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ARTICLE

NOVEL FEATURES OF CONSIDERABLE BIOLOGIC INTEREST<sup>†</sup>  
THE FOURTH AMENDMENT AND THE ADMISSIBILITY OF  
ABANDONED DNA EVIDENCE<sup>††</sup>

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<sup>†</sup> James D. Watson & Francis H. Crick, *Molecular Structures of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid*, 171 NATURE 737 (1953) (“We wish to discuss a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biologic interest.”).

<sup>††</sup> This article may be cited as <http://www.stlr.org/cite.cgi?volume=20&article=holland.pdf>. This work is made available under the Creative Commons Attribution–Non-Commercial–No Derivative Works 3.0 License.

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*DNA has become a fixture of modern society, so much so that much of the recent debate on the so-called “CSI effect” was actually a debate on the extent to which the general public has come to expect that DNA will play a role in even the most routine criminal cases. Expectations notwithstanding, DNA is unarguably a powerful forensic tool, one that almost seems to beg for its own set of rules—a “genetic exceptionalism” perhaps. In no area is this more debated than in the realm of “abandoned DNA,” i.e., DNA that is abandoned in the course of everyday activities, often unconsciously and unwittingly. Abandoned DNA, like abandoned property generally, falls outside of the protection of the Fourth Amendment by virtue of having been abandoned, and it may be collected by law enforcement without the benefit of a warrant. Many scholars argue that abandoned DNA is particularly in need of an exception that would bring it within the Fourth Amendment’s protection rather than to exclude it like other abandoned property, but there is no ready legal analogue for such action, and we should be wary of crafting one. Abandoned DNA, as its name implies, has its legal roots deep in the soil of abandoned property, and the existing body of abandoned-property law provides a workable framework with which to analyze DNA issues. In this regard, abandoned DNA differs very little from other unconsciously and unwittingly abandoned human markers, such as fingerprints. To adopt an exception whereby abandoned DNA is given Fourth Amendment protection leads logically to an unworkable end state. If protection is sought for DNA privacy, it needs to come through statute rather than shoehorning it in under the Fourth Amendment.*

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*He said, “Kid, we found your name on an envelope at the bottom of a half a ton of garbage, and just wanted to know if you had any information about it.”*

*I said, “Yes, sir, Officer Obie, I cannot tell a lie, I put that envelope under that garbage.”*

Arlo Guthrie, *Alice’s Restaurant Massacre*<sup>1</sup>

## I. INTRODUCTION

In the early morning hours of June 21, 1957, two agents of the Federal Bureau of Investigation (“FBI”) entered the Hotel Latham in New York City and knocked on the door of Willie A. Fisher, part-time photographer and would-be artist.<sup>2</sup> When Mr. Fisher answered the door, the agents, without the benefit of either arrest or search warrants, pushed their way into his room, and there, convinced that Mr. Fisher was harboring a dark secret,<sup>3</sup> questioned him for almost half an hour before giving up. Rather than leaving the apartment in frustration, however, the men called to agents of the Immigration and Naturalization Service (“INS”), who were waiting patiently in a room next door and arrested Mr. Fisher under an administrative warrant for suspicion of violating the McCarran-Walter Immigration

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1. ARLO GUTHRIE, *Alice’s Restaurant Massacre*, on ALICE’S RESTAURANT (Warner Bros. 1967). For readers too young, or too old, to remember the 1960s, Guthrie’s *Massacre* is an 18 minute, 34 second-long shaggy-dog song that describes his 1965 arrest for littering and how it led to him being rejected for the Vietnam War draft. The key piece of evidence was a discarded envelope with an address that was traced back to Guthrie. I hope the relevance of the reference will become clear by the end.

2. Background details are taken from *Abel v. United States*, 362 U.S. 217 (1960). *See also* *United States v. Abel*, 258 F.2d 485 (2d Cir. 1958). Fisher had rented the room under the alias of Martin Collins.

3. He clearly harbored no secrets on his person. The FBI agents reported that Mr. Fisher (aka Rudolf Abel) was nude when he opened the door. Probably for their own comfort as much as his, the agents allowed him to put on some undershorts and sit on the edge of his bed while they questioned him.

and Nationality Act. Mr. Fisher was allowed to pack most of his belongings into several suitcases, under the watchful eye of what by then had grown to be seven federal agents, but ultimately, left some of his things in the room – including a few items placed on the windowsill and in a trash basket.

As they left the Hotel Latham with Mr. Fisher in handcuffs, the INS agents arranged for him to settle his account and turn in his key on the very good assumption that he would not be returning. This assumption would prove as pivotal as it was prescient, for as soon as Mr. Fisher was out of the door, the FBI agents obtained the permission of the hotel manager to search Mr. Fisher's room on the grounds that it had technically been vacated. Their ensuing search yielded a pencil and a block of wood covered with sandpaper (ostensibly used to sharpen an artist's pencil).

Willie Fisher, whose more notorious alias, Rudolf Abel,<sup>4</sup> would soon become a 72-point banner headline on almost every newspaper in the country, was subsequently convicted of espionage against the United States. Key among the evidence used at his trial were the pencil and wood block, both of which had been hollowed out and contained microfilm and a cryptology cipher pad.

Abel appealed his conviction, arguing that not only was his administrative arrest by INS agents a mere pretext for a warrantless arrest by the FBI, but moreover, that the improper arrest meant that the material evidence used against him at trial had been improperly seized. Failing to carry either argument before the Second Circuit,<sup>5</sup> Abel persuaded the United States Supreme Court to grant certiorari.

On March 28, 1960, a 5-4 majority of the Court closed the door on the matter of the evidence, holding that the pencil and wood block were admissible despite their seizure without a lawful warrant. Justice Frankfurter, writing for the majority, took note of the fact that Abel had paid his bill and checked out of the hotel, concluding therefore that he had “abandoned these articles. He had thrown them away. So far as [Abel] was concerned, they were *bona*

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4. Fisher was born William (Willie) August Fisher. He adopted a number of aliases, among them Emil Goldfus, Martin Collins, and most notoriously, Colonel Rudolf Ivanovich Abel, a name borrowed from a deceased acquaintance from Russia. He later admitted that he told FBI agents that his name was Abel knowing that newspaper stories reporting “Abel's” arrest would help alert the Soviet KGB of his capture. In February 1962, Abel was returned to the Soviet Union in exchange for the captured American U-2 pilot, Francis Gary Powers. See generally LOUISE BERNIKOW, ABEL (1970); VIN ARTHEY, ABEL: THE TRUE STORY OF THE SPY THEY SWAPPED FOR GARY POWERS (2015).

5. United States v. Abel, 258 F.2d 485, 492 (2d Cir. 1958).

*vacantia*.”<sup>6</sup> As such, “[t]here can be nothing unlawful in the Government’s appropriation of such abandoned property.”<sup>7</sup>

Sixty years later, the *Abel* case continues to cast a long shadow over the rules of evidence admissibility. The basic parameters set out by Justice Frankfurter have been applied to a variety of contexts without encountering significant legal roadblocks; however, there is one emerging area of evidence where the applicability of abandonment law is increasingly being called into question: abandoned DNA.<sup>8</sup>

DNA analysis is such a powerful forensic tool that it almost seems to beg for its own set of rules—what some have termed “genetic exceptionalism.” This Article argues to the contrary, at least as it relates to abandoned DNA and the protection provided by the Fourth Amendment. Not only does using the existing body of abandoned-property law provide a workable framework in which to analyze DNA issues, but to do otherwise leads logically to an unworkable end state. If protection is sought for DNA privacy, it needs to come through statute rather than by shoehorning it in under the Fourth Amendment.

Part of the difficulty in working through the issues posed by DNA is the reality that most lawyers and judges did not gravitate toward the legal profession because of an innate faculty for the hard sciences. Further complicating the matter is the relative infancy of the field, especially as it is applied to forensics. It is easy to forget, amid the popular hype of the *CSI* genre on television and the

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6. *Abel*, 362 U.S. at 241.

7. *Id.* In formulating its opinion, the Court reached back to the Prohibition-era case of *Hester v. United States*. In *Hester*, revenue agents were raiding a still when the bootleggers fled, throwing jugs of moonshine into an open field as they ran. Despite the jugs breaking when they hit the ground, the revenue agents were able to detect enough alcohol amid the fragments to make an arrest. In upholding the conviction, the Court noted that “there was no seizure in the sense of the law when the officers examined the contents of each [broken jug] after it had been abandoned.” Moreover, the agents had not entered into the Hester house, and “the special protection accorded by the Fourth Amendment to the people in their ‘persons, houses, papers, and effects,’ is not extended to the open fields.” *Hester v. United States*, 265 U.S. 57, 58-59 (1924).

8. The term “abandoned DNA” is used in this discussion to refer to DNA obtained from other items, such as cigarette butts and drinking cups, that have been obtained by law enforcement after the items have been “abandoned” by the previous possessor. The position taken in this discussion is that “abandoned DNA” remains the proper term despite cogent arguments by others, such as Elizabeth Joh, who has written on this topic extensively, that a more appropriate term might be “covert involuntary DNA sampling.” See Elizabeth Joh, *Reclaiming “Abandoned” DNA: The Fourth Amendment and Genetic Privacy*, 100 NW. U. L. REV. 857, 860 (2006).

ubiquity of forensics-related stories in the mass print media, that DNA's forensic lifespan has only been about thirty years, having been first employed in a criminal case in England in 1987<sup>9</sup> and in the United States the following year.<sup>10</sup> The real significance of this fact, given that judges are relatively older when they ascend to the bench, is that many of the cases which established much of the precedential case law—were decided by individuals who had, at best, limited exposure to DNA science in high school and college, let alone any advanced training. For example, Justice Kennedy, who wrote the majority opinion in the influential DNA case, *Maryland v. King*,<sup>11</sup> started undergraduate classes at Stanford University in 1954. This was only a year after Watson and Crick first theorized the structure of DNA in their 1953 article in *Nature*<sup>12</sup> and well before that discovery was fully integrated into science curricula. Moreover, he was sworn in as a Supreme Court justice only twenty-six days after Colin Pitchfork, the first man convicted of murder using DNA testing, was sentenced to life imprisonment in England.<sup>13</sup>

Even for those lawyers and judges who may have a more formal background in genetics and biochemistry, keeping abreast of developments in the science can be a problem. For example, from 2015 to 2016 alone, the *Journal of Forensic Sciences*<sup>14</sup> published over forty articles on developments and uses of DNA testing and analysis. Thus, the challenge of staying abreast of changes in the field can be daunting even for scientists who live and breathe it on a daily basis.

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9. See *R v. Pitchfork* [2009] EWCA (Crim) 963 [10-11], [2009] All ER 132 (appeal taken from Eng.). See also JOSEPH WAMBAUGH, *THE BLOODING: THE TRUE STORY OF THE NARBOROUGH VILLAGE MURDERS* (1990).

10. *Andrews v. State*, 533 So. 2d 841 (Fla. App. 1988). DNA actually saw first forensic use in the United States in 1986, when it was employed to sort out the origin of two autopsy samples at issue in the unreported case of *Pennsylvania v. Pestinikas*, 421 Pa. Super. 371 (1992). See KEVIN STROM & MATTHEW HICKMAN, *FORENSIC SCIENCE AND THE ADMINISTRATION OF JUSTICE* 203 (2015).

11. 569 U.S. 435 (2013).

12. Watson & Crick, *supra* note †, at 737.

13. WAMBAUGH, *supra* note 9. Pitchfork was arrested on September 19, 1987, and sentenced on January 22, 1988. Justice Kennedy was nominated by Ronald Reagan on November 11, 1987, and sworn in as a Supreme Court Justice on February 18, 1988. The juxtaposition of Justice Kennedy's career against the DNA timeline is not intended as a criticism of the Justice, but is intended to show what little exposure judges of that generation had to the foundational science behind the use of DNA in forensic situations.

14. The *Journal of Forensic Sciences* is by no means the primary journal for publishing DNA research but was selected for illustration because of its wide readership across forensic sub-disciplines.

DNA evidence is a complex area, with multiple overlapping zones of applicability and concern. This Article focuses on the admissibility of abandoned DNA evidence in a Fourth Amendment context and largely ignores the related, but distinct problems posed by coerced sampling and involuntary databasing<sup>15</sup> and by the use of familial DNA sampling, the latter having received renewed interest following the recent sensational arrest of a suspect in the Golden State Killer case.<sup>16</sup> The sections below focus on three links in an evidence chain: the abandonment of an object, e.g., a cigarette

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15. Coerced sampling occurs when a DNA sample is obtained against the individual's will through force or color of law and without the issuance of a warrant. It encompasses the related aspect of inclusion of the DNA data in a database without the consent of the individual. Coerced DNA sampling was at the heart of *Maryland v. King*. See 569 U.S. at 465 (holding that suspect's "expectations of privacy were not offended by the minor intrusion of a brief swab of his cheeks," and so did not defeat the "significant state interests in identifying" a suspect.)).

16. See, e.g., Frederick Bieber, Charles Brenner & David Lazer, *Finding Criminals Through DNA of their Relatives*, 312 SCIENCE 1315 (2006). As the name implies, familial DNA analysis involves using similarities in the DNA of an individual in a law enforcement DNA database to identify a related suspect whose DNA is not on file. Most recently the technique was used in the Golden State Killer case in California when an investigator for the Contra Costa County DA's office submitted a DNA sample from one of the crime scenes to the open-access GEDmatch database. The submission resulted in a suspect being identified. The police then followed the suspect and obtained additional DNA from the door handle of his car, which was parked at a Hobby Lobby outside Sacramento, and from a tissue paper deposited in the curbside trash can at his residence. DNA from these samples matched the DNA left by the perpetrator at several of the Golden State Killer's crime scenes, and the suspect was arrested and indicted. See Paige St. John Joseph Serna, Ruben Vives & Benjamin Oreskes, *DNA lifted from Golden State Killer suspect at Hobby Lobby parking lot key to cracking case, documents show*, L.A. TIMES (June 1, 2018), <https://www.latimes.com/local/lanow/la-me-ln-golden-state-killer-deangelo-warrant-20180601-story.html>. See also *Joseph James DeAngelo Search Warrant and Affidavit*, SACRAMENTO COUNTY DISTRICT ATTORNEY'S OFFICE (Apr. 24, 2018), [http://www.sacda.org/files/9415/2789/1272/P\\_v\\_DeAngelo\\_Redacted\\_Search\\_Warrant\\_Final.pdf](http://www.sacda.org/files/9415/2789/1272/P_v_DeAngelo_Redacted_Search_Warrant_Final.pdf). In another high-profile case, in 2010, L.A. police used a similar technique to arrest Lonnie Franklin, Jr., a serial killer known as the Grim Sleeper, who had terrorized the city in the 1980s. In 2010, Franklin's son was in jail for an unrelated weapons offense, and a search of the criminal database revealed that his DNA shared familiar similarities to DNA evidence found on some of the Grim Sleeper's murder victims. Based on that lead, police began following Lonnie Franklin and subsequently obtained a partially eaten pizza crust that Franklin had abandoned at a local restaurant. DNA from the pizza matched the evidence from the murders and Lonnie Franklin was arrested and convicted of ten counts of murder. See Marisa Gerber and James Queally, *The 'Grim Sleeper' is sentenced to death for a string of murders*, L.A. TIMES (Aug. 10, 2016), <http://www.latimes.com/local/lanow/la-me-grim-sleeper-sentencing-20160810-snap-story.html>.

butt; the “abandonment” of skin cells on that object; and the reasonableness of the privacy interest associated with the DNA contained in those skin cells. The discussion begins briefly with the concept of abandoned property and evidence, then moves to the rights attached to human tissue and bodily fluids. It is important to examine these precedential roots in order to understand that property law—despite the death knell that *Katz*<sup>17</sup> seemingly rang—is still important in Fourth Amendment analyses and is critical in understanding how we came to be perched on the limb where we now find ourselves. Then, the focus will shift to the more complex, and certainly most problematic question: given the vast amount of genetic data contained in skin cells and bodily fluids, how much privacy can be reasonably expected, and is there a need for genetic exceptionalism going forward? The argument presented here is that if greater protection of DNA privacy is desired, it will not be easily found in the Fourth Amendment.

## II. ABANDONED PROPERTY AND ABANDONED EVIDENCE

Legal pedigree is important, and abandoned DNA’s roots lie deep in the soil of abandoned-property law. At common law, individuals who abandon property retain no rights to that property, including Fourth Amendment protection. The concept of abandoned evidence, whether it is a hollowed-out pencil or a saliva-soaked cigarette butt, derives from these common law principles of abandoned property, making this the logical place to start the discussion.

### A. *The Beginning: The Common Law View of Abandoned Property*

Abandonment requires deliberate relinquishment of property. Roman law, from which much of English and American common law ultimately derives, required “the deliberate intention [on the part of the owner] that it shall no longer be his property, and of which, consequently, he immediately ceases to be owner.”<sup>18</sup> Absent such intent, involuntarily relinquished property would be characterized as simply lost or mislaid. To this requirement of intent to abandon

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17. *Katz v. United States*, 389 U.S. 347 (1967). As discussed *infra*, *Katz* often is viewed as severing the link between the Fourth Amendment and property law. *Id.* at 353 (“[T]he Fourth Amendment protects people—and not simply ‘areas’—against unreasonable searches and seizures.”).

18. Comment, *Lost, Mislaid, and Abandoned Property*, 8 FORDHAM L. REV. 222 (1939) (quoting Justinian, *Institutes* (Moyle’s 4th ed. 1906) 38; Tacitus, *Annales XVI*, 1-3).



property, early U.S. courts soon added a second element: an overt act manifesting the intent. In one of the earliest such examples, the Supreme Court of Errors of Connecticut in 1875, deciding a property dispute involving a cemetery, found that the town of Norfolk had not abandoned its property rights to the cemetery despite a vote by the town council that arguably did so. The Court observed that “to constitute an abandonment there must be an intention to abandon, and that intention must be accompanied by some act by which the [property] is actually abandoned.”<sup>19</sup> In this case, the council’s vote manifested only a conditional “willingness” to relinquish its claim to the cemetery, provided certain other conditions were met, rather than a definitive intent to relinquish. Thus, the vote did not constitute abandonment. Other decisions from the era followed the same logic.<sup>20</sup>

Abandonment law applies only to personal property. At common law, real property could not be abandoned because the feudal concept of seisin required that land be at all times owned, even if the owner was not immediately or widely known. Conversely, personal property could be relinquished freely,<sup>21</sup> but unlike real property, in which ownership automatically defaults to the next owner, abandoned personal property requires the subsequent assertion of a possessory right to establish ownership. Over time, two sometimes overlapping, sometimes exclusive, approaches to resolving lost and abandoned personal property have evolved. Although both approaches begin with the “rule in common

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19. *Stevens v. Norfolk*, 42 Conn. 377, 384 (1875).

20. For example, in *Livermore v. White*, an action of replevin involving hides unintentionally left behind when a tannery was sold, the Supreme Court of Maine held that the previous owner of the tannery had overlooked the hides and had not abandoned them. “Abandonment includes both the intention to abandon and the external act by which the intention is carried into effect.” 74 Me. 452, 455 (1883). *See also* *Lindblom v. Rocks*, 146 F. 660, 664 (9th Cir. 1906) (finding that a woman who left her belongings in Nome, Alaska, in 1899, intending to return the following spring, but who was delayed due to illness, did not intend to abandon her property, because “[a]bandonment consists in the intention to abandon and the external act by which the intention is carried into effect”); *Banks v. Banks*, 77 N.C. 186, 187 (1877) (holding that a soldier away at war had not abandoned his property, because “[t]o constitute an abandonment or renunciation of claim, there must be acts and conduct positive, unequivocal and inconsistent with his claim of title”).

21. Eduardo Penalver argues that the difference between real property and chattels is largely illusory. Because real property is at all times owned, material property must be “abandoned” on another’s real property. Such an abandonment is done either with the permission of the landowner, and thus forms a conveyance, or without the landowner’s permission, and thus is a trespass. *See* Eduardo Penalver, *The Illusory Right to Abandon*, 109 MICH. L. REV. 191 (2010).

law that property must belong to somebody,”<sup>22</sup> the implementation can lead to quite different results. The first approach, dating to 1722, is the concept that subsequent possessors of lost or mislaid property hold title superior to that of all but the rightful owner.<sup>23</sup> This principle sometimes has been termed the “law of finds” and commonly (and modernly) is applied to cases involving treasure or lost property of significant value, generally in a maritime context.<sup>24</sup> However, in the case of intentionally abandoned property—*res nullius*—where the original owner has relinquished rights of ownership and where no successor claims ownership, the doctrine of *bona vacantia* comes into play.<sup>25</sup> Under this doctrine, all property “which has no other owner” traditionally defaulted to the crown as sovereign.<sup>26</sup> Today, this common law doctrine is commonly used to deal with matters of intestacy.

This principle that “when a person divests himself of property, it becomes *res nullius* . . . [and] the one who first reduces it to his possession should [take title],”<sup>27</sup> is one that courts have found workable when ownership of the property is the only contested issue. Whatever errors may result from a common law claim of possession typically can be adequately redressed through traditional common

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22. *Illinois Bell Tel. Co. v. Slattery*, 102 F.2d 58, 68 (7th Cir. 1939) (quoting *Dyke v. Walford*, 13 Eng. Rep. 557, 571; 5 Moo. P.C.C. 434, 471 (1846)).

23. *Armory v. Delamirie* (1722) 93 Eng. Rep. 664; 1 Str. 505 (holding that “the finder of a jewel, though he does not by such finding acquire an absolute property or ownership, yet he has such a property as will enable him to keep it against all but the rightful owner, and consequently may maintain trover”). See also *Bridges v. Hawkesworth* (1851), 21 LJQB 75; 15 Jur. 1079.

24. See, e.g., *Treasure Salvors, Inc. v. Unidentified Wrecked & Abandoned Sailing Vessel*, 569 F.2d 330, 336-37 (5th Cir. 1978) (finding that “[u]nder this theory, title to abandoned property vests in the person who reduces that property to his or her possession.”). See also *Treasure Salvors, Inc. v. Unidentified Wrecked & Abandoned Sailing Vessel*, 640 F.2d 560, 571 (5th Cir. 1981) (“As a general rule, under the law of finds, a finder acquires title to lost or abandoned property by ‘occupancy’, i.e. by taking possession of the property and exercising dominion and control over it. It is well established that a finder does not acquire title merely on the strength of his discovery of lost or abandoned property.”).

25. *Bona Vacantia*, BLACK’S LAW DICTIONARY 161 (5th ed. 1979) (“Vacant goods; unclaimed property. Generally, personal property which escheats to state because no owner, heir or next of kin claims it. Now includes real as well as personal property and passes to state as an incident of sovereignty.”).

26. *Illinois Bell Tel. Co.*, 102 F.2d at 68 (quoting *Dyke v. Walford* (1846) 13 Eng. Rep. 557, 580; 5 Moo. P.C.C. 434, 496). Vestiges of the concept of sovereign-as-owner are still visible in U.S. law. See, e.g., 40 U.S.C. § 1309 (2012) (authorizing the Administrator of General Services to “make contracts and provisions for the preservation, sale, or collection of property, or the proceeds of property, which may have been wrecked, been abandoned, or become derelict”)

27. *Lost, Mislaid, and Abandoned Property*, *supra* note 18, at 236.

law remedies, such as trover, replevin, and detinue. But when the property at stake has evidentiary weight in a criminal matter, the stakes are much greater.

*B. The Logical Extension of Abandoned Property to Abandoned Evidence*

“Abandoned property is outside the scope of fourth amendment protection because its owner has forfeited any expectation of privacy in it.”<sup>28</sup> As such, abandonment is an *exemption from*, not an exception to, Fourth Amendment restraints on searches and seizures. When property is abandoned, by convention and precedent, the former owner relinquishes any possessory right in the object(s), and with it any reasonable expectation of privacy that might have formerly been recognized. Accordingly, the subsequent finder takes possession and may use the item subject to their ownership. When the subsequent finder is the state, the property may be used for evidentiary purposes.

In his opinion rejecting Rudolf Abel’s appeal to exclude the hollowed-out pencil, Justice Frankfurter specifically invoked the common law property doctrine of *bona vacantia*, clearly implying that Abel had abandoned any property rights to the items that he left in the wastebasket and on the windowsill when he checked out of the hotel.<sup>29</sup> As a consequence, lawful ownership passed to the

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28. *United States v. Thomas*, 451 F.3d 543, 545 (8th Cir. 2006). *See also* *United States v. Davis*, 624 F.3d 508, 510 (2d Cir. 2010) (quoting *United States v. Springer*, 946 F.2d 1012, 1017 (2d Cir. 1991) (“It is settled that a warrantless seizure of property that has been abandoned does not violate the Fourth Amendment.”); *United States v. Colbert*, 474 F.2d 174, 176 (5th Cir. 1973) (“[I]t is settled law that one has no standing to complain of a search or seizure of property he has voluntarily abandoned.”); *United States v. Martin*, 399 F.3d 750, 752 (6th Cir. 2005) (“[T]he fourth amendment does not apply to anything one may abandon while fleeing the police in an attempt to avoid a seizure.”); *United States v. Pitts*, 322 F.3d 449, 455 (7th Cir. 2003) (“Abandoned property is not subject to Fourth Amendment protection.”); *United States v. Nowak*, 825 F.3d 946, 948 (8th Cir. 2016) (“The Fourth Amendment is not implicated by a search of property that has been abandoned.”); *United States v. Easley*, 911 F.3d 1074, 1083 (10th Cir. 2018) (“The Fourth Amendment is not implicated when police search property that has been abandoned.”); *United States v. Witten*, 649 Fed. Appx. 880, 885 (11th Cir. 2016) (“No seizure of property exists under the Fourth Amendment when a person abandons property.”); *United States v. Hammock*, 860 F.2d 390, 392 (11th Cir. 1988) (“The significance of abandoned property in the law of search and seizure lies in the maxim that the protection of the fourth amendment does not extend to it.”); and *Parman v. United States*, 399 F.2d 559, 565 (D.C. Cir. 1968) (“No recent Supreme Court decision hints any curtailing of this rule, and we see no reason for treating a person who abandons property before the search any differently from a third party.”).

29. *Abel*, 362 U.S. at 241.

next entity asserting ownership, or absent that, to the U.S. government as sovereign. For *Abel*, the consequence of the Court's applying this principle of property law to an evidentiary matter was the imposition of a thirty-year sentence at the federal penitentiary in Atlanta, Georgia.

While *Abel* remains one of the seminal cases on the application of property law to abandoned evidence, contemporaneous and subsequent Supreme Court rulings have cautioned that Fourth Amendment issues involving evidence may require a subtler analysis. “[I]t is . . . ill-advised to import into the law surrounding the constitutional right to be free from unreasonable searches and seizures subtle distinctions, developed and refined by the common law in evolving the body of private property law . . . .”<sup>30</sup>

Common law remedies for property loss would appear to be wholly inadequate to address injury associated with a wrongful search and seizure under the Fourth Amendment. Precisely because the stakes are raised when seized property has evidentiary value, the Court has carved out of abandoned-property law a body of case law that specifically addresses abandoned evidence, which has unavoidably entangled property and privacy.<sup>31</sup> This case law, probably more by default than design, has been employed to deal with problems wrought by the emerging forensic science of DNA testing—but before getting there, we must first look inside some trash bags.

### 1. Billy Greenwood and his Curbside Trash

In the early morning hours of April 6, 1984, Billy Greenwood took his garbage to the curb. Unbeknownst to him at the time, an investigator for the Laguna Beach Police Department was watching the house and had already arranged with the garbage collector to obtain Greenwood's trash bags for inspection. In the trash, the investigator found evidence of drug trafficking that led to warrants for a home search and additional drugs being found. Both Greenwood and a companion, Dyanne Van Houten, were charged with felony drug possession.<sup>32</sup>

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30. *Jones v. United States*, 362 U.S. 257, 266 (1960).

31. *E.g.*, *United States v. Thomas*, 864 F.2d 843, 845 (D.C. Cir. 1989) (“The test for abandonment in the search and seizure context is distinct from the property law notion of abandonment,” and “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.”).

32. *See People v. Greenwood*, 227 Cal. Rptr. 539, 540 (Cal. Ct. App. 1986).

Greenwood's misfortune likely would have had no lasting impact on American jurisprudence had the judge presiding over his trial shared the Laguna Beach Police Department's enthusiasm for out-of-the-box thinking. Instead, the court found that Greenwood's reasonable expectation of privacy had been violated, suppressed the evidence seized during the search of the house as fruit of the poisonous tree, and dismissed the charges.<sup>33</sup> In reaching their conclusions, both the trial court and the California Court of Appeal, which affirmed the trial court, relied on an earlier California Supreme Court ruling<sup>34</sup> that had found a privacy interest in curbside trash.<sup>35</sup> The Supreme Court of California accordingly denied the State's petition for review, but the U.S. Supreme Court granted certiorari and reversed.<sup>36</sup>

Writing for a 6-2 majority,<sup>37</sup> Justice White specifically addressed the relationship between privacy and property. Building on the principle articulated in *Katz v. United States*,<sup>38</sup> the Court reasoned that "[t]he warrantless search and seizure of the garbage bags left at the curb outside the Greenwood house would violate the Fourth Amendment only if respondents manifested a subjective expectation of privacy in their garbage that society accepts as objectively reasonable."<sup>39</sup> But in this case, "having deposited their garbage 'in an area particularly suited for public inspection and, in a manner of speaking, public consumption, for the express purpose of having strangers take it,'" Greenwood and Van Houten "had no reasonable expectation of privacy in the inculpatory items that they discarded."<sup>40</sup>

In the *Greenwood* decision, one can see clearly how privacy and property are entangled. Privacy derives in part from property rights. The Fourth Amendment protects not only the person, but also the papers and "effects" of that person from unreasonable searches and

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33. *See id.*

34. *People v. Krivda*, 486 P.2d 1262, 1268 (Cal. 1971) (holding that because street-side trash is consigned to designated collectors, "[t]he placement of one's trash barrels onto the sidewalk for collection is not . . . necessarily an abandonment of one's trash to the police or general public").

35. *See Greenwood*, 227 Cal. Rptr. at 542 (citing *People v. Krivda*, 486 P.2d 1262 (Cal. 1971)) ("We are convinced neither the trial court nor this court may reexamine the rule in *Krivda* which declares warrantless trash searches illegal.")

36. *California v. Greenwood*, 486 U.S. 35 (1988).

37. Justices Brennan and Marshall dissented; Justice Kennedy took no part in the consideration of the case or in the decision.

38. 389 U.S. 347 (1967).

39. *Greenwood*, 486 U.S. at 39 (1988).

40. *Id.* at 40-41 (citation omitted) (quoting *United States v. Reichert*, 647 F.2d 397, 399 (3d Cir. 1981)).

seizures. And yet, to abandon property requires a subjective intent, while the concomitant relinquishment of any associated privacy expectation substitutes an objective test. In *Greenwood's* and *Van Houten's* cases, there is no doubt that they subjectively intended to abandon their garbage, and while they may have just as subjectively intended to retain a privacy interest in the contents of the trash bags, to the world (and to the police officer parked across the street) objectively observing their actions, they simultaneously abandoned any reasonable expectation of privacy in those items. In the language of the majority opinion “[i]t may well be that [Greenwood and Van Houten] did not expect that the contents of their garbage bags would become known to the police or other members of the public,” but their “expectation of privacy does not give rise to Fourth Amendment protection . . . unless society is prepared to accept that expectation as objectively reasonable.”<sup>41</sup> As to this second prong of the *Katz* analysis, the matter is settled: “We have already concluded that society as a whole possesses no such understanding [of privacy] with regard to garbage left for collection at the side of a public street.”<sup>42</sup>

It is perhaps unfortunate that Justice White did not specifically invoke the abandoned property language of *Hester* or *Abel* in his opinion instead of relying solely on the privacy language associated with *Katz*. To do so might have helped to further clarify the relationship between property and privacy. Perhaps he assumed that the use of words such as “trash,” “garbage,” and “discarded” was sufficiently synonymous with abandoned property so as to be self-explanatory in the context. In fact, for several decades prior to *Greenwood's* appeal, the lower courts had been developing a significant body of law that did what White did not, i.e., explicitly link the loss of privacy interests in curbside trash to the abandoned property doctrine. A closer reading of *Greenwood* makes clear that this body of law formed a significant, albeit largely unspoken, underpinning of the majority's reasoning: “Our conclusion that society would not accept as reasonable [Greenwood's and Van Houten's] claim to an expectation of privacy in trash left for collection in an area accessible to the public is reinforced by the unanimous rejection of similar claims by the Federal Courts of

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41. *Id.* at 39-40.

42. *Id.* at 43-44. In support of this conclusion, the Court cited numerous cases from the federal courts of appeals. *See id.* at 42 (“[T]he overwhelming weight of authority rejects the proposition that a reasonable expectation of privacy exists with respect to trash discarded outside the home and the curtilage [sic] thereof.” (quoting *United States v. Thornton*, 746 F.2d 39, 49 (1984))).

Appeals.”<sup>43</sup> White then cited antecedent appellate decisions, representing the breadth of the circuit system, in which publicly discarded trash was not afforded Fourth Amendment protection precisely because it had been abandoned, and with it, so was any objectively recognizable expectation of privacy by the former owners. Moreover, unlike the *Greenwood* opinion, the majority of the cases cited in support explicitly invoked traditional abandonment language.<sup>44</sup>

Trash sealed in plastic bags and left at the curbside now represents an easy Fourth Amendment privacy analysis in the abandoned property context. Other situations, where the putatively abandoned object is handled in a more ambiguous manner, require a closer examination.

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43. *Id.* at 41.

44. *See* United States v. Mustone, 469 F.2d 970, 972 (1st Cir. 1972) (“[W]hen [defendant] deposited the [trash] bags on the sidewalk he abandoned them. Implicit in the concept of abandonment is a renunciation of any ‘reasonable’ expectation of privacy in the property abandoned. The contrary suggestion strikes us as anomalous.”); United States v. Terry, 702 F.2d 299, 309 (2d Cir. 1983) (“In the absence of evidence indicating an intent by the former owner to retain some control over or interest in discarded trash, his placement of it for collection on a public sidewalk is inconsistent with the notion that he retains a privacy interest in it. His act is one of abandonment.”); United States v. Reichert, 647 F.2d 397, 399 (3d Cir. 1981) (“Every circuit considering the issue has concluded that no reasonable expectation of privacy exists once trash has been placed in a public area for collection. . . . The reasoning underlying these decisions is clear and persuasive. . . . ‘[T]he placing of trash in garbage cans at a time and place for anticipated collection by public employees for hauling to a public dump signifies abandonment.’” (citations omitted) (quoting United States v. Shelby, 573 F.2d 971, 973 (7th Cir. 1978))); United States v. Crowell, 586 F.2d 1020, 1025 (4th Cir. 1978) (“The act of placing [trash] for collection is an act of abandonment and what happens to it thereafter is not within the protection of the fourth amendment.”); United States v. Vahalik, 606 F.2d 99, 101 (5th Cir. 1979) (“We prefer the view adopted by every United States Court of Appeals to consider the issue, that the act of placing garbage for collection is an act of abandonment which terminates any fourth amendment protection . . . .” (footnote omitted)); Magda v. Benson, 536 F.2d 111, 112 (6th Cir. 1976) (per curiam) (affirming the trial judge’s decision as “supported by federal case law, which holds that garbage under such circumstances is abandoned and no longer protected by the Fourth Amendment”); and United States v. Dela Espriella, 781 F.2d 1432, 1437 (9th Cir. 1985) (“Warrantless searches of abandoned property do not violate the fourth amendment. The question, then, becomes whether placing garbage for collection constitutes abandonment of the property. We join the other federal appellate circuits that have considered the matter and hold that it does.”) (citations omitted).

## 2. Less obvious trash

*Greenwood* shifted the emphasis away from the subjective intent of an individual who abandons property to a more *Katz*-like analysis of whether there is an objectively recognized retention of privacy by that individual in the abandoned property. For explicitly abandoned property, such as trash, there is no such retention of privacy, and the analysis is straightforward. But this distinction can become difficult to discern in evidentiary situations where property is seized by others almost simultaneously upon its being discarded, and it can be particularly ambiguous in situations where individuals who, upon being confronted by police officers, make snap decisions to discard evidence so as not to be found with it, only to attempt immediately to reclaim it for the purpose of asserting a Fourth Amendment privacy right.<sup>45</sup> In these situations, where a person seemingly abandons an object only to later attempt to reclaim it, the court must judge the person's words and acts solely through the eyes of "a reasonable person possessing the same knowledge available to the government agents" and without regard to "whether the defendant harbors a [subjective] desire to later reclaim an item."<sup>46</sup>

For example, in *Rios v. United States*, a passenger in a taxi dropped a bag of drugs when approached by the police and then later attempted to reclaim possession for the purpose of invoking the Fourth Amendment. For Justice Stewart, writing for the 5-4 majority, "[a] passenger who lets a package drop to the floor of the taxicab in which he is riding can hardly be said to have 'abandoned' it. An occupied taxicab is not to be compared to an open field . . . or a vacated hotel room."<sup>47</sup>

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45. Judge Learned Hand was referring to just such a situation when he noted that "[m]en may wince at admitting that they were the owners, or in possession, of contraband property; may wish at once to secure the remedies of a possessor, and avoid the perils of the part; but equivocation will not serve. If they come as victims, they must take on that role, with enough detail to cast them without question. The petitioners at bar shrank from that predicament; but they were obliged to choose one horn of the dilemma." *Connolly v. Medalie*, 58 F.2d 629, 630 (2d Cir. 1932).

46. *United States v. Basinski*, 226 F.3d 829, 836 (7th Cir. 2000). *See also* *United States v. Tugwell*, 125 F.3d 600, 602 (8th Cir. 1997) (noting "[w]hether an abandonment has occurred is determined on the basis of the objective facts available to the investigating officers, not on the basis of the owner's subjective intent").

47. *Rios v. United States*, 364 U.S. 253, 262 n.6 (1960) (citations omitted). Justices Clark, Frankfurter, Harlan, and Whittaker dissented. The references to an open field and a vacated room clearly invoke *Hester* and *Abel*, respectively.



In *Smith v. Ohio*,<sup>48</sup> the Court further defined the parameters of objective abandonment. A suspect was approached by plainclothes officers, tossed a paper shopping bag he was carrying onto the hood of his car, and then, realizing the situation he had just created, attempted to keep the officers from inspecting it by holding his hands in front of the bag. Pushing the suspect's hands aside, the officers searched the bag, found drug paraphernalia, and made an arrest. At trial, the State of Ohio proffered a circular argument for the warrantless search on the grounds that the search was both probable cause for, and incident to, the arrest. Failing to convince the trial judge, the State then took a different tack on appeal. Citing both *Abel* and *Hester*,<sup>49</sup> the prosecutors maintained that Smith had abandoned the bag, a situation that would allow the police to seize it without a warrant. A per curiam opinion of the Court found no substance to the argument, holding that from an *objective* view, "a citizen who attempts to protect his private property from inspection, after throwing it [away] on a car to respond to a police officer's inquiry, clearly has not abandoned that property."<sup>50</sup>

Individuals often choose to discard property when confronted by police, but for it to be considered abandonment for Fourth Amendment purposes, the relinquishment must be voluntary. However in this area, there is no requirement that the police play fair in obtaining the substances—only that they remain within the confines of the law.

For example, in late 2000, police in Muskogee, Oklahoma, posted signs on Interstate 40 warning drivers of a drug checkpoint ahead. In fact, no such checkpoint had been established. However, it was enough to induce Mack Flynn to pull his car off the main highway long enough to toss out a bag containing methamphetamine, which the watchful police soon recovered. On appeal to the Tenth Circuit, Flynn asserted that the drug checkpoint was unconstitutional under the Fourth Amendment, and that he had been improperly induced into abandoning the drugs which were then seized. In affirming Flynn's conviction, the Court acknowledged that "[i]n order to be effective, abandonment must be voluntary [and it would be] considered involuntary if it results from a violation of the Fourth Amendment" or "as a consequence of [other] illegal police conduct"<sup>51</sup> But in this case, the police had not

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48. 494 U.S. 541 (1990).

49. *Hester v. United States*, 265 U.S. 57, 58-59 (1924).

50. *Smith*, 494 U.S. at 543-44.

51. *United States v. Flynn*, 309 F.3d 736, 738 (10th Cir. 2002). Flynn based his argument on the recently decided case, *Indianapolis v. Edmond*, 531 U.S. 32

actually established a checkpoint and had not violated the Fourth Amendment by way of their ruse. Thus, there was no improper inducement on the part of the authorities, and Flynn acted voluntarily when he abandoned the evidence.

Nor does the abandonment of the substance need to be a conscious act to be considered voluntary. Instead, voluntary abandonment may occur when a reasonable person should know that the abandonment of an object is a logical consequence of some other act. When his boat, the *Lady Barbara*, began taking on water in rough seas off the coast of Key West, Florida, Ted Edwards quite understandably radioed the U.S. Coast Guard and the Florida Marine Patrol for assistance. The Coast Guard was first to arrive and rescued Edwards. Consequently, when the Marine Patrol arrived shortly thereafter, they found the boat “abandoned,” except for some 30,000 pounds of marijuana. Responding to Edward’s motion to suppress the seized contraband, the Fifth Circuit showed little sympathy for the peril posed by a foundering ship, finding that Edwards “called for aid, accepted aid from the Coast Guard, and voluntarily abandoned the ‘Lady Barbara’ . . . [and therefore] may not claim that he had an expectation of privacy in the ship.”<sup>52</sup>

*Abel* and *Greenwood*, and the cases they influenced, establish that the concept of abandoned evidence thus combines the elements of common law property abandonment—intent to forego ownership combined with an act manifesting that intent—with the concept of objectively recognized privacy. Recast in Fourth Amendment terms, for evidence to be legitimately abandoned, the physical property, as well as the individual’s interest in that property, must be “voluntarily discarded, left behind, or otherwise relinquished . . . so that he could no longer retain a reasonable expectation of privacy with regard to it at the time of the search.”<sup>53</sup>

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(2000), which had found that police checkpoints established solely for the purpose of general crime control violate the Fourth Amendment.

52. *United States v. Edwards*, 644 F.2d 1, 2 (5th Cir. 1981).

53. *Id.* (quoting *United States v. Colbert*, 474 F.2d 174, 176 (5th Cir. 1973) (en banc)). *See also* *United States v. Hoey*, 983 F.2d 890, 892-93 (8th Cir. 1993) (noting that for Fourth Amendment purposes, abandonment is not evaluated “in the strict property right sense, but rather, whether the defendant in leaving the property has relinquished her reasonable expectation of privacy so that the search and seizure is valid”); *United States v. Diggs*, 649 F.2d 731, 735 (9th Cir. 1981) (citation omitted) (stating that “[t]he test in this circuit for determining whether property is abandoned is not whether all formal property rights have been relinquished, but whether the complaining party retains a reasonable expectation of privacy in the articles alleged to be abandoned”); *United States v. Jones*, 707 F.2d 1169, 1172 (10th Cir. 1983) (citation omitted) (noting that since *Abel*, the circuit courts have interpreted the interplay of the Fourth Amendment and

Abandoned evidence analysis is at times nuanced but is overall not a complex line of reasoning. However, before it can be applied to abandoned DNA evidence, it is necessary to understand how the courts have treated biological tissues within the context of property rights.

### III. PROPERTY AND PRIVACY RIGHTS IN HUMAN TISSUES AND FLUIDS

Losing a property right in something intentionally discarded is fairly easy to conceptualize; indeed, if it weren't, the personal shredder industry wouldn't be the multi-million-dollar business it is today.<sup>54</sup> Less well understood is what sorts of rights might, or might not, attach to microscopic skin cells stuck to the rim of a paper cup or swabbed from the elbow rest of an office chair.

#### A. *No Property Rights to Abandoned Bodily Cells and Fluids*

To understand abandoned DNA, it is important to first understand that, irrespective of evidentiary concerns, in the United States, there is no property right associated with bodily tissues once they are separated from the individual.<sup>55</sup> In the absence of a relevant U.S. Supreme Court holding on the property rights of human tissues, perhaps the most influential case in this regard is that of *Moore v. Regents of University of California*.<sup>56</sup> In 1976, John Moore

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property to mean “[w]hen individuals voluntarily abandon property, they forfeit any expectation of privacy in it that they might have had”).

54. It is perhaps not surprising that personal paper shredders began gaining in popularity in the years following the Supreme Court's *Greenwood* ruling. See Mickey Meece, *Many Buying Home Shredders to Thwart Garbage Snoops*, N.Y. TIMES (June 4, 1998), <http://www.nytimes.com/1998/06/04/technology/productivity-many-buying-home-shredders-to-thwart-garbage-snoops.html>. See also John Woestendiek, *The Compleat History of SHREDDING*, BALTIMORE SUN (Feb. 10, 2002), [http://articles.baltimoresun.com/2002-02-10/entertainment/0202110302\\_1\\_paper-shredders-papyrus-thereof](http://articles.baltimoresun.com/2002-02-10/entertainment/0202110302_1_paper-shredders-papyrus-thereof).

55. Similarly, there is no property right in the remains of the deceased, though courts in the majority of states have crafted what is commonly termed a “quasi-property” right that is limited largely to the right of the next-of-kin to “possess, preserve and bury, or otherwise to dispose of, a dead body.” *Steagall v. Doctors Hosp.*, 171 F.2d 352, 353 (D.C. Cir. 1948). In other words, the next-of-kin have a temporary possessory right—but not an ownership right—for the purpose of directing disposition of the remains of the dead through burial, cremation, donative use by science, etc. See generally Thomas Holland, “*Since I Must Please Those Below*”: *Human Skeletal Remains Research and the Law*, 41 AM. J. L. & MED. 617 (2015).

56. 793 P.2d 479 (Cal. 1990).

developed hairy-cell leukemia and sought treatment at the UCLA medical center. Over the next seven years, Mr. Moore continued to visit the medical center, at his physician's direction, during which times blood, bone marrow, skin, and sperm samples were taken. Unbeknownst to Mr. Moore, his treating physician was using the biological material obtained from the samples to culture a cell line—the *Mo-Line*—from Mr. Moore's T-lymphocytes for commercial development.<sup>57</sup> Ultimately, Mr. Moore became suspicious of the purpose of his ongoing medical visits, and he subsequently brought suit against UCLA for, inter alia, conversion of his property, i.e., his cells.<sup>58</sup>

In *Moore*, the Supreme Court of California acknowledged the potentially lucrative commercial market for the *Mo-Line*, but nonetheless declined to extend the tort theory of conversion to human cells, finding that Moore “clearly did not expect to retain possession of his cells following their removal [from his body],”<sup>59</sup> and therefore did not retain an ownership interest in them. For the California Court, extending ownership rights to include cells removed from the body would run counter to “activities that are important to society,”<sup>60</sup> in Moore's particular case, medical research. The court went on to say that to the extent patient protection is needed, it should come not from the courts, but rather from the legislatures, which “have the ability to gather empirical evidence, solicit the advice of experts, and hold hearings at which all interested parties present evidence and express their views.”<sup>61</sup>

The *Moore* court, while finding no property basis to support a conversion cause of action, did accept the possibility that Mr. Moore might retain a privacy interest in his cells. Nonetheless, the majority sidestepped the matter, finding no reason to “force the round pegs of ‘privacy’ and ‘dignity’ into the square hole of ‘property’ in order to protect” that interest, which was better addressed in Moore's case

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57. *Id.* at 480-81. John Moore ultimately died from his disease in 2001. Dennis McLellan, *John Moore, 56; Sued to Share Profits from his Cells*, L.A. TIMES (Oct. 13, 2001), <http://articles.latimes.com/2001/oct/13/local/me-56770>.

58. The *Moore* case bears strong similarities to the better publicized case of Henrietta Lacks. See generally REBECCA SKLOOT, *THE IMMORTAL LIFE OF HENRIETTA LACKS* (2010). In 2017, the Lacks family announced their intent to sue Johns Hopkins University for compensation. Andrea McDaniels, *Henrietta Lacks' Family Wants Compensation for her Cells*, BALTIMORE SUN (Feb. 15, 2017), <http://www.baltimoresun.com/health/bs-hs-henrietta-lacks-johns-hopkins-20170213-story.html>.

59. *Moore*, 793 P.2d at 488-89.

60. *Id.* at 495.

61. *Id.* at 496 (citation omitted).

by the principles of patient-physician fiduciary duty and informed consent.<sup>62</sup>

*B. Limited Privacy Rights Associated with Bodily Cells and Fluids*

While the Supreme Court of California may have dodged the privacy aspect of the argument in its *Moore* holding, the U.S. Supreme Court has addressed it in several relevant holdings, beginning with a landmark case better known for its role in defining the parameters of “evanescent” evidence collection. In situations where bodily fluids are extracted from the body under government control, privacy interests may be implicated when the collection techniques prove invasive.

Armando Schmerber wrecked his car. While he was being treated at the hospital for his injuries, the police, fearful that the unconscious Schmerber’s blood-alcohol concentration would decline in the time required to obtain a warrant, directed that a blood sample be drawn, analysis of which showed that he had been driving while intoxicated. At trial, Schmerber unsuccessfully sought to have the blood-alcohol evidence suppressed on the grounds that it had been obtained without his consent in violation of the Fourth Amendment. He was convicted, and the verdict was upheld on appeal. The Supreme Court granted certiorari and affirmed.<sup>63</sup>

The core issue for the Court was not whether drawing blood was a search and seizure subject to Fourth Amendment scrutiny—it clearly was—but rather whether it was reasonable under the circumstances to do so with neither consent nor a judicial warrant. Writing for the 5-4 majority, Justice Brennan noted that “[b]ecause we are dealing with intrusions into the human body rather than with state interferences with property relationships or private papers . . . we write on a clean slate.”<sup>64</sup> The majority acknowledged that “[t]he integrity of an individual’s person is a cherished value of our society,”<sup>65</sup> but then quickly parsed the word “reasonable.” What was important for the majority was that the “quantity of blood extracted [for such a test] is minimal,” and the procedure involves “virtually

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62. *Id.* at 491.

63. *Schmerber v. California*, 384 U.S. 757 (1966). In fact, Schmerber proffered several arguments, including the fact that the blood sample violated his Fifth Amendment protection from self-incrimination. Only the Fourth Amendment aspect is considered here.

64. *Id.* at 767-68. Chief Justice Warren and Justices Black, Douglas, and Fortas dissented.

65. *Id.* at 772.

no risk, trauma, or pain.”<sup>66</sup> Accordingly, the Court held that when weighed against the State’s interest in obtaining accurate blood-alcohol evidence, and the risk of that evanescent evidence being degraded by the time necessary to obtain a warrant, the drawing of blood was “reasonable” under the Fourth Amendment.<sup>67</sup>

The *Schmerber* ruling was followed in 1973 by *Cupp v. Murphy*, which upheld the warrantless collection of scrapings from under a suspect’s fingernails, holding that under certain exigent circumstances a “very limited search necessary to preserve the highly evanescent evidence” did not violate the Fourth Amendment.<sup>68</sup>

Privacy interests may be implicated even in situations where sample collection does not require a *Schmerber*-like intrusion into the body. In *Skinner v. Railway Labor Executives’ Association*, the Court found a privacy interest in the collection of urine samples.<sup>69</sup> Seeking to address safety concerns, the Federal Railroad Safety Act of 1970 had authorized the Federal Railroad Administration (FRA) to conduct drug and alcohol tests of employees involved in train mishaps. Railway labor organizations brought suit on Fourth Amendment grounds. The Court acknowledged that “[u]nlike the blood-testing procedure at issue in *Schmerber*, the procedures prescribed by the FRA regulations for collecting and testing urine samples do not entail a surgical intrusion into the body,” but nonetheless “involve visual or aural monitoring of the act of urination, [which] itself implicates privacy interests.”<sup>70</sup> Still, as it had in *Schmerber*, the Court carved out a Fourth Amendment exception for the FRA on the basis of “the surpassing safety interests served by toxicological tests in this context, and the diminished expectation of privacy that attaches to . . . covered employees.”<sup>71</sup>

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66. *Id.* at 771.

67. Not surprisingly, Justice Douglas, writing in dissent only a year after his famous “penumbra” opinion in *Griswold v. Connecticut*, 381 U.S. 479 (1965), found no reasonableness in the collection. “No clearer invasion of this right of privacy can be imagined than forcible bloodletting of the kind involved here.” *Schmerber*, 384 U.S. at 779.

68. 412 U.S. 291, 296 (1973).

69. 489 U.S. 602 (1989).

70. *Id.* at 617. The same concern for privacy in the act of urination can be seen in *National Treasury Employees Union v. Von Raab*, 816 F.2d 170, 175 (5th Cir. 1987), *aff’d in part, vacated in part*, 489 U.S. 656 (1989), when the court noted the personal and private nature of urination and the fact that “[m]ost people describe it by euphemisms if they talk about it at all.”

71. *Skinner v. Railway Lab. Executives’ Ass’n*, 489 U.S. 602, 634 (1989). *See also Vernonia School Dist. 47J v. Acton*, 515 U.S. 646, 665 (1995) (holding that urinalysis drug testing of student athletes “is reasonable and hence constitutional”).

The *Schmerber* and *Skinner* holdings rest on the concept of exigency and public policy and are narrow in their application.<sup>72</sup> Forty-seven years after *Schmerber*, the Court again addressed the privacy of involuntary blood draws when it declined to adopt a per se exception to the warrant rule for DUI testing in *Missouri v. McNeely*.<sup>73</sup> Announcing the opinion of the Court, Justice Sotomayor noted that, the *Schmerber* holding notwithstanding, “[w]e have never retreated, however, from our recognition that any compelled intrusion into the human body implicates significant, constitutionally protected privacy interests.”<sup>74</sup>

In 2016, three years after the *McNeely* case, the U.S. Supreme Court again took up the issue of warrantless blood draws associated with drunk driving. Several states, including North Dakota and Minnesota, had enacted criminal penalties for suspected drunk drivers who refused to consent to blood draws. Two individuals, Danny Birchfield and Steve Beylund, both from North Dakota, contested the law on the grounds that imposing a criminal penalty on refusal to consent to a blood test was unreasonably coercive and violated the Fourth Amendment.<sup>75</sup> The Court granted certiorari and joined a third case involving Robert Bernard, Jr., from Minnesota, who had been similarly charged after he refused to take a breath test to determine his blood-alcohol concentration.<sup>76</sup>

Justice Alito, writing the opinion for the Court, started his analysis by acknowledging that “our cases establish that the taking of a blood sample or the administration of a breath test is a [Fourth Amendment] search.”<sup>77</sup> The real question, Alito believed, is whether conducting these types of searches without a warrant is reasonable, and here, the Court drew a line between blood and breath. For the majority, the invasive nature of blood draws was the deciding factor. Citing *McNeely*, the Court reiterated that because a blood draw is

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72. The *Schmerber* majority was clear that the holding did not apply to “more substantial intrusions, or intrusions under other conditions.” 384 U.S. at 772.

73. 569 U.S. 141 (2013).

74. *Id.* at 159.

75. Unlike Birchfield, Beylund actually consented to the blood draw, but argued on appeal that the coercive nature of being charged with a separate crime, i.e., “refusal to consent,” if he in fact refused was unconstitutional. Birchfield v. North Dakota, 136 S. Ct. 2160, 2172 (2016).

76. The three cases are cited as *Birchfield v. North Dakota*, 136 S. Ct. 2160 (2016). Bernard was charged with “test refusal in the first degree.” *Id.* at 2171.

77. *Id.* at 2173. The “cases” referred to are *Skinner* and *Schmerber*.

“a compelled physical intrusion beneath [the defendant's] skin and into his veins,”<sup>78</sup> a greater privacy interest is implicated.

By contrast, breath tests involve “almost negligible” physical intrusion into the body,<sup>79</sup> and thus do not “implicat[e] significant privacy concerns.”<sup>80</sup> This is due in no small part to the fact that:

Humans have never been known to assert a possessory interest in or any emotional attachment to *any* of the air in their lungs. The air that humans exhale is not part of their bodies. Exhalation is a natural process—indeed, one that is necessary for life. Humans cannot hold their breath for more than a few minutes, and all the air that is breathed into a breath analyzing machine, including deep lung air, sooner or later would be exhaled even without the test.<sup>81</sup>

For the Court then, privacy rights in bodily tissues and fluids would appear not to be inherently bound to the substances themselves but rather are identified by the level to which the state must physically intrude upon the body in order to obtain a sample.

*C. No Privacy Rights to Bodily Fluids and Cells that are Voluntarily Abandoned*

*Schmerber* should be read as recognizing the need to evaluate each case based on the totality of its circumstances and should not be read as attaching a per se privacy interest in bodily fluids. For the Court, the privacy interest in bodily fluids attaches more to the invasive nature of the sample collection—whether through needle sticks or through the intrusive presence of a visual and aural monitor—than to the nature of the sample itself. When the bubble of privacy surrounding the body is not invaded, or when fluids, with the accompanying human cells, are voluntarily cast off, there is little or no privacy interest retained. Consequently, *Schmerber* and its progeny should not be viewed as controlling on the matter of *abandoned* evidence.

One of the more commonly abandoned bodily fluids is saliva, and state courts have been reluctant to cloak lowly sputum with much constitutional protection. For example, in *State v. Athan*,<sup>82</sup> the

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78. *Id.* at 2178 (alteration in original) (quoting *McNeely*, 569 U.S. at 148).

79. *Id.* at 2176.

80. *Id.* (alteration in original) (quoting *Skinner v. Railway Lab. Executives' Ass'n*, 489 U.S. 602, 626 (1989)).

81. *Id.* at 2177.

82. 158 P.3d 27 (Wash. 2007).



Washington Supreme Court refused to suppress DNA obtained when Seattle police detectives tricked the defendant into mailing an envelope to them in the mistaken belief that he was responding to a law firm about a possible class action suit. The police lab then successfully extracted his DNA from the adhesive on the flap. The court found “there is no inherent privacy interest in saliva,”<sup>83</sup> reasoning that “when a person licks an envelope and places it in the mail,” it is “analogous to a person spitting on the sidewalk or leaving a cigarette butt in an ashtray.”<sup>84</sup> With an eye clearly focused on the concept of abandoned property, the court found that under “these circumstances, any privacy interest is lost [and] [t]he envelope, and any saliva contained on it, becomes the property of the recipient.”<sup>85</sup>

Similarly, in *Commonwealth v. Cabral*, the Massachusetts Appeals Court found that “although the [convicted rapist] had a reasonable expectation of privacy in his saliva (and other bodily fluids), when he expectorated onto a public street and did not retrieve the fluid, he voluntarily abandoned that protection; he assumed the risk of the public witnessing his action and thereafter taking possession of his bodily fluids.”<sup>86</sup>

Nor did Troy Thomas, across the continent in California, have any better luck when he sought to suppress DNA evidence linking him to a series of burglaries. The police obtained his DNA from the disposable mouthpiece on a breathalyzer used when Thomas was given a sobriety test after being stopped for a traffic violation. In *People v. Thomas*, the court refused to exclude the evidence, writing that “[w]hether defendant subjectively expected that the genetic material contained in his saliva would become known to the police is irrelevant since he deposited it on a police device and thus made it accessible to the police,” and “[t]hus, any subjective expectation defendant may have had that his right to privacy would be preserved was unreasonable.”<sup>87</sup>

Texas courts have come to the same conclusion. In *Hudson v. State*,<sup>88</sup> when the police questioned Jimmie Hudson about a

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83. *Id.* at 33.

84. *Id.* at 33-34

85. *Id.* at 34. The court failed to reach the more complex issue of the extent of data collected. Acknowledging the possible validity of an amicus position taken by the ACLU that DNA has the potential to reveal a “vast amount of personal information” and thereby “should constitute a privacy interest,” the court noted that Athan’s sample was used narrowly for the purpose of identification for which he had no privacy. *Id.*

86. 866 N.E.2d 429, 433 (Mass. App. Ct. 2007) (citation omitted).

87. 132 Cal. Rptr. 3d 714, 718-19 (Cal. Ct. App. 2011).

88. 205 S.W.3d 600, 604 (Tex. Crim. App. 2006).

burglary, he requested a can of Dr. Pepper, which the police were more than willing to provide and from which he proceeded to drink. Upon leaving the interrogation room, Hudson smashed the can and threw it into a trash can, where it was later retrieved by an investigator. In denying Hudson's motion to suppress seizure of the can—from which his DNA was extracted—the court cited *Abel* and *Greenwood*, noting that Hudson “threw his Dr. Pepper can in the trash of his own volition [which] indicated an intent on his part to abandon the can”<sup>89</sup> and with it, his DNA.

However, in *Commonwealth v. Bly*,<sup>90</sup> the Supreme Judicial Court of Massachusetts took a similar, though slightly more deliberate, approach to the issue of abandonment by focusing specifically on the objective manifestation of a privacy right. Jeffrey Bly, a murder suspect, had been interviewed for two hours by the police, during which time he smoked two cigarettes and drank a bottle of water supplied to him by the officers. When he departed, he left the cigarette butts in a cleaned ashtray and failed to take the water bottle. The police waited an hour before collecting the items, to ensure that Bly would make no further claim on them, and then submitted them for DNA testing. In ruling against suppression of the evidence, the court held that its conclusion that Bly “had no subjective expectation of privacy is compelled not by a finding that he legally abandoned them as much as it is by his wholesale failure to manifest any expectation of privacy in the items whatsoever.”<sup>91</sup>

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89. *Id.* at 604. *See also* State v. Christian, No. 04-0900, 2006 WL 2419031 (Iowa Ct. App. Aug. 23, 2006) (finding that a defendant who left a water bottle at a job interview, which was attended by a police officer, had no expectation of privacy in the bottle and therefore no expectation of privacy in the adhering DNA); Williamson v. State, 993 A.2d 626, 635 (Md. 2010) (finding that a McDonald's cup was “unequivocally abandoned” when it was thrown on the jail floor by the prisoner and could be sampled for DNA without a warrant); Commonwealth v. Perkins, 883 N.E.2d 230, 239-40 (Mass. 2008) (finding that a murderer/rapist who was supplied with cigarettes and a canned drink during a police interview “abandoned the cigarette butts [in the interview room], and . . . never had a reasonable expectation of privacy in the soda can” when he “made no attempt to sanitize the item or exert control over it, and therefore it, too, could be considered abandoned”); State v. Wickline, 440 N.W.2d 249, 253 (Neb. 1989) (finding, in a pre-DNA case involving amylase and blood typing analyses, no Fourth Amendment violation when the police collected cigarette butts deposited in the jail by a suspect, because “[t]he defendant abandoned these items and sufficiently exposed them to the officer and the public to defeat his claim to fourth amendment protection”).

90. 862 N.E.2d 341 (Mass. 2007).

91. *Id.* at 357.

Other “abandoned” bodily substances have not been afforded any more protection than saliva. While in jail awaiting trial, Charles Cox had his hair cut. At the request of the FBI, the jail barber kept samples of Cox’s hair that later were sent to the FBI lab. On appeal to the Seventh Circuit, Cox mounted a *Schmerber* argument that hair samples, much like blood samples, trigger Fourth Amendment scrutiny. The court dismissed the comparison, noting that Cox did not allege that the “haircut was illegally or improperly given,” and that he “never indicated any desire or intention to retain possession of the hair after it had been scissored from his head.”<sup>92</sup> Then, citing *Abel*, the court found that “[h]aving voluntarily abandoned his property, in this case his hair, Cox may not object to its appropriation by the Government.”<sup>93</sup>

As with other forms of evidence, the voluntary abandonment of bodily substances also can be elicited by law enforcement through ruse and pretext, provided there is no illegal coercion so as to deny due process. For example, in *People v. Laguerre*,<sup>94</sup> New York police convinced Mr. Laguerre to participate in a contrived Pepsi taste-test challenge. In order to do so, he voluntarily discarded his chewing gum, from which the police obtained his saliva and with it, his DNA. Predictably, Mr. Laguerre moved to exclude the evidence obtained from the saliva on the grounds that the police had improperly tricked him into relinquishing his gum, but the court rejected that argument, holding that “[t]he police may engage in a ruse with respect to a defendant as long as it is ‘not coercive or so fundamentally unfair as to deny due process.’”<sup>95</sup>

Similarly, when Glenn Raynor was questioned for thirty minutes at the police station regarding a rape, he made the common mistake of showing up wearing a short-sleeved shirt rather than a Tyvek body suit. Maryland State Troopers, noticing that he had rubbed his bare arms on the armrests of the chair during the interview, swabbed the chair after he departed, and obtained his DNA, which was matched to that of the suspected rapist. In denying his motion to suppress, the court found that “the fact that one has not knowingly exposed to the public certain evidence does not, by itself, demonstrate a reasonable expectation of privacy in that evidence.”<sup>96</sup> In other words, just as Mr. Edwards should have known that when he

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92. *United States v. Cox*, 428 F.2d 683, 687 (7th Cir. 1970).

93. *Id.* at 688.

94. 815 N.Y.S.2d 211 (N.Y. App. Div. 2006)

95. *Id.* at 213 (quoting *People v. Amador*, 782 N.Y.S.2d 371, 371 (N.Y. App. Div. 2004)).

96. *Raynor v. State*, 99 A.3d 753, 766 (Md. 2014).

abandoned his boat, he was abandoning his marijuana, Raynor should have known that by exposing his skin to the environment, the abandonment of his skin cells could logically follow.

A principle emerges from these cases: the critical factor is not the nature of the bodily substance, or even whether the abandonment is well-informed or reasoned under the circumstances, but rather whether the abandonment of the substance was voluntary or not, i.e., was there an objectively determined *intent* to abandon the substance, which in some cases may be determined by the lack of any demonstrable intent to recover the substance once abandoned?<sup>97</sup>

Not all courts are willing to draw a bright line on the issue. In *United States v. Davis*,<sup>98</sup> the Fourth Circuit discerned a distinction between the property and any privacy interest encumbered by the adhering DNA. At issue was whether the defendant retained a reasonable expectation of privacy in DNA obtained from material evidence properly seized at a hospital without a warrant. Here, the court found that Davis did have a protected right to his genetic privacy, but the holding was more nuanced than it is sometimes reported.

In 2000, Earl Davis arrived at the Howard County [Maryland] General Hospital with a gunshot wound to his leg.<sup>99</sup> As part of his treatment, his pants were removed and, in accordance with hospital protocol, were placed in a bag that was stored under his hospital bed. Subsequently, a Howard County police officer investigating Davis's shooting took the bloody pants into evidence, presumably for their potential use should the shooter ever be apprehended. Unfortunately for Davis, while his attacker was never caught, he subsequently was identified as a suspect in a murder that had occurred in the spring of 2001 in neighboring Prince Georges County. In June 2004, the Prince Georges County police, learning that Davis's clothing was in a Howard County evidence locker, obtained the pants and tested them for DNA. Davis was eliminated from consideration in the Prince Georges County murder; however, his DNA was entered into the county's local DNA database. Two months later, an armored car was robbed in Prince Georges County and one of the guards murdered, and when DNA obtained from the crime scene was entered into the local database, it produced a "cold hit" for Earl Davis. Davis subsequently was convicted of the armored

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97. See, e.g., *Smith v. Ohio*, 494 U.S. 541 (1990).

98. 690 F.3d 226 (4th Cir. 2012).

99. For a detailed description of the events pertinent to the case, see *id.* at 230-32.

car robbery and murder and appealed on the grounds of a violation of his Fourth Amendment rights.

On appeal, the Fourth Circuit drew a distinction between the seizure of Davis's clothing, which was easily accommodated under the Fourth Amendment's "plain view" exception, and the subsequent analysis of the blood on the clothing, which was not. As to the initial seizure of the pants, the court found that there was "no dispute that [the Howard County police officer] was lawfully present in the hospital room," and "thus had lawful access in the ordinary course of his investigation to the bag of clothing which could be evidence against Davis's assailant."<sup>100</sup> Accordingly, the bag could be seized under the plain view exception. Similarly, the clothing in the paper bag, which was opaque, could be searched without a warrant because "the totality of the circumstances," including the established hospital practice of bagging the patient's clothing and placing the bag under the bed, established for the officer a certainty of the bag's contents.<sup>101</sup> The court held that when "the contents of a seized container are a foregone conclusion," such as when a container's "distinctive configuration proclaims its contents, the container supports no reasonable expectation of privacy and the contents are said to be in plain view."<sup>102</sup> Thus, because the officer was lawfully present in the room for the purpose of investigating a crime, the bag was in plain view of the officer, and knowledge of the contents of the bag were a "foregone conclusion" based on the hospital's regular practice of bagging the clothes in a paper bag and the officer's knowledge of that practice, then the contents could be seized and searched without a warrant with no Fourth Amendment violation.

Davis fared better with his blood on the clothing, however. The Fourth Circuit acknowledged that "[t]he general issue of a person's reasonable expectation of privacy in his DNA is a developing and unsettled area of law, one that has not yet been addressed by the Supreme Court,"<sup>103</sup> but went on to hold that because "Davis' DNA was specifically sought as a result of police suspicions that he was involved in the [] murder,"<sup>104</sup> the government's extraction of his DNA from his clothing and its entry into the DNA database "constituted unreasonable searches under the Fourth

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100. *Id.* at 234 (citing *Washington v. Chrisman*, 455 U.S. 1, 8 (1982)).

101. *Davis*, 690 F.3d at 236.

102. *Id.* at 235 (quoting *United States v. Williams*, 41 F.3d 192, 197 (4th Cir. 1994)).

103. *Davis*, 690 F.3d at 240.

104. *Id.* at 250.

Amendment.”<sup>105</sup> The court did note, however, that Davis’s “privacy interest was diminished”<sup>106</sup> by the fact that his “bodily integrity was not implicated when police obtained the DNA sample,”<sup>107</sup> and because “he knew that the police had retained his bloody clothing, and yet did nothing to retrieve the clothing or otherwise retain ownership in it.”<sup>108</sup> It is tempting to read the *Davis* ruling more broadly than perhaps it should be. As with *Schmerber* and *Skinner*, *Davis* involved evidence seized under narrow Fourth Amendment exceptions and not as abandoned evidence. Given time, Davis might have abandoned his bloody pants, but the police seized them before he had the opportunity to manifest any intent to do so, closing off that possibility. Once the seizure had occurred, the police were free to operate under the parameters of the plain view exception, but the *Davis* court was unwilling to bootstrap this narrow Fourth Amendment exception into a broader Fourth Amendment abandonment exemption that would allow the DNA to be tested.

For the most part, the case law for abandoned evidence does not present an overly convoluted path to follow: individuals who intentionally abandon items, or who demonstrate no objective intent to recover the abandoned items, typically relinquish all possessory and privacy rights in those items, and this principle has been interpreted to include biological materials such as saliva, blood, hair, skin, and semen. The admissibility issues posed by abandoned biological evidence likely would be uncontroversial were it not for the rapid emergence of DNA as a law enforcement tool. In fact, police have been collecting biological samples for decades, long before the emergence of DNA analysis, and traditionally, these samples were used for morphological comparisons (for example, hair types) or the determination of group characteristics such as blood type. What has changed is the fact that DNA, rightly or wrongly, has achieved an almost mythical reputation within the legal system due to its perceived “unparalleled ability to exonerate the wrongly convicted and to identify the guilty.”<sup>109</sup> This perception is unsettling to many, and because DNA appears to differ from other forms of evidence in both a qualitative and quantitative way, some legal scholars have called for the need for “genetic exceptionalism.”

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105. *Id.*

106. *Id.* at 249.

107. *Id.*

108. *Id.*

109. *Dist. Attorney’s Office v. Osborne*, 557 U.S. 52, 55 (2009).

## IV. IS THERE A NEED FOR GENETIC EXCEPTIONALISM?

Abandoned DNA has its pedigree in abandoned property and evidence. It is *exempt* from the Fourth Amendment's constraints on unreasonable search and seizure, and thus no narrowly drawn exception needs to be found to either collect it or analyze it. In fact, to make the Fourth Amendment relevant to abandoned DNA, an exception indeed must be made, but in this instance the exception is not to pull it out from under the protective umbrella of the Fourth Amendment, but to put it under. That has no modern precedent.

While "genetic exceptionalism" first entered the lexicon in the area of medical patient privacy rights,<sup>110</sup> it more recently has been advocated in legal discussions as it relates to the collection and admissibility of DNA evidence.<sup>111</sup> The typical argument follows these lines: Unlike Greenwood's trash bags, "[l]eaving a trail of DNA . . . is not a conscious activity. The deposition of DNA in public places cannot be avoided unless one is a hermit or is fanatical in using extraordinary containment measures. In this setting, the inference of intent to abandon is markedly weaker."<sup>112</sup> Furthermore, unlike other forms of "abandoned" evidence, such as fingerprints, DNA evidence has the "potential for yielding vast amounts of genetic information for government use, forever,"<sup>113</sup> so special protection is needed.

Thus, the argument that abandoned DNA evidence is *sui generis* and therefore must be dealt with outside of the historical body of common law rests on two facts: (A) that individuals unavoidably shed DNA constantly and without volition, and (B) that DNA is so

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110. The term "genetic exceptionalism" was first used by the NIH-DOE Joint Working Group on Ethical, Legal, and Social Implications of the Human Genome Project that was chaired by T.H. Murray. As used by that group, genetic exceptionalism referred to the belief that "genetic information is sufficiently different from other kinds of health-related information that it deserves special protection and other exceptional measures." See T.H. Murray, *Genetic Exceptionalism and "Future Diaries": Is Genetic Information Different from other Medical Information?*, in GENETIC SECRETS: PROTECTING PRIVACY AND CONFIDENTIALITY IN THE GENETIC ERA 60, 61 (R.A. Rothstein ed., 1997).

111. See Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413, 437-38 (2001). See also Joh, *supra* note 8, at 883 (arguing that "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").

112. Imwinkelried & Kaye, *supra* note 111, at 437-38. See also Joh, *supra* note 8, at 867 ("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.").

113. Joh, *supra* note 8, at 871.

rich in personal information, it requires special consideration. In fact, neither of these footings will hold much weight; neither are unique in the evidentiary world, and both can be dealt with using existing legal analogues.

*A. Non-Volitional Loss of DNA Does Not Give Rise to a Per Se Privacy Right*

While intent to abandon a possessory or property interest is a key element of evidence abandonment, that requirement is not directly applicable to the involuntary and natural loss of human skin cells. Humans involuntarily shed epithelial cells—and with it, their DNA—at a prodigious rate.<sup>114</sup> As Judge Kozinski noted, “we can’t go anywhere or do much of anything without leaving a breadcrumb trail of identifying DNA matter.”<sup>115</sup> It is precisely because the loss of skin cells is both constant and involuntary that there can be no retained possessory interest in the cellular matter. While the Supreme Court has not addressed the subject directly, it came close in its ruling in *Birchfield* that breathalyzers implicate no privacy concern (as opposed to an invasive blood draw). The Court reasoned that individuals have no “emotional attachment” and no possessory interest in the air in their lungs because “[e]xhalation is a natural process—indeed, one that is necessary for life. Humans cannot hold their breath for more than a few minutes, and all the air that is breathed into a breath analyzing machine, including deep lung air, sooner or later would be exhaled even without the test.”<sup>116</sup> In other words, cast in more traditional property-law terms, breath—including “deep lung air”—is “abandoned” when exhaled and there

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114. One recent study estimated that an individual may lose up to 500 million skin cells each day. See Charles J. Weschler et al., *Squalene and Cholesterol in Dust from Danish Homes and Daycare Centers*, 45 ENVTL. SCI. & TECH. 3872 (2011). Though many of these cells are keratinized and lack their DNA-containing nuclei. See Toshiro Kita et al., *Morphological Study of Fragmented DNA on Touched Objects*, 3 FORENSIC SCI. INT’L: GENETICS 32 (2008). Other studies place the number of shed cells at a lower, albeit still substantial rate of 400,000 cells a day. See Ray A. Wickenheiser, *Trace DNA: A Review, Discussion of Theory, and Application of the Transfer of Trace Quantities of DNA Through Skin Contact*, 47 J. FORENSIC SCI. 442 (2002). It also is the case that some humans, affectionately known in the forensic DNA world as “shedders,” lose cells at abnormally higher rates. See, e.g., Alex Lowe et al., *The Propensity of Individuals to Deposit DNA and Secondary Transfer of Low Level DNA from Individuals to Inert Surfaces*, 129 FORENSIC SCI. INT’L 25 (2002).

115. *United States v. Kincade*, 379 F.3d 813, 873 (9th Cir. 2004) (en banc) (Kozinski, J., dissenting).

116. *Birchfield v. North Dakota*, 136 S. Ct. 2160, 2177 (2016).



can be no possessory interest in it. Similarly, individuals retain no possessory interest in shed skin cells because (to paraphrase *Birchfield*) exfoliation is a natural process, and all the skin cells on the surface of the body sooner or later would be sloughed off.

Precisely because exfoliation of hair and skin cells is a natural and unconscious process, we do not attach any liability or responsibility for the act. We do not, for example, allow claims for trespass or nuisance simply because our neighbor's dandruff rubs off on our couch cushions. This of course sounds ludicrous precisely because we do not think of holding a possessory interest in naturally shed skin cells, but in theory there is no reason why a trespass claim could not be mounted. The Second Restatement of Torts reads that "[o]ne is subject to liability to another for trespass, irrespective of whether he thereby causes harm to any legally protected interest of the other, if he intentionally . . . enters land in the possession of the other, or *causes a thing* or a third person to do so."<sup>117</sup> As noted above, humans lose millions of skin cells annually, and these have a not-inconsequential weight, somewhere between 0.5 and 1.5 pounds of skin each year.<sup>118</sup> Certainly most of this is lost down shower and sink drains, but not all, and some of what is not flushed down the drain inevitably ends up on the property of others, and that fact could theoretically form the basis for a trespass claim. "Even though no harm is done to the land or to the possessor's enjoyment of it," tortious trespass may occur by foreign matter intruding onto another's property even if it is not "thrown directly and immediately upon the other's land" but rather "is done with knowledge that it will to a substantial certainty result in the entry of the foreign matter."<sup>119</sup>

While not directly addressing the loss of human hair and skin cells, several states have touched close to the matter in cases involving trespass by dust and particulates. The Supreme Court of Washington has opined that "[a]n intentional deposit of microscopic particulates, undetectable by the human senses, gives rise to a cause

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117. RESTATEMENT (SECOND) OF TORTS: LIABILITY FOR INTENTIONAL INTRUSIONS ON LAND § 158 (AM. LAW INST. 1977) (emphasis added).

118. Charles J. Weschler, *Characterization Techniques Applied to Indoor Dust*, 12 ENVTL. SCI. & TECH. 923 (1978) (the outer layer of skin is shed at a rate of 0.001-0.003 ounces of skin every hour).

119. RESTATEMENT (SECOND) OF TORTS: LIABILITY FOR INTENTIONAL INTRUSIONS ON LAND § 158 cmt. i (AM. LAW INST. 1977) ("*Causing entry of a thing*: The actor, without himself entering the land, may invade another's interest in its exclusive possession by throwing, propelling, or placing a thing either on or beneath the surface of the land or in the air space above it.>").

of action for trespass as well as a claim of nuisance.”<sup>120</sup> Similarly, Oregon has held that trespass is “any intrusion which invades the possessor’s protected interest in exclusive possession, whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist.”<sup>121</sup>

Perhaps more analogous to skin cells is the growing problem posed by wind-blown pollen from fields of proprietary Genetically Modified Organisms (GMOs), such as corn and canola. Several states have started to grapple with the issue of GMO pollen cross-fertilizing adjacent farms, especially those of farmers who wish to keep their crops GMO-free. No clear picture has emerged, but to date, farmers claiming injury by drifting GMO pollen have found little relief in the courts. This is in no small part due to the fact that it is considered “a biological fact that pollen flows between varieties of the same crop and between related plant species. Therefore, if pollen flow constituted trespass upon a neighbor’s crops, all farmers would be liable for trespass for almost every crop they grow.”<sup>122</sup> In other words, pollen drift is a natural process that is going to happen, and so no liability should attach. But the inference to be drawn is that you cannot have it both ways: A GMO farmer cannot simultaneously disclaim liability for pollen drifting onto his or her neighbor’s farm and contaminating a GMO-free crop, on account of it being a natural process, while simultaneously retaining a possessory right to the proprietary GMO pollen.<sup>123</sup> Similarly, skin

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120. *Bradley v. Am. Smelting and Refining Co.*, 709 P.2d 782, 784 (Wash. 1985) (certifying a question as to whether the intentional deposit of microscopic air particulates can give rise to a claim of trespass).

121. *Martin v. Reynolds Metals Co.*, 342 P.2d 790, 794 (Or. 1959) (finding fluoride particulates from a nearby aluminum plant constituted a trespass); *see also* *Borland v. Sanders Lead Co.*, 369 So. 2d 523, 529 (Ala. 1979) (in addressing the accumulation of lead particulates from smelting process, the Alabama Supreme Court held that “whether an invasion of a property interest is a trespass or a nuisance does not depend upon whether the intruding agent is ‘tangible’ or ‘intangible’”); *Babb v. Lee County Landfill SC, LLC*, 747 S.E.2d 468 (S.C. 2013) (finding that odors—being by nature intangible—do not constitute trespass, because “South Carolina hews to the traditional dimensional test and only recognizes intrusions by physical, tangible things as capable of constituting a trespass”).

122. Richard Y. Boadi, *Managing Liability Associated with Genetically Modified Crops*, in *INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION* 1385, 1388 (Anatole Krattiger ed., 2007), <http://www.iphandbook.org/handbook/ch14/p05/> (last visited Aug. 24, 2018).

123. The analogy is perhaps not as straightforward as it might otherwise be due to the entanglement of patent law. In *Monsanto Can., Inc. v. Schmeiser*, [2004] 1 S.C.R. 902 (Can.), the Supreme Court of Canada held that a canola farmer whose crop had been fertilized by drifting GMO pollen could not make

and hair cells, the shedding of which is an unavoidable biological fact no less natural and inevitable than pollen drift, cannot be protected by a possessory right (which might implicate the Fourth Amendment), while simultaneously being detached from any damage or mischief that their errant deposition might cause. Except in very rare circumstances, such as the case of “Typhoid Mary,”<sup>124</sup> the involuntary shedding of biological material—including germ-laden substances—comes with no criminal liability.<sup>125</sup> Similarly, we attach no civil liability to shed biological material. To do so would be to open a Pandora’s Box of mischief. As with farmers who “would be liable for trespass for almost every crop they grow” due to naturally drifting pollen, every worker who shows up at the office with a head cold could be subject to a civil action by the hypochondriac in the next cubicle. This is of course a ridiculous outcome, but the reason we can view it as being so ridiculous is due to our unspoken understanding that humans claim no possessory right to the human dust (and germs) that they deposit naturally, constantly, and unintentionally and therefore retain no liability for it.<sup>126</sup>

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monetary use of his resulting crop. Monsanto, rather than being held liable for the drift of the modified pollen, retained a protected patent right to any seed produced from the pollen.

124. “Typhoid Mary” was the unfortunate moniker applied by newspapers to Mary Mallon, an Irish-American cook living in New York in the early 1900s. She is thought to be the first recognized asymptomatic carrier of *Salmonella typhi*, the pathogen responsible for typhoid fever. During a short time from 1906 to 1915, the epidemiologist George Soper was able to associate her with the infection of a score of individuals in New York, and the death of at least three, although the numbers likely are underestimates. However, even in this extreme case, no criminal charge was ever brought against her. Instead, the New York Department of Health used its statutory authority to quarantine Mary Mallon for the last 26 years of her life on the Brother Islands in the East River. See George A. Soper, *The Curious Career of Typhoid Mary*, 15 BULL. N.Y. ACAD. MED. 698 (1939).

125. At the federal level, the government has the power to isolate or quarantine individuals believed to pose an infectious threat to society. The power derives from the Commerce Clause. At the state level, the authority typically derives from statutes grounded on the police power. Quarantine and isolation are not criminal sanctions but can bear a resemblance to criminal sanctions to those on the receiving end. See *Legal Authorities for Isolation and Quarantine*, CENTERS FOR DISEASE CONTROL AND PREVENTION, <https://www.cdc.gov/quarantine/aboutlawsregulationsquarantineisolation.html> (last visited Aug. 28, 2018).

126. Even when infections are not involved, there could easily be other grounds for claiming injury. For most individuals, the prospect of errant dandruff deposited in their house might be mildly upsetting if they took time to consider it, but few people would seek redress from the shedder. In other situations, however, the damage can be quite tangible. Consider the threat that shed biological debris

In American law, liability is inextricably linked to ownership and actions (or lack of action). One cannot disclaim liability while simultaneously claiming the benefit of ownership. Similarly, property and possessory rights are important elements in the calculus of privacy, but are not the sole determining factors.<sup>127</sup> Certainly, other human biological substances that “sooner or later” are expelled from the body, notably urine and feces, have been afforded some Fourth Amendment protection, but these substances differ from the sloughed-off skin cell in the fact that their loss is bound up with an *act* for which there is an expectation of intimacy that is recognized in our society. Therefore, *Skinner* could find that compelled collections of urine samples reach the Fourth Amendment not through a retained possessory interest in the urine, or because the urination was either voluntary or involuntary, but because the government’s collection of samples “involve[s] visual or aural monitoring of the act of urination, [which] itself implicates privacy interests.”<sup>128</sup> Conversely, the natural shedding of epithelial cells involves no such private or intimate act; occurring spontaneously, regularly, and unconsciously—often in public settings.

Similarly, in a case that tested the limits of privacy, the Maryland Court of Appeals addressed the intimacy of fecal matter in *Venner v. State*.<sup>129</sup> Charles Venner was admitted to a Baltimore hospital in a semi-conscious condition after some hashish-filled balloons that he swallowed began leaking into his stomach. While in the hospital, Venner passed twenty-one balloons in his stool, which were deposited in a bedpan and soon collected by the police. Venner subsequently was convicted on drug charges, from which he appealed, seeking to have the evidence dismissed on Fourth Amendment grounds. Ruling against him, the Maryland Court declined to follow *Skinner*, noting that when Mr. Venner deposited his waste in the bedpan, which he knew someone had to remove, the normal level of privacy afforded such matters disappeared. “Utilizing the criteria of Mr. Justice Harlan, we are of the view that Venner could not have had [a privacy right] . . . that society [would

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can pose in the electronics industry or the medical profession. In these environments, biological contamination is real and liability could be attached were it not for the fact that the shedders retain no possessory rights.

127. *Rakas v. Illinois*, 439 U.S. 128, 153 (1978) (“[P]roperty rights reflect society’s explicit recognition of a person’s authority to act as he wishes in certain areas, and therefore should be considered in determining whether an individual’s expectations of privacy are reasonable.”).

128. *Skinner v. Railway Lab. Executives’ Ass’n*, 489 U.S. 602, 617 (1989).

129. 367 A.2d 949 (Md. 1977).

be] prepared to recognize as reasonable . . . for the simple reason that human experience is to abandon [human excreta] immediately.”<sup>130</sup>

It also is human experience to exfoliate skin cells and hair constantly and with no intimate act to which a normal level of privacy attaches. Consequently, the Fourth Amendment does not reach these items.

### B. *The Locked-Container Analogy*

One argument for genetic exceptionalism is that there are in fact two items being “abandoned” when an individual sheds a cell, rendering a traditional model of abandonment inadequate. On this view, DNA is analogized to the contents of a “locked container.” And while the container (the cell) may have been abandoned, the contents (the information encoded in the DNA) were not. Facially, this bifurcation of the medium and the information carried by the medium maps loosely onto the principle underlying intellectual property.

When an author discards a draft manuscript, the subsequent finder of the manuscript is free to make use of the manuscript subject to the restraints created by copyright law. What the finder cannot do is monetize the information represented in the manuscript to the detriment of the author. Those constraints, however, do not apply to the use of the information by the police. If Theodore Kaczynski had thrown out an early draft of his Unabomber Manifesto, the neighbor who pulled it from the trash could not publish it to Kaczynski’s financial detriment, but the FBI certainly could use the information gleaned from reading it. The analogy can be made that the DNA information contained in a skin cell adhering to a cigarette butt is similarly severable.

The concept of severing the abandoned material (e.g., a skin cell attached to a cigarette butt) from the information contained within the material (e.g., the DNA), in a manner analogous to intellectual property, while not directly applicable for several reasons, is worth exploring. In a well-reasoned essay on genetic privacy and the Fourth Amendment, Professor Scherr<sup>131</sup> develops the argument that searching an abandoned cigarette butt and seizing the DNA adhering to it are distinct government actions; one requires a

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130. *Id.* at 956 (internal quotation omitted) (quoting *Katz v. United States*, 389 U.S. 347, 361 (1967)).

131. Albert E. Scherr, *Genetic Privacy & the Fourth Amendment: Unregulated Surreptitious DNA Harvesting*, 47 GA. L. REV. 445 (2013).

warrant, while the other may not. He supports this view with reference to several search-and-seizure cases that have helped to define the scope of privacy.

In *United States v. Chadwick*,<sup>132</sup> police arrested the defendant after watching him load a locked footlocker, which they suspected of containing illegal drugs, into his car's trunk. The police impounded the automobile, and then subsequently, using the automobile exception to the warrant requirement, opened the footlocker and discovered drugs. The Court held that while the search of the car was reasonable under the automobile exception to the Fourth Amendment, the subsequent search of the contents of the locked footlocker was subject "to the protection of the Warrant Clause."<sup>133</sup>

In another case, *State v. Smith*,<sup>134</sup> the Ohio Supreme Court took up the question of whether police could search a cell phone without a warrant. Police had arrested Smith on drug trafficking, seizing his cell phone incident to the arrest. On appeal, the justices found that cell phones cannot be equated to traditional closed containers, but rather are "intricate and multifunctional"<sup>135</sup> devices with the "ability to store large amounts of private data [which] give their users a reasonable and justifiable expectation of a higher level of privacy in the information they contain."<sup>136</sup>

For Professor Scherr, the analogy between these cases, *Chadwick* and *Smith*, and abandoned DNA is direct: "If there is a reasonable expectation of privacy in [abandoned] DNA . . . as the courts found in the contents of the trunk, bag, and cell phones in those cases, then the police must have probable cause and, depending on the circumstances, a warrant to search for DNA in surreptitious harvesting cases."<sup>137</sup>

As compelling as these examples are, they are inapposite for the manner in which abandoned DNA has been characterized up to this point in two major ways. First, both *Chadwick* and *Smith* involve narrow exceptions to the warrant requirement, the automobile exception in *Chadwick*'s case and the seizure-incident-to-arrest

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132. 433 U.S. 1 (1977), *abrogated by* *California v. Acevedo*, 500 U.S. 565 (1991).

133. *Id.* at 15. *Chadwick* was effectively overruled by *California v. Acevedo*, 500 U.S. 565 (1991), which established that police may conduct warrantless searches of containers in automobiles when there is probable cause to believe that evidence or contraband is present.

134. 920 N.E.2d 949 (Ohio 2009).

135. *Id.* at 955.

136. *Id.*

137. Scherr, *supra* note 131, at 489.

exception in Smith's case. Exceptions to the Fourth Amendment are "jealously and carefully drawn,"<sup>138</sup> and the justices appear to have been reluctant to expand a narrow exception beyond its intended purpose. The warrant exceptions employed in *Chadwick* and *Smith* are deemed necessary for the narrow purposes of ensuring the safety of the arresting officers and the safeguarding of evidence. However, once Chadwick's locked footlocker was in the possession of the police, these circumstances were no longer in play and the subsequent search of the footlocker without a warrant "cannot be viewed as incidental to the arrest or as justified by any other exigency."<sup>139</sup> Similarly, with regard to Smith's cell phone, once in police control, "the state has satisfied its immediate interest in collecting and preserving evidence and can take preventive steps to ensure that the data found on the phone are neither lost nor erased."<sup>140</sup> Accordingly, the police "must then obtain a warrant before intruding into the phone's contents."<sup>141</sup> In other words, both footlocker and cell phone data fall under the protective umbrella of the Fourth Amendment, and a warrant is required to search their contents unless narrowly drawn exceptions exist. The application of these exceptions are not dependent upon the nature of the contents, but rather are tied to the circumstances of the seizure. Once those circumstances no longer exist, the narrow exceptions fall away. Conversely, if either the footlocker or cell phone had been abandoned, neither would be protected by the Fourth Amendment, and no exception would be needed in order to search their contents without a warrant.

By contrast, abandoned DNA, by virtue of its abandoned property roots, has not to date been viewed as protected by the Fourth Amendment. Accordingly, abandoned DNA is exempt from the Warrant Clause of the Fourth Amendment and, as would be the case with an abandoned footlocker or cell phone, no narrow, circumstance-dependent exception is required.

The second way in which these cases depart from the situation presented by abandoned DNA is that the expectation of privacy that an individual has in his or her abandoned DNA is in no way clear. Chadwick clearly had an expectation of privacy in the locked footlocker in his trunk. We know this because he took steps to safeguard the contents from prying eyes and hands by locking the box, and society recognizes the expectation of privacy in locked

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138. *Jones v. United States*, 357 U.S. 493, 499 (1958).

139. *United States v. Chadwick*, 433 U.S. 1, 15 (1977).

140. *State v. Smith*, 920 N.E.2d 949, 955 (Ohio 2009).

141. *Id.*

boxes as reasonable. As did Charles Katz when he closed the phone booth door and paid the toll, Chadwick, “[b]y placing personal effects inside a double-locked locked footlocker, . . . manifested an expectation that the contents would remain free from public examination.”<sup>142</sup> It is less clear in the *Smith* case whether there was an action that subjectively manifested a privacy expectation. The record of the case does not make clear whether or not the cell phone was password-protected, but assuming that it was, and assuming that Smith used that protection, there would be a clear manifestation of a privacy expectation.

By contrast, it is not established what affirmative steps would be required to manifest a privacy expectation in one’s DNA. As noted previously, short of wearing a bodysuit or bleaching every surface touched, there is little that can be done to mask the breadcrumb trail of DNA that we inevitably leave behind us. In this regard, DNA is very much like fingerprints, and an examination of how fingerprints are viewed in a Fourth Amendment context is illustrative.

### C. *The Fingerprint Analogy*

As applied to the issue of abandoned DNA, the fingerprint analogy clearly has appeal. Both fingerprints and DNA are powerful means of individual identification, and fingerprints, like DNA, are involuntarily “abandoned” in prodigious amounts on the items that we touch. Some scholars, however, contend that the analogy fails under closer analysis. One difference, the argument goes, is that because DNA contains so much information on an individual, it is in a class of its own and must be afforded greater protection than fingerprints.<sup>143</sup> The other line of argument is that we all are on notice about the ubiquity of fingerprints to a degree that we are not concerning DNA. “It is ‘common knowledge’ that whenever you touch something in public, you run the risk of leaving fingerprints that can be used for identification purposes,”<sup>144</sup> but “the same cannot be said about shed, out-of-body DNA.”<sup>145</sup> Being on notice diminishes the expectation of privacy.

While *Maryland v. King*<sup>146</sup> involved the constitutionality of pre-conviction DNA sampling, the view of DNA testing as analogous to fingerprints, which was expressed in the majority’s opinion, is both

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142. *Chadwick*, 433 U.S. at 11.

143. *E.g.*, Joh, *supra* note 8; Imwinkelried & Kaye, *supra* note 111.

144. Scherr, *supra* note 131, at 467.

145. *Id.* at 468.

146. 569 U.S. 435 (2013).



noteworthy and applicable to the discussion of abandoned DNA evidence. In 2009, Alonzo King was arrested on armed assault charges in Maryland. As part of the routine booking procedure, a buccal swab was taken from King's cheek and the resulting DNA was entered into a state DNA database. King's DNA cold-matched that from an unsolved 2003 rape case, and King subsequently was convicted of that offense. On appeal, King argued that the taking and databasing of his DNA prior to any conviction violated his Fourth Amendment rights. The Maryland Court of Appeals agreed with Mr. King, but the U.S. Supreme Court reversed.

In striking down King's Fourth Amendment challenge, the Court focused not on whether swabbing an individual's cheek for DNA is a search—it is—but rather on the reasonableness of the search under the circumstances (in King's situation, his pre-arraignment booking). For the majority, the "proper processing of arrestees is so important and has consequences for every stage of the criminal process," that the Court "has been reluctant to circumscribe the authority of the police to conduct reasonable booking procedures."<sup>147</sup> DNA simply represents "an important advance in these techniques," which include the taking of familiar "mug" shots and Bertillon measurements.<sup>148</sup> Then, Justice Kennedy, writing for the 5-4 majority, connected the final dot in the picture: "Perhaps the most direct historical analogue to the DNA technology used to identify [the suspect] is the familiar practice of fingerprinting arrestees."<sup>149</sup> Indeed, "DNA identification is an advanced technique superior to fingerprinting in many ways, so much so that to insist on fingerprints as the norm would make little sense to either the forensic expert or the layperson."<sup>150</sup>

*King*, as had *Schmerber* and *Skinner* before it, involved the coerced, invasive (albeit minimally so) taking of a DNA sample. In that regard, it is somewhat inapplicable to the discussion of abandoned DNA, but Justice Kennedy's obiter dictum is relevant in that it illustrates how the Court views DNA as an analogue to fingerprints.

### 1. Too Much Information and the *Parade of Horribles*

Proponents of genetic exceptionalism contend that what sets DNA apart from other types of evidence, such as fingerprints, is the

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147. *Id.* at 456.

148. *Id.*

149. *Id.* at 458. Justices Ginsburg, Kagan, Scalia, and Sotomayor dissented.

150. *Id.* at 459.

fact that DNA samples hold the potential to reveal vast amounts of information not necessary for identification purposes. In so arguing, they often cite<sup>151</sup> Judge Reinhardt's dissent in *United States v. Kincade*: "DNA profiles derived by STR may yield probabilistic evidence of the contributor's race or sex . . . [as well as] genetic defects, predispositions to diseases, and perhaps even sexual orientation."<sup>152</sup>

Because *Kincade*'s dissenters are often cited by those arguing for greater protection for abandoned DNA, it is worth taking a detour into the facts of the case. Thomas Kincade was a parolee when he was asked by his parole officer to give a blood sample so that his DNA could be added to the CODIS database in accordance with the DNA Analysis Backlog Elimination Act of 2000.<sup>153</sup> Kincade refused and filed suit alleging, inter alia, a Fourth Amendment violation. While his case was pending, he was incarcerated for violating his parole, at which time the government was able to take his DNA sample over his objection. Nonetheless he maintained his action, and his case, now reduced to a Fourth Amendment objection, was heard by the Ninth Circuit sitting en banc. For the court's majority, the case proved relatively simple: As a convicted felon on parole, Kincade had a reduced expectation of privacy, and following *Skinner*, the government could compel the "minimally invasive" taking of a sample under "the totality of the circumstances."<sup>154</sup> For the dissent, however, the case raised the frightening specter of "nightmarish worlds depicted in films such as *Minority Report* and *Gattaca*."<sup>155</sup>

In the absence of Supreme Court guidance, it is tempting to look at the opinions in *Kincade* for help in navigating the DNA question. As prescient as the dissenters' concerns may, or may not, prove to be, *Kincade* is a Fourth Amendment *exception* case that looks to the protection afforded against compelled DNA sampling and is not a Fourth Amendment *exemption* case based on abandoned DNA.

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151. See, e.g., Scherr, *supra* note 131, at 492-93.

152. *United States v. Kincade*, 379 F.3d 813, 850 (9th Cir. 2004) (en banc) (Reinhardt, J., dissenting). As the name implies, Short Tandem Repeats (STR) refer to small segments of DNA, usually less than six base pairs in length, that repeat. The length of the segments and the number of repeats can be highly variable among individuals, making STR "markers" effective for identification purposes.

153. DNA Analysis Backlog Elimination Act of 2000, Pub. L. No. 106-546, 114 Stat. 2726 (2000).

154. *Kincade*, 379 F.3d at 838-39.

155. *Id.* at 851 (Reinhardt, J., dissenting).

While Judges Reinhardt and Kozinski correctly note the potential for DNA analysis to unlock the source of an individual's identity, their caution flies somewhat in the face of reality. The science of DNA analysis is time-consuming and requires highly trained personnel and expensive equipment and chemical reagents. While DNA does have the potential to yield a vast amount of personal information, DNA technicians and analysts employed in crime laboratories typically lack the training to do so. Crime laboratory technicians are trained to run specific tests and little more. Moreover, even those that do have the training typically lack the equipment, primer sets, and access to relevant databases to fish about in the broader genome of a test sample. Most of all, they lack the time. For example, in 2008, at the request of Congress, the U.S. National Academies of Science (NAS) undertook a comprehensive review of the state of forensic science in the United States. It found it sorely wanting. Among NAS's observations was the fact that "[e]xisting data suggest that forensic laboratories are under-resourced and understaffed, which contributes to case backlogs and likely makes it difficult for laboratories to do as much as they could to (1) inform investigations, (2) provide strong evidence for prosecutions, and (3) avoid errors that could lead to imperfect justice."<sup>156</sup> This is the sad reality, and one way in which this under-resourcing manifests is in tens of thousands of evidentiary samples—especially DNA samples—sitting unanalyzed across the nation. In 2015, the Department of Justice estimated that there were as many as 400,000 untested rape kits in police evidence lockers, many of which had been languishing for decades,<sup>157</sup> despite the fact that the cost of processing a rape kit can be as little as \$400.<sup>158</sup> And these are not hypothetical numbers but actual samples that have real potential to solve crimes. Rape cases, because of the nature of the evidence, are almost ideally suited for resolution using DNA testing, yet in

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156. NAT'L RESEARCH COUNCIL, COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 14 (2009).

157. Josh Saul, *Untested Rape Kits Hid 817 Serial Predators in Detroit, Tens of Thousands More Concealed in Backlog Across U.S.*, NEWSWEEK (Dec. 19, 2017, 11:48 AM), <https://www.newsweek.com/rape-kit-untested-sexual-assault-serial-rapist-detroit-prosecutor-nation-752440>.

158. The National Center for Victims of Crime places the cost of processing a rape kit at \$400-\$1500, depending on the number of samples and types of biological evidence being processed. Nat'l Center for Victims of Crime, *Sexual Assault Kit Testing: What Victims Need to Know* 6, <http://victimsofcrime.org/docs/default-source/dna-resource-center-documents/dna-sak-victim-brofinal.pdf?sfvrsn=2> (last visited Aug. 28, 2018).

2011, the city of Detroit alone had over 11,000 rape kits in storage, some dating back almost thirty years, and almost 77 percent of those kits had never even been submitted to the crime lab.<sup>159</sup> Moreover, an initial sampling of Detroit's backlogged samples, accomplished only with supplemental Department of Justice funding, found that 28 percent of the kits "revealed the DNA identification of a potential suspect,"<sup>160</sup> including what would later be determined to be over 800 serial rapists.<sup>161</sup> In a workplace environment where thousands of legally obtained evidentiary samples—many of which could lead directly to the closing of open cases—languish unanalyzed solely for lack of time and resources, there is little incentive for crime laboratory technicians to engage in the fishing expeditions that some may fear.

This reality places those fears squarely in the realm of the hypothetical. While DNA admittedly has the theoretical capacity to unlock and expose a great many aspects of an individual's make-up (ignoring the obvious confounding factor that the internal genotype does not map directly onto the external phenotype), the real probability of a crime laboratory technician having the time, training, and resources to actually extract, let alone use, that information is vanishingly small. This fundamentally reframes the DNA argument into one of assessing remote harm versus realized benefit. In the United States, there typically must be an "injury in fact,"<sup>162</sup> as "courts base decisions not on dramatic Hollywood fantasies . . . but on concretely particularized facts developed in the cauldron of the adversary process and reduced to an assessable record."<sup>163</sup> But even assuming a crime laboratory technician could mine a DNA sample for more information than needed simply for routine identification purposes, how much does that set DNA samples apart from fingerprints?

The argument against using fingerprints as an analogue to DNA largely is based on the belief that fingerprints are "dumb" features that are useful for no purpose other than identification. But "[t]hese assumptions about fingerprinting . . . are neither biologically nor

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159. *Untested Evidence in Sexual Assault Cases*, NAT'L INSTITUTE OF JUSTICE, <https://www.nij.gov/topics/lawenforcement/investigations/sexual-assault/Pages/untested-sexual-assault.aspx> (last modified Mar. 18, 2016).

160. *Id.*

161. Saul, *supra* note 157.

162. *Rakas v. Illinois*, 439 U.S. 128, 139 (1978) ("The issue of standing involves two inquiries: first, whether the proponent of a particular legal right has alleged 'injury in fact,' and, second, whether the proponent is asserting his own legal rights and interests.").

163. *United States v. Kincade*, 379 F.3d 813, 838 (9th Cir. 2004) (en banc).

historically accurate.”<sup>164</sup> This underappreciation for the power of fingerprints likely is due, at least in part, to academic insulation and also in part to how fingerprints are actually used in our society—as opposed to how they potentially could be used. As employed in forensic and crime-scene settings, fingerprints are indeed dumb, traditionally restricted to identification purposes alone. But the reality is that fingerprints have been a fertile source of study for anthropologists, geneticists, and medical professionals since at least 1888,<sup>165</sup> and very much like DNA, have the potential to reveal considerably more information than they currently do.

Studies by anthropologists and medical researchers suggest that both the size and density of fingerprint ridges are statistically linked to the sex of the individual,<sup>166</sup> and scientists also have shown that the amino acids left behind in sweat deposited with the fingerprint varies with sex as well.<sup>167</sup> A recent study suggests that ancestry may also be inferred from the shape and pattern of fingerprint ridges.<sup>168</sup>

Aside from information obtained in the ridge impressions themselves, there is a growing awareness of secondary information that may be exposed by the fingerprints. For example, studies suggest that the length of the fingers is “a lifelong signature of prenatal hormonal exposure.”<sup>169</sup> In other words, the ratio between the lengths of the digits, primarily the second and fourth fingers

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164. SIMON A. COLE, SUSPECT IDENTITIES: A HISTORY OF FINGERPRINTING AND CRIMINAL IDENTIFICATION, 307 (2001).

165. Sir William J. Herschel is largely regarded as the first government official to see the value in fingerprints for personal identification, using them for that purpose in India in 1858. W.J. HERSCHEL, THE ORIGIN OF FINGER-PRINTING 7 (1916). <http://galton.org/fingerprints/books/herschel/herschel-1916-origins-1up.pdf>. Despite this early use for identification, Sir Francis Galton generally is regarded as the father of academic fingerprint study. His seminal work, “Finger Prints,” was first published in 1892, but it was developed from a lecture given four years earlier at the Royal Institution. See FRANCIS GALTON, FINGER PRINTS (1892), <http://galton.org/books/finger-prints/galton-1892-fingerprints-1up-lowres.pdf>; see also Francis Galton, *Personal Identification and Description*, 38 NATURE 173 (1888).

166. E.g., Mark A. Acree, *Is there a Gender Difference in Fingerprint Ridge Density?* 102 FORENSIC SCI. INT. 35 (1999); Amy Z. Mundorff et al., *Sexual Dimorphism in Finger Ridge Breadth Measurements: A Tool for Sex Estimation from Fingerprints*. 59 J. FORENSIC SCI. 991 (2014).

167. Crystal Huynh et al., *Forensic Identification of Gender from Fingerprints*, 87 ANALYTICAL CHEMISTRY 11531 (2015).

168. Nichole A. Fournier & Ann H. Ross, *Sex, Ancestral, and Pattern Type Variation of Fingerprint Minutiae: A Forensic Perspective on Anthropological Dermatoglyphics*, 160 AM. J. PHYSICAL ANTHROPOLOGY 625 (2015).

169. Zhengui Zheng & Martin J. Cohn, *Developmental Basis of Sexually Dimorphic Digit Ratios*, 108 PROC. NAT’L ACAD. SCI. U.S. 16289 (2011).

(2D:4D), which can be readily observed whenever the second, third, and fourth fingers lay down a simultaneous fingerprint, shows statistically significant sexual dimorphism, with males commonly having a longer fourth finger. What is more surprising, however, is that the same pattern may be correlated with differences in athletic ability;<sup>170</sup> predisposition to certain diseases and conditions,<sup>171</sup> including autism,<sup>172</sup> coronary heart disease,<sup>173</sup> and alcohol dependence;<sup>174</sup> fertility;<sup>175</sup> sexual orientation;<sup>176</sup> predisposition to suicide;<sup>177</sup> and even the probability of financial success on Wall Street.<sup>178</sup> It is noteworthy how this list of correlated traits meets Judge Reinhardt's often cited concerns with DNA testing that it might "yield probabilistic evidence of the contributor's race or sex . . . [as well as] genetic defects, predispositions to diseases, and perhaps even sexual orientation."<sup>179</sup>

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170. John T. Manning & Rogan P. Taylor, *Second to Fourth Digit Ratio and Male Ability in Sport: Implications for Sexual Selection in Humans*, 22 *EVOLUTION & HUMAN BEHAVIOR* 61 (2001).

171. John T. Manning & Peter E. Bundred, *The Ratio of 2nd to 4th Digit Length: A New Predictor of Disease Predisposition?*, 54 *MED HYPOTHESIS* 855 (2000).

172. John T. Manning et al., *The 2nd to 4th Digit Ratio and Autism*, 43 *DEVELOPMENTAL MED. & CHILD NEUROLOGY* 160 (2001).

173. Bernhard Fink, John T. Manning & Nick Neave, *The 2nd-4th Digit Ratio (2D:4D) and Neck Circumference: Implications for Risk Factors in Coronary Heart Disease*, 30 *INT. J. OBESITY* 711 (2006).

174. Changwoo Han et al., *The Ratio of 2nd to 4th Digit Length in Korean Alcohol-Dependent Patients*, 14 *CLIN. PSYCHOPHARMACOLOGY & NEUROSCIENCE* 148 (2016).

175. John T. Manning et al., *The Ratio of 2nd to 4th Digit Length: A Predictor of Sperm Numbers and Concentrations of Testosterone, Luteinizing Hormone and Oestrogen*, 13 *HUM. REPRODUCTION* 3000 (1998).

176. Terrance J. Williams et al., *Finger Length Ratios and Sexual Orientation*, 404 *NATURE* 455 (2000).

177. Bernd Lenz et al., *Low Digit Ratio (2D:4D) in Male Suicide Victims*, 123 *J. NEURAL TRANSMISSION* 1499 (2016).

178. John M. Coates, Mark Gurnell & Aldo Rustichini, *Second-to-Fourth Digit Ratio Predicts Success Among High-Frequency Financial Traders*, 106 *PROC. NAT'L ACAD. SCI. U.S.* 623 (2009). The correlations between many of these "traits" and "predispositions" may appear far-fetched until one realizes that the correlation is between these predispositions and prenatal exposure to male hormones. Finger length itself is not driving financial or sporting success, but the quantity and timing of *in utero* hormone exposure may be, and hormone exposure is definitely correlated with behavioral traits such as risk-taking and impulsivity, which may in turn correlate with various forms of success.

179. *United States v. Kincade*, 379 F.3d 813, 850 (9th Cir. 2004) (en banc) (Reinhardt, J., dissenting).

In other words, fingerprints are dumb only as they are *currently* employed by law enforcement. Relative to the information contained in the human genome, fingerprints will never have the capacity to reveal idiosyncratic information about the individual. But the comparison is no longer between apples and oranges, but rather two apples of different sizes. Where on the information spectrum is the line to be drawn? It is as if the question is whether police can use a utility bill recovered from the trash but not a credit card bill, because of the greater amount of information revealed by the latter.

And should we draw the line at DNA and fingerprints? Hairs are shed with almost the same unavoidable frequency as skin cells.<sup>180</sup> As the Scientific Working Group on Materials Analysis noted in its guidelines for hair analysis, “[h]airs are readily available for transfer, easily transferred, and resilient.”<sup>181</sup> For this reason, human hairs have long been used in forensics to assess whether the individual bleached or dyed<sup>182</sup> their hair as well as to assess certain individual biological characteristics.<sup>183</sup>

Forensic use notwithstanding, chemical and morphological analyses of hair have long been employed by anthropologists to determine geographic origin and diet,<sup>184</sup> and by medical

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180. The Minnesota Department of Public Safety’s Bureau of Criminal Apprehension estimates that the average human shed approximately 100 hairs a day. *Hair*, MINN. BUREAU OF CRIM. APPREHENSION, <https://dps.mn.gov/divisions/bca/bca-divisions/forensic-science/Pages/trace-hair.aspx> (last visited May 26, 2017).

181. NAT’L INST. OF STANDARDS & TECH., FORENSIC HUMAN HAIR EXAMINATION GUIDELINES (2005), [https://www.nist.gov/sites/default/files/documents/2016/09/22/forensic\\_human\\_hair\\_examination\\_guidelines.pdf](https://www.nist.gov/sites/default/files/documents/2016/09/22/forensic_human_hair_examination_guidelines.pdf)

182. Julie A. Barrett, Jay A. Sieger & John V. Goodpaster, *Forensic Discrimination of Dyed Hair Color: I. UV-Visible Microspectrophotometry*, 55 J. FORENSIC SCI. 323 (2010).

183. Douglas W. Deedrick, *Hairs, Fibers, Crime, and Evidence, Part 1*, 2 FORENSIC SCI. COMM. (July 2000), <https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/july2000/deedric1.htm>. The determination of physical characteristics recently has been called into serious question when it is not supported by DNA. See the National Research Council of the National Academies of Science’s 2009 comprehensive review of forensic science in the United States. It focused particular concern on the overuse and misuse of hair analysis and found “no scientific support for the use of hair comparisons for individualization in the absence of nuclear DNA.” NAT’L RESEARCH COUNCIL, COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 161 (2009), <https://www.nap.edu/catalog/12589/strengthening-forensic-science-in-the-united-states-a-path-forward>.

184. *E.g.*, Kate Britton et al., *Maritime Adaptations and Dietary Variation in Prehistoric Western Alaska: Stable Isotope Analysis of Permafrost-Preserved Human Hair*, 151 AM. J. PHYSICAL ANTHROPOLOGY 448 (2013); Stephen A. Macko et al., *The Ice Man’s Diet as Reflected by the Stable Nitrogen and Carbon*

professionals to examine drug use<sup>185</sup> and sports doping,<sup>186</sup> detail exposure to environmental toxins, and document episodes of metabolic stress<sup>187</sup> and starvation,<sup>188</sup> including the diagnosis of anorexia and bulimia nervosa<sup>189</sup>—certainly areas of privacy that many individuals would want to protect.

Thus hairs, not unlike fingerprints, are limited only as they are commonly employed by law enforcement, but similar to fingerprints, have the potential to reveal information that the average person may not wish to expose for public knowledge. In fact, hairs, unlike fingerprints or DNA, have a temporal component in that they contain a record of past practices such as drug ingestion—certainly information that many would prefer to remain private.

In fact, as one forensic science expert has observed, “[i]t is entirely possible that a research program with a fraction of the resources currently devoted to genetic research might come up with a way of making even more discriminating determinations of racial and ethnic origin from a closer examination of fingerprint patterns.”<sup>190</sup> Given this potential, should the umbrella of privacy be expanded to include the trail of fingerprint “breadcrumbs” that we all unavoidably (and somewhat unconsciously) leave in public? If DNA is to be protected because of its potential to reveal details about disease predisposition, shouldn’t fingerprints (and hairs) be afforded similar protection lest the government potentially misuse them?

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*Isotopic Composition of His Hair*, 13 FED’N OF AM. SOCIETIES FOR EXPERIMENTAL BIOLOGY J. 559 (1999); James R. Ehleringer et al., *Hydrogen and Oxygen Isotope Ratios in Human Hair are Related to Geography*, 105 PROC. NAT’L ACAD. SCI. U.S. 2788 (2007).

185. Yuji Nakahara et al., *Hair Analysis for Drug Abuse: I. Determination of Methamphetamine and Amphetamine in Hair by Stable Isotope Dilution Gas Chromatography/Mass Spectrometry Method*, 36 J. FORENSIC SCI. 70 (1991).

186. Detlef Thieme et al., *Analytical Strategy for Detecting Doping Agents in Hair*, 107 FORENSIC SCI. INT’L 335 (2000).

187. Emily Webb et al., *Assessing Individual Systemic Stress Through Cortisol Analysis of Archaeological Hair*, 37 J. ARCHAEOLOGICAL SCI. 807 (2010).

188. Ferdinand M. Neuberger et al., *Signs of Malnutrition and Starvation—Reconstruction of Nutritional Life Histories by Serial Isotopic Analyses of Hair*, 226 FORENSIC SCI. INT’L 22 (2013).

189. Kent A. Hatch et al., *An Objective Means of Diagnosing Anorexia Nervosa and Bulimia Nervosa Using <sup>15</sup>N/<sup>14</sup>N and <sup>13</sup>C/<sup>12</sup>C Ratios in Hair*, 20 RAPID COMM. IN MASS SPECTROMETRY 3367 (2006).

190. COLE, *supra* note 164, at 307.



## 2. The Ubiquity of DNA, the Applicability of *Kyllo* and *Katz*, and the Real CSI Effect

For many, Judge Kozinski's DNA breadcrumb trail analogy strikes a loud chord. Unlike Billy Greenwood and his trash bags, if individuals cannot control the shedding of their DNA, how can they reasonably be said to have foregone their right to privacy? It is a fair question, and some have sought to tie the answer to the availability and use of emerging technology.

### a. *Kyllo* and the Effect of Technology on Privacy

Many of those arguing that DNA cannot be analogized to fingerprints point to the Supreme Court's opinion in *Kyllo v. United States*<sup>191</sup> as supporting the limiting of the collection and analysis of abandoned DNA on the grounds that DNA testing is highly technical.<sup>192</sup> At issue in *Kyllo* was the use by police of thermal-imaging cameras to detect heat escaping from Danny Lee *Kyllo*'s house and his subsequent arrest for growing marijuana. In overturning *Kyllo*'s conviction, the Court found that where "the Government uses a device that is not in general use, to explore details of the home that would previously have been unknowable without physical intrusion, the surveillance is a 'search' and is presumptively unreasonable without a warrant."<sup>193</sup>

The *Kyllo* decision sometimes is viewed as having a "significance beyond its narrow holding," in that "the majority took the occasion to set ground rules for determining when any new technology of surveillance constitutes a 'search' and thus must comply with the requirements of the Fourth Amendment."<sup>194</sup> But reading *Kyllo* only as a statement on emerging technology misses the real target. *Kyllo* is an affirmation of the unique status that the

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191. 533 U.S. 27 (2001).

192. *E.g.*, Scherr, *supra* note 131, at 468. *Kyllo* focused on "intrusion by the police into the intimacy of what occurred within the home," and accordingly analysis of "out-of-body DNA" may similarly intrude upon "genetic intimacy or privacy." *See also* Mike Silvestri, Comment, *Naturally Shed DNA: The Fourth Amendment Implications in the Trail of Intimate Information We All Cannot Help but Leave Behind*, 41 U. BALT. L. REV. 165, 178-179 (2011) (contending that *Kyllo* applies because "[t]he general public clearly has no access to the technology used to collect and analyze naturally shed DNA").

193. *Kyllo*, 533 U.S. at 40.

194. David A. Sklansky, *Back to the Future: Kyllo, Katz, and Common Law*, 72 MISS. L.J. 143, 145 (2002).

Fourth Amendment places upon the home<sup>195</sup> and upon the expectation of privacy that traditionally attaches to it.

It is the reasonableness of the expectation of privacy that is of concern to the *Kyllo* majority, not the advancement of technology. Technology only becomes a factor when it breaches the curtain of privacy around an individual that society recognizes as reasonably drawn. Consider the circumstances surrounding *Katz v. United States*<sup>196</sup>: Charles Katz was using a public phone booth to place illegal gambling bets, and federal agents had attached a recording device to the exterior of the booth without benefit of a warrant. The Court held that the government had violated the Fourth Amendment, finding that Katz had a recognized expectation of privacy not because he was making a telephone call but because he took affirmative steps while doing so that would reasonably lead to privacy. The phone booth that he used for making his calls was designed with walls and a door for the very purpose of providing privacy of sound, and neither Katz nor any other user was on notice that the conversation could be monitored by an attached recording device. Rather, the expectation was that no one outside the glass booth, whether bystander or government agent, could overhear the conversation. Thus Katz, or anyone else “who occupies [the booth], shuts the door behind him, and pays the toll that permits him to place a call is surely entitled to assume that the words he utters . . . will not be broadcast to the world.”<sup>197</sup> It is the act of utilizing the booth’s intended design to block sound—not sight<sup>198</sup>—that affords the privacy that society will recognize, and it is the government’s surreptitious placement of a recording device to defeat that expectation that violates the Fourth Amendment. Had Charles Katz neglected to close the phone booth door, the situation would have been much different.

Similarly, when Danny Lee *Kyllo* closed his door and drew the blinds across the windows in his home, he took affirmative steps that are recognized by our society as affording privacy, in his case from sight, to ensure that no one outside the house, whether bystander or government agent, could see what was going on inside. Despite the

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195. *Kyllo*, 533 U.S. at 40 (observing that the Fourth Amendment draws a line at the entrance to the house that “must be not only firm but also bright”).

196. 389 U.S. 347 (1967).

197. *Id.* at 352. Arguably, the Court could have arrived at much the same conclusion by employing a more traditional property-based argument. By paying the toll, Katz effectively rented the booth for the duration of his call, and thus had the same Fourth Amendment rights as a lessee.

198. *See id.* (observing that what Katz “sought to exclude when he entered the booth was not the intruding eye—it was the uninvited ear”).

special protection afforded the home, had he left the blinds open or the door ajar, anything visible in “plain view” would not have been protected. Thus, as in *Katz*, it was the government’s use of a thermal scanner to overcome a recognized expectation that is of concern—not the nature of the technology. Indeed, the technology and equipment needed to accomplish cyanoacrylate fuming of latent fingerprints, and the alternate light sources needed to view them, are not widespread among the public, yet the collection of fingerprints is not deemed an unreasonable search when they have been deposited in unprotected places. Why? Because society accepts the ubiquity of fingerprints. A common figurative expression is to say that someone “has their fingerprints all over” something.<sup>199</sup> What *Kyllo* really tells us is that when the knowledge of the existence of something becomes pervasive in our society, the expectation of privacy drops away. Technology need not be involved at all, except to the extent that it furthers the pervasiveness. When we reach a point where thermal scanners are widespread within the community, then individuals, including Mr. Kyllo, will no longer have a reasonable expectation that closed doors and shuttered windows will provide thermal privacy from one’s neighbors, and therefore from the government as well.<sup>200</sup>

The use of technology is only one means of propagating that societal acceptance. Far more impactful is our appetite for entertainment.

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199. In his dissent in *U.S. v. Kincade*, 379 F.3d 813, 874 (9th Cir. 2004) (en banc), Judge Kozinski conceded that “we have come to accept that people—even totally innocent people—have no legitimate expectation of privacy in their fingerprints, and that’s that.”

200. This deterministic view of the availability of technology is somewhat at odds with the Court’s earlier ruling in *California v. Ciraolo*, 476 U.S. 207 (1986). In that case, a marijuana grower had surrounded his back yard with a ten-foot-high fence in order to shield his plants from view. Santa Clara police officers “secured a private plane and flew over respondent’s house at an altitude of 1,000 feet, within navigable airspace” and observed the plants. *Id.* at 209. Accepting that the plants were being grown in the defendant’s curtilage, the Court nonetheless found that “[i]n an age where private and commercial flight in the public airways is routine, it is unreasonable for respondent to expect that his marijuana plants were constitutionally protected from being observed with the naked eye from an altitude of 1,000 feet.” *Id.* at 215. While it is true that a member of the general public could have secured an aircraft and arranged to fly over Ciraolo’s property, the likelihood is low, and the act of doing so does not seem to be fundamentally different from securing a thermal scanner and pointing it at Kyllo’s house.

### b. The “Real” CSI Effect

What is the societally recognized privacy interest in DNA in the age of forensically-themed television programming? In 2013, sixty years after Watson and Crick published the molecular structure of DNA, the Macmillan Dictionary noted that DNA had “taken a further step into the mainstream by acquiring a metaphorical use. We say that a particular characteristic or talent is ‘in someone’s DNA’ or ‘part of their DNA’ as a way of emphasizing that this is a fundamental aspect of their nature, and unlikely ever to change.”<sup>201</sup> Thus, as with the expression, “having fingerprints all over it,” the public has recognized the ubiquity of DNA even if it doesn’t understand the science underlying it, and much of that recognition can be traced back to television.

For most of human history, the shedding of skin cells, consciously or unconsciously, was of limited consequence to everyone except dandruff shampoo manufacturers, but the relatively recent ability of forensic scientists to extract DNA from a single epithelial cell or shed hair follicle<sup>202</sup> has revolutionized crime solving and has enabled decades-old “cold” cases to be successfully closed.<sup>203</sup> Moreover, the rapid improvement in DNA technology is

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201. Michael Rundell, *It’s All in the Genes: DNA and Metaphor*, MACMILLAN DICTIONARY BLOG (2013), <http://www.macmillan.com/dictionaryblog/its-all-in-the-genes-dna-and-metaphor>.

202. The shaft of a hair typically contains only small amounts of fragmented nuclear DNA. Consequently, only hairs containing the root, or follicle, generally are used for nuclear DNA testing; whereas, the shaft of the hair is a rich source of mitochondrial DNA. It also is becoming clear that some quantity of DNA can be transferred even when there is no corresponding cell structure. Cell-free Nucleic Acids may make up a sizable percentage of “touch DNA.” See, e.g., Ignacio Quinones & Barbara Daniel, *Cell Free DNA as a Component of Forensic Evidence Recovered from Touched Surfaces*, 6 FORENSIC SCI. INT’L.: GENETICS 26 (2012).

203. For example, in 2013, Utah police obtained “touch” DNA from a granite rock used to bludgeon a woman 18 years earlier. Using both “touch” and “abandoned” DNA, the crime lab was able to match DNA from the rock to that of a cigarette abandoned in 2013 by a suspect, Joseph Michael Simpson. Simpson was convicted in 2016. Jessica Miller, *Utah Jury Sentences Man to Life Without Parole for Killing Teen in 1995*, SALT LAKE TRIB. (Sept. 30, 2016, 2:00 PM), <http://www.sltrib.com/home/4416500-155/utah-jury-deliberating-sentence-for-man>. The resolution of “cold” cases includes exoneration of wrongfully convicted individuals. For example, in 2010, Frank Sterling was exonerated after 18 years in prison for murder when “touch” DNA extracted from the clothing of the 1988 murder victim pointed to another suspect. See *Frank Sterling*, INNOCENCE PROJECT, <https://www.innocenceproject.org/cases/frank-sterling/> (last visited Mar. 30, 2017).

pushing the applicability further and further back in time. Scientists now claim the ability to recover human DNA fragments from cave soils deposited 50,000 years ago.<sup>204</sup> The consequence of this is that we now find ourselves painted into an evidentiary corner that no one could have imagined when Rudolf Abel abandoned his pencil in a motel room in New York in 1957.

Beginning in the late 1990s and early 2000s, the legal world began debating the effect of crime-scene television programs on potential jury pools in what came to be known as the *CSI effect*. In 2002, in one of the first public references to it, *Time Magazine's* science editor Jeffrey Kluger wrote, “[t]he myth of quick-and-easy crime busting may be starting to get in the way of law enforcement. Forensic scientists speak of something they call the CSI effect, a growing public expectation that police labs can do everything TV labs can.”<sup>205</sup>

The legal debate was actually quite extensive for a few years, though it seems to have somewhat run its course of late.<sup>206</sup> What concerned most commentators during this period was the contention that the people making up juries were so conditioned by exposure to crime-scene dramas on television, that they brought with them to the courtroom an unrealistic expectation of the power and scope of forensic science. One area of particular concern was the belief that many jurors expected every case to be resolved through the magic and mastery of DNA technology.<sup>207</sup>

Subsequent studies have cast significant doubt on this underlying concern about the CSI effect's ability to bias jury verdicts, and it no longer projects the pernicious shadow that many feared.<sup>208</sup> But the fact that jurors may not harbor an intrinsic bias against a case brought without DNA or other high-tech evidence does not mean that there is not the overarching *awareness* of DNA that triggered

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204. Lizzie Wade, *DNA from Cave Soil Reveals Ancient Human Occupants*, 356 (6336) *SCIENCE* 363 (2017), <http://science.sciencemag.org/content/356/6336/363>. DNA sequenced from these contexts is recognizable as human but cannot, at least presently, be sequenced to the level of the individual.

205. Jeffrey Kluger et al., *How Science Solves Crimes*, *TIME*, Oct. 21, 2002, at 36.

206. See Donald E. Shelton, Gregg Barak & Young S. Kim, *Studying Juror Expectations for Scientific Evidence: A New Model for Looking at the CSI Myth*, 47 *CT. REV.: J. AM. JUDGES ASS'N* 8, 9 (2011) (“[T]he CSI effect could be more appropriately called the ‘CSI myth.’”).

207. *Id.* at 11. A 2009 study conducted in Wayne County, Michigan (Detroit), found that 42.1% of potential jurors expected DNA evidence to be presented in every case, and 74.6% expected it in murder cases. *Id.*

208. *E.g.*, Wyatt Feeler, *Can Fiction Impede Conviction? Addressing Claims of a “CSI Effect” in the Criminal Courtroom*, 83 *MISS. L.J.* 1 (2014).

the concern in the first place. The underlying predicate of the CSI effect—that the general public is sensitized to the power and ubiquity of DNA—is not in dispute. In other words, those that now argue that there is no CSI effect are not arguing that the general public is unaware of DNA technology, but rather only that the awareness does not have any substantial and systemic impact on jury verdicts.

In fact, all evidence suggests that the general public is not only well aware of DNA, but is actively making it a part of general life as shown in no small part by the rise of commercial direct-to-consumer DNA sampling services.<sup>209</sup> Celebrities are aware of it;<sup>210</sup> students are aware of it;<sup>211</sup> sports fans are aware of it;<sup>212</sup> and certainly consumers in general appear all too aware of it. During the 2016 Black Friday sales frenzy, AncestryDNA, one of only several large commercial direct-to-consumer DNA companies, sold more than 500,000 DNA

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209. In 2008, Time Magazine named the Retail DNA kit as its number one invention of the year, beating out the (2) Tesla *Roadster* and the (3) Lunar Reconnaissance Orbiter. See Anita Hamilton, *Best Inventions of 2008: Invention of the Year: 1. The Retail DNA Test*, TIME (Oct. 29, 2008), [http://content.time.com/time/specials/packages/article/0,28804,1852747\\_1854493\\_1854113,00.html](http://content.time.com/time/specials/packages/article/0,28804,1852747_1854493_1854113,00.html) (“[F]or pioneering retail genomics, 23andMe’s DNA-testing service is Time’s 2008 Invention of the Year.”).

210. Social A-Listers such as Rupert Murdoch and Chevy Chase have been known to participate in “Spit Parties” in which they deposit their saliva, and the accompanying DNA, into vials for later analysis. Michael Schulman, *Ptooy!*, NEW YORKER (Sept. 22, 2008), <https://www.newyorker.com/magazine/2008/09/22/ptooey>.

211. University students agree to genetic testing as part of sociology and anthropology classes. See, e.g., Emma Daly, *DNA Tells Students They Aren’t Who They Thought*, N.Y. TIMES (Apr. 13, 2005), <http://www.nytimes.com/2005/04/13/nyregion/dna-tells-students-they-arent-who-they-thought.html>.

212. The Boston-based biotech firm, Orig3n, planned to offer free DNA testing to the first 55,000 Baltimore Ravens fans to attend a September 2017 home game against the Cleveland Browns. The fans would have the opportunity to swab their cheek and deposit “the sample into a stadium bin” in between trips to the restroom and snack bar. Jeff Barker, *Ravens Fans to Be Offered DNA Test Kits Sunday in Unusual NFL Promotion*, BALTIMORE SUN (Sept. 14, 2017), <http://www.baltimoresun.com/business/bs-bz-ravens-dna-testing-20170913-story.html>. The event was cancelled just hours before kick-off after the Maryland Department of Health learned that the lab doing the testing lacked the proper certificate under the Clinical Laboratory Improvement Amendments of 1988. Jeff Barker, *‘DNA Day’ Planned for Ravens’ Game Undergoes Federal and State Scrutiny*, BALTIMORE SUN (Sept. 18, 2017), <http://www.baltimoresun.com/business/bs-bz-ravens-dna-day-20170918-story.html>. Orig3n had previously collected blood samples for DNA testing at San Francisco 49ers games, a NASCAR Sprint Cup Series race, and the Wizard World Comic Con. Kara Chin, *San Francisco 49ers Want Blood for Human Genome Research*, AD AGE (June 30, 2016), <http://adage.com/article/adagestat/san-francisco-49ers-blood-human-genome-research/304759/>.

kits alone;<sup>213</sup> and on Cyber Monday 2017, the same company reported selling 700 percent more DNA kits than in the entire 2016 holiday shopping period—putting the size of its private database at the time at over six million individuals.<sup>214</sup> And any of these six million consumers who failed to read the disclosure agreement perhaps should have read it, because they signed away much of their privacy interests in their DNA.<sup>215</sup>

While the full scope of the effect of these programs is open to debate, one aspect is relatively clear: the “Real” CSI effect is the extent to which the general population is now acutely aware of the ubiquity of DNA, arguably on a level approaching that of the awareness of fingerprints. Combined with the widespread commercialization of private DNA services, it increasingly is difficult to argue that people are ignorant of the fact that they are leaving a trail of their DNA behind them in the course of their everyday activities, that the DNA is easy to collect and sequence, and of the scope of the information it can yield.

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213. Miguel Helft, *Ancestry.com DNA Database Tops 3M, Sales Rise to \$850M Ahead of Likely 2017 IPO*, FORBES (Jan. 10, 2017), <https://www.forbes.com/sites/miguelhelft/2017/01/10/ancestry-com-dna-database-tops-3m-sales-rise-to-850m-ahead-of-likely-2017-ipo/#1a895c3913b3>.

214. Amanda Pena, *Is Ancestry.com Worth It? Cyber Monday Shoppers Think So*, HUFFINGTON POST (Nov. 29, 2017), [https://www.huffingtonpost.com/entry/is-ancestry-worth-it\\_us\\_5a1ee4b2e4b017a311ebbf9c](https://www.huffingtonpost.com/entry/is-ancestry-worth-it_us_5a1ee4b2e4b017a311ebbf9c). Similarly, 23andMe’s DNA kit was one of the most-purchased items on Amazon’s Prime Day. According to Ancestry’s CEO, the personal DNA kit is “a mass consumer market, with millions of people wanting to experience the emotionally powerful, life-affirming discoveries that can come from simply spitting in a tube.” *Id.* (quoting *AncestryDNA Breaks Holiday Sales Record for Black Friday to Cyber Monday; More Than Triples Kits Sold Versus 2016*, ANCESTRY (Nov. 28, 2017), <https://www.ancestry.com/corporate/newsroom/press-releases/ancestrydna-breaks-holiday-sales-record-black-friday-cyber-monday-more>).

215. AncestryDNA retained substantial rights to use the resulting DNA data. *Ancestry Terms and Conditions*, ANCESTRY (June 5, 2018), <https://www.ancestry.com/dna/en/legal/us/termsAndConditions> (DNA submission grants AncestryDNA, inter alia, “a sublicensable, worldwide, royalty-free license to host, store, copy, publish, distribute, provide access to, create derivative works of, and otherwise use such User Provided Content to the extent and in the form or context we deem appropriate on or through any media or medium and with any technology or devices now known or hereafter developed or discovered. This includes the right for Ancestry to copy, display, and index your User Provided Content. Ancestry will own the indexes it creates. We will also have the right to continue to use your User Provided Content, even if you stop using the Services, but only as necessary for us to provide and improve the Services.”).

c. Non-volitional Shedding of DNA Does Not Result in a Per Se Privacy Interest

The idea that simply because we involuntarily shed skin cells, we somehow must retain a privacy interest in the accompanying DNA has no legal analogue. Quite the contrary; the analogues that do exist point to the opposite conclusion. With other aspects of our bodies and character that we routinely expose to the public—consciously or unconsciously—we lose any expectation of privacy that we might otherwise enjoy.<sup>216</sup> If we could retain our privacy by simply wishing it be so, there would be little need for gym memberships or liposuction. There is no Fourth Amendment reasonable expectation of privacy associated with a person's facial features, eye color, hair color, or body type. And yet, “[e]xcept for the rare recluse who chooses to live his life in complete solitude,”<sup>217</sup> we have no more choice about exposing our face to the world than we do about leaving DNA breadcrumbs. And it is not just our face and out-of-shape bodies; in today's society, the same holds true for our voice<sup>218</sup> and our handwriting,<sup>219</sup> and even certain types of financial records<sup>220</sup> and telephone information.<sup>221</sup>

Nor does it matter, *Kyllo's* warning notwithstanding, that a certain type or level of technology is, or is not, required to make use of these publicly exposed characteristics of our lives. Certainly, to see an individual's face or hear an individual's voice does not require anything more than a set of eyes and ears, but to make

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216. *Katz v. United States*, 389 U.S. 347, 351 (1967) (“What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection.”).

217. *United States v. Doe*, 457 F.2d 895, 898 (2d Cir. 1972).

218. *United States v. Dionisio*, 410 U.S. 1, 14 (1973) (“The physical characteristics of a person's voice, its tone and manner, . . . are constantly exposed to the public . . . [and] [n]o person can have a reasonable expectation that others will not know the sound of his voice, any more than he can reasonably expect that his face will be a mystery to the world.”).

219. *United States v. Mara*, 410 U.S. 19, 21 (1973) (“Handwriting, like speech, is repeatedly shown to the public, and there is no more expectation of privacy in the physical characteristics of a person's script than there is in the tone of his voice.”).

220. *United States v. Miller*, 425 U.S. 435, 442 (1976) (finding no legitimate Fourth Amendment “expectation of privacy” in the contents of original checks and deposit slips submitted to a bank). Privacy of bank records is now protected by statute.

221. *Smith v. Maryland*, 442 U.S. 735, 745 (1979) (holding that there is “no actual expectation of privacy in the phone numbers [a person] dialed, and that, even if [there was, that] expectation was not ‘legitimate’”). As with bank records, this information is now protected by statute.



effective use of that information (at least by law enforcement) may require photography or audio recording devices—technology that we now take for granted but which is every bit as complex and poorly understood by the general public as DNA sequencing procedures. Even that other biological breadcrumb that humans shed without their conscious volition—fingerprints—requires some level of technology, in the form of powders, sprays, or fumes, to be visualized.

It strains the Fourth Amendment to argue, on the one hand, that unconscious and non-volitional exposure to the public robs a characteristic or trait of any reasonable expectation of privacy when it is someone's face or voice or fingerprints, and then to argue that the same unconscious and non-volitional exposure to the public of prodigious amounts of cellular matter establishes a *per se* privacy interest.

*D. Genetic Exceptionalism and the Slippery Slope of "Touch DNA"*

Researchers have long appreciated the applicability of Locard's Exchange Principle<sup>222</sup> to DNA. In fact, individuals unavoidably leave traces of their DNA on objects they encounter, including those that might have been only lightly or briefly touched—leading to the somewhat colloquial term, "touch DNA." As early as 1997, studies documented the mutual exchange of DNA through handshaking.<sup>223</sup> The same study showed that objects routinely handled by specific individuals, such as pens and telephone handsets, not only yielded the recognizable DNA of those specific individuals, but also regularly yielded DNA from individuals who had previously touched the items. Moreover, the study found that "the strongest [DNA] profile obtained was not always that of the person who last held the object."<sup>224</sup>

Early DNA procedures, especially prior to the development of the polymerase chain reaction method for amplifying small DNA

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222. This principle asserts that, when persons or items come into contact, each transfers to the other some trace or evidence of the contact.

223. Roland A.H. van Oorshot & Maxwell K. Jones, *DNA Fingerprints from Fingerprints*, 387 NATURE 767 (1997). The researchers found DNA transfer in one of four hands swabbed following the individuals shaking hands with other individuals.

224. *Id. Contra* Dyan J. Daly, Charlotte Murphy & Sean D. McDermott, *The Transfer of Touch DNA from Hands to Glass, Fabric and Wood*, 6 FORENSIC SCI INT'L: GENETICS 41 (2012) ("Although secondary transfer is possible, the profiles obtained from touched objects are more likely to be as a result of primary rather than a secondary source.").

samples, were sufficiently coarse-grained that native DNA from a perpetrator could be reasonably relied upon to overwhelm incidental “touch DNA” in most cases; however, as the science has evolved, so has the sensitivity of the DNA amplification and extraction techniques. Consequently, this combination of increasingly sensitive laboratory methods and the ubiquity of DNA means that “contamination” is a greater and greater concern. In one notable example, from 1993 to 2009, police departments in Germany, Austria, and France sought in vain for a woman believed to be associated with multiple crimes including murder and burglary. Dubbed the *Phantom of Heilbronn*, after the town in Germany where she was suspected of killing a local police officer, the single evidentiary link across time and space was a DNA sequence found at each crime scene. On March 26, 2009, the German authorities announced that the real culprit had been identified—factory contaminated cotton swabs used to collect the DNA samples.<sup>225</sup>

How does this combination of DNA breadcrumb shedding combined with increasingly sensitive detection play out in a Fourth Amendment argument? Because much of the discussion about abandoned DNA centers on hypothetical misuse by the government, consider another hypothetical example that assumes no governmental misuse: An innocent couple (*A* and *B*) rent a vehicle at the airport. The couple then drive to their hotel, where the parking valet (*C*) takes the vehicle. In the morning, another parking valet (*D*) retrieves the car, and the couple drives to a tourist attraction. At the end of their sightseeing, the couple drop the car off at the airport rental garage, where rental car employee (*E*) checks the mileage and fuel level. Another rental car employee (*F*) refuels the car and returns it to the lot. Repeat this with the next two renters and their spouses or business associates (*G*, *H*, *I*, and *J*) over the next week, and factor in a different suite of parking valets (*K*, *L*, *M*, and *N*) and rental car employees (*O*, *P*, *Q*, and *R*). Now, further suppose that the following week, another individual (*S*) rents the same car, kills his victim (*T*) and then uses the car to drive the body

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225. *Contaminated Cotton Swabs Send Police on Search for Phantom Killer*, DEUTSCHE WELLE (Mar. 26, 2009), <https://p.dw.com/p/HKMq>. The contamination of these swabs illustrates how different professions sometimes attach different denotations and connotations to common words, leading to inevitable confusion. To the medical-supply manufacturers, “sterile” is a term of art intended to assure the end-user that the swabs were free of infectious agents, such as bacteria. To the forensic DNA analyst, a “sterile” swab is one that is free of extractable DNA residue. The “sterile” swabs used by the German forensic labs met the former connotation but not the latter.

to the nearest landfill, where he deposits it before returning the car to the airport, where rental car employees (*U* and *V*) check it in and refuel it. The next day, another innocent couple (*W* and *X*) rent the car and return it later that night to rental car employees (*Y* and *Z*). The victim's body is found a few days later, and the police develop probable cause to suspect that this particular rental car was used in the murder and the disposal of the body.

When the police swab the hypothetical car for DNA residue—subject to a valid warrant or not—whose DNA is likely to be present? Moreover, who has a recognizable privacy interest (or standing) under the Fourth Amendment? The answer to the first question is that, because of the dramatic improvements in the sensitivity of DNA extraction techniques, potentially the DNA of any, or all, of the twenty-six individuals (*A-Z*) could be present, and, were it not for the fact that “there comes a point when use of an area is shared with so many that one simply cannot reasonably expect seclusion,”<sup>226</sup> the answer to the second question would be that any of those same twenty-six individuals could claim a privacy interest. To allow such “casual visitor[s] . . . to contest the legality of the search . . . advances no purpose served by the *Fourth Amendment*”;<sup>227</sup> nonetheless, this is the corner into which the technology rapidly is painting us. Welcome to the frightening world of “touch DNA.”

## V. CONCLUSION: WHERE DOES THIS LEAVE US?

We find ourselves holding both the bathwater and the baby, and we need to be careful before we toss either one out.

Legal textbooks and judges' dissenting opinions often sound the warning of the impending “slippery slope.” And yet, all of common law is nothing but a massive slippery slope; that's the very nature of judge-made law, building incrementally, analogy-by-analogy on what came before, each analogy pushing us further out on a limb from which retreat becomes increasingly difficult. The introduction of DNA into the mix has been no different, though the mystique of lab coats and the fact that most people struggled through high school chemistry class would make us think that it is in a class by itself. It is not.

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226. *Mancusi v. DeForte*, 392 U.S. 364, 377 (1968) (White, J., dissenting). *Mancusi* involved the matter of privacy of personal records stored in a public, non-residential location, in this case, a labor union office.

227. *Rakas v. Illinois*, 439 U.S. 128, 141-42 (1978).

DNA is a powerful tool, but it is not magic, any more than fingerprints or photography or variable alternate-light sources or luminol sprays are magic. All have their place within forensic science, but none are panaceas. The problem is that we have become inured to the latter, and yet arguably the statistics and embryology of fingerprint ridge development is less well understood than the science of DNA. But DNA is the forensic science *du jour*, and we presumptuously assume that we have stumbled upon something the likes of which our predecessors never encountered. It is quite impossible for us today to imagine how photography or sound recording or the discovery of fingerprints changed the way that our forebears thought about their shrinking world of privacy.

The slippery slope that DNA now places us on was first stepped upon hundreds of years ago when the courts first took up the issue of abandoned property. From that point on, emerging technologies—fingerprints, Bertillon measurements, photography, Rogues' Galleries, electronic recordings—many that now seem almost quaint in retrospect, have been painting us into an ever tighter legal corner that many now argue leaves little room for privacy. The still undiscovered power of DNA analysis threatens our diminishing corner of unpainted floor even more, as will the next technological breakthrough, and the next after that. All of that may be true, but it is equally true that there is no going backward at this point. We need to deal with it.

Fingerprinting revolutionized forensics in much the same way that DNA is now doing. At one time, its potential uses for crime fighting and social engineering were seen as almost limitless, and yet only a hundred years after the first U.S. criminal conviction using fingerprints,<sup>228</sup> the foundational “hereditary and racial fingerprint research has been buried in the catacombs of history.”<sup>229</sup> Why? Certainly not by accident. Professor Cole argues that “[f]ingerprint patterns came to be viewed as empty of meaning because fingerprint examiners were so successful at disassociating the identification project from the diagnostic project.”<sup>230</sup> In other words, by isolating the identification function from any use as a profiling tool, the science avoided the appearance of taint and potential misuse that fuels today’s genetic exceptionalism debate. Fingerprint ridge patterns match or do not match independently of extraneous knowledge; whereas, DNA today is viewed as a vast storehouse of extraneous knowledge. But potential and reality seldom coincide.

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228. *People v. Jennings*, 96 N.E. 1077 (Ill. 1911).

229. COLE, *supra* note 164, at 102-03.

230. *Id.* at 118.

Abandoned DNA's evidentiary pedigree is rooted in abandoned property law, and as such it is exempt from the Fourth Amendment. There is no legal analogue capable of pulling it under the Fourth Amendment's protective umbrella without straining the fabric of its making. The manner in which humans shed cellular material is not fundamentally different from the manner in which the oils comprising fingerprints are shed. The information potentially obtainable from DNA admittedly is great, but it is not without parallel, and it does not require special treatment under the Constitution.

The Fourth Amendment has served this country well for over 200 years, in no small part because the courts have jealously guarded its scope, crafting exceptions carefully. If after a sober evaluation of the role of DNA in criminal justice, society demands greater protection of our genetic privacy, then, as the Supreme Court of California noted in its *Moore* holding, it is the role of the legislature to act. It already has done so with regard to genetic information in the employment context,<sup>231</sup> and as with the concerns engendered by the advent of wiretapping technology, or the burgeoning threat to privacy wrought by financial records, statute is the more appropriate solution. Chief Justice Taft noted in the majority opinion in *Olmstead v. United States* that "Congress may of course protect the secrecy of telephone messages by making them, when intercepted, inadmissible in evidence in federal criminal trials, by direct legislation, and thus depart from the common law of evidence. But the courts may not adopt such a policy by attributing an enlarged and unusual meaning to the Fourth Amendment."<sup>232</sup>

We need not adopt a Panglossian view of a beneficent state any more than we need to subscribe to an Orwellian vision of a malevolent state. We should take a deep breath. Technology has revolutionized how law enforcement operates before, and it will again. That is a good thing. The more that objective, empirical science can be used, the less that subjective means of fettering out the truth need be employed. It often is forgotten that the first use of DNA in a criminal case was to exonerate a murder suspect who had already confessed to the crime, not to convict.<sup>233</sup>

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231. Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-233, 122 Stat. 881.

232. 277 U.S. 438, 465-66 (1928). *Olmstead* was overturned by *Katz v. United States*, and later made moot by the adoption of the Wiretap Act, codified at 18 U.S.C. §§ 2510-2522.

233. While Colin Pitchfork is known as the first person criminally convicted using DNA testing, the same DNA testing was first employed to exonerate

Without doubt we would do well to heed Justice Brandeis's warning that "[e]xperience should teach us to be most on our guard to protect liberty when the government's purposes are beneficent,"<sup>234</sup> but Justice holds two weight pans in her scale, and we would also do well to remember that "[e]ach time the exclusionary rule is applied it exacts a substantial cost for the vindication of Fourth Amendment rights. Relevant and reliable evidence is kept from the trier of fact and the search for truth at trial is deflected."<sup>235</sup> Arguably, the cost is even greater when something traditionally residing outside of the Fourth Amendment's control is pulled under it.

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Richard Buckland, a 17-year-old man with learning disabilities who had previously confessed to the murders for which Pitchfork ultimately pleaded guilty. See WAMBAUGH, *supra* note 9.

234. *Olmstead*, 277 U.S. at 479 (1928) (Brandeis, J., dissenting).

235. *Rakas v. Illinois*, 439 U.S. 128, 137 (1978).