliva, few of us would characterize our own genetic information as lacking any protection in these circumstances.

Second, there may be no helpful comparisons between abandoned DNA and the way in which body parts and bodies are treated. Given the kind of personal information that may be extracted from even a very small sample containing DNA, there are real limitations to comparing abandoned DNA to fingerprints, body parts, and human waste. As a result, courts and legislatures should consider abandoned DNA in a separate category of "genetic exceptionalism" or should look outside the Fourth Amendment context altogether for more perfect analogues.

Third, even if the collection of abandoned DNA were folded into the guidelines used for the banking of DNA from those convicted or arrested, more scrutiny is needed here about how the abandoned DNA can be used. There remain many questions about the potential uses of abandoned DNA (and other bankable DNA) that cannot be easily allayed with the claim that only "junk" DNA is retained for identification purposes. While legislatures have been swift in enacting collection statutes, they have been much less clear and responsive to concerns regarding the longer-term handling, storage, and use of samples and records.

It may be that we are already moving toward a system in which the government will have access to the genetic information of everyone in the population,¹³⁸ which will be used to solve crimes ranging from murders to littering.¹³⁹ If we want unrestricted government access to DNA information, however, that ought to be the subject of public debate rather than made possible through means such as analogizing DNA to trash.

Without meaningful consideration of abandoned DNA, we lose the ability to protect our genetic information. Those who wish to avoid becoming targeted by such techniques can resort to unconventional behavior, like that of the excrement-collecting testator in John Barth's novel *The Floating*

¹³⁷ *Katz v. United States*, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

¹³⁸ While most states began their DNA databanks by limiting sample collection to sex offenders, most have since expanded considerably the categories of applicable offenses and persons. For instance, the recent passage of Proposition 69 by California's voters will permit the collection of DNA, beginning in 2009, from any adult arrested for or charged with a felony. See CAL. PENAL CODE § 296(a)(2) (West 2005). Moreover, Fourth Amendment analysis presents no obvious bar to the use of the nearly 300 million DNA samples sitting in tissue repositories. See Kaye & Smith, *supra* note 12, at 436–37. Future developments will only make DNA-based identification easier. Australian scientists already have patented a document that stores DNA in a sealed packet: one step towards the concept of using DNA swipes instead of signatures to verify one's identity. See Stephen Cauchi, *Saliva, Blood and Skin to Seal Deal for Kith and Kin*, THE AGE, June 1, 2004, at A3, available at 2004 WL 81235050.

¹³⁹ DNA testing for minor crimes has already begun. In the British county of Yorkshire, South Yorkshire police have issued bus drivers DNA swab kits so that passengers who spit on them may be prosecuted successfully. See *Bus Drivers Get DNA Swab Kits to Catch Assailants Who Spit*, YORKSHIRE POST, Jan. 21, 2005, at 8, available at 2005 WL 62376150.

Opera, or of the legendary eccentricities of the elderly Howard Hughes.¹⁴⁰ Most will not find such behavior palatable.¹⁴¹

The real objections here are not to the use of DNA data banking itself. As social theorist David Garland observes, surveillance technologies are an essential part of modern societies that require some means of data gathering.¹⁴² One day DNA identification for the entire population may indeed be as ordinary as the Social Security number, or as mundane as a t-shirt slogan.¹⁴³ The problem that abandoned DNA raises so acutely, however, is that the means by which total population DNA data banking might be achieved have arrived without general public awareness and thus without discussion of how it may be regulated against abuse.

¹⁴⁰ See JOHN BARTH, *THE FLOATING OPERA* 87 (1967); MICHAEL DROSIN, *CITIZEN HUGHES* 46 (1985) (“[Hughes] urinated into a wide-necked mason jar, insisting that the filled jars be kept and stored in his bedroom closet.”).

¹⁴¹ Some enterprising criminals have tried, however, to outsmart the science. See, e.g., Shawn Pogatchnik, *Belfast Gang Posed as Police to Rob Millions from Bank*, PHILA. ENQUIRER, Dec. 23, 2004, at A17 (reporting that bank robbers burned getaway car “to destroy DNA and other forensic traces”); Richard Willing, *Criminals Try to Outwit DNA*, USA TODAY, Aug. 28, 2000, at A1 (noting the increasing “sinister creativity” of criminals and reporting instances of criminals wearing masks, gloves, condoms, and plastic-covered shoes).

¹⁴² See David Garland, *Panopticon Days: Surveillance and Society*, 20 CRIM. JUST. MATTERS 3 (1995).

¹⁴³ One company offers the opportunity to have your DNA analyzed and to print its “snapshot” on t-shirts and mugs. See Joe Holleman, *Want Your DNA Encoded on a Starbucks Mug?*, ST. LOUIS POST-DISPATCH, Mar. 16, 2004, at E1.