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Introduction: DNA and the Criminal Justice System

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Just a couple of weeks ago in New York City where I sit as a member of the [New York] Forensic Science Commission, it was brought to our attention that the New York City Medical Examiner's Office would like to create a similar laboratory which would be able to solve property crimes. And it was mentioned at that meeting by some of the people there, that in order to make that laboratory most effective in doing this, it would be critically important to include for elimination purposes biological samples that have come from the New York City Police Department.

Needless to say, the blood drained out of the face of some of the people who are [charged] with this particular responsibility, because they realize the problems they would have in effectuating it. Perhaps these New York police officers and perhaps their brethren in England realize that if you wanted to do some of these research studies, one of the studies you might wish to do is to find the gene for antisocial behavior. And if you were doing that, perhaps the first data set you'd like to study are law enforcement personnel.

Peter Neufeld, Innocence Project, November 20, 2000[1]

One attorney . . . had a position that thousands of innocent people are in jail because of DNA typing. That same attorney has this position—thousands of innocent people are in jail because of no DNA typing.

So how do we reconcile these, what seem to be, diametrically opposed positions? And the reality is, is that we have an adversary system. And that given certain situations, one will take one position versus another position. Even though the same practices, the same tools, the same interpretations are used, we can find this to occur.

Bruce Budowle, Federal Bureau of Investigation, November 19, 2000[2]

An earlier volume on the use of DNA in the criminal justice system was titled *DNA on Trial*.[3] In it, for example, Richard Lewontin and Daniel L. Hartl's influential early critique of the use of DNA evidence in criminal proceedings questioned whether the science of DNA testing was ready for the courtroom—whether, for instance, random-match probabilities produced by the population genetics of the early 1990s reflected the complexities of the distribution of DNA in the population.[4]

Today DNA technology is no longer on trial; in fact, it has now been rather neatly integrated into the courtroom. This, of course, does not mean that there are no controversial issues surrounding the use of DNA technology in criminal prosecution. What is striking is that the dominant controversies about DNA technology now revolve around the competence of the criminal justice system rather than the reliability of the technology itself. The very precision of DNA technology is, in fact, exhibit 1 in the current trial of the criminal justice system.

The O. J. Simpson case is a prime example of the relative roles of trust in DNA technology and trust in the system to use the technology. The Simpson case still dominates the public perception of the use of DNA in the criminal justice system. In fact, there was more media coverage of the DNA issues in the Simpson case than on *both* the development of a national DNA database *and* wrongful convictions uncovered as a result of DNA evidence *during the entire 1990s*.[5] Underlying the Simpson case was the issue of trust: not trust in DNA technology, but trust in the system. Did the Los Angeles Police Department handle the samples from Simpson properly? Might they have engaged in a conspiracy to frame Simpson? In the end, the technology was not a cure for distrust in the system.

The apparent paradox that the FBI's Bruce Budowle raises in his quote beginning the chapter—the fact that some individuals, such as the Innocence Project's Peter Neufeld, also quoted, question the reliability of DNA technology in one circumstance (e.g., in the Simpson trial) and use that technology to their advantage in other circumstances (e.g., postconviction exonerations)—is resolved when one considers the distrust of the criminal justice system evident in Neufeld's statement. The system, according to this view, wrongly convicts individuals because of racial biases, the underfunding of the defense, and unreliable police practices. DNA technology occasionally offers an ex post correction of these errors; however, the technology cannot be trusted in the hands of the system as the system is currently constructed. As discussed later in the chapter, issues regarding the trustworthiness of the U.S. criminal justice system are deeply embedded in current policy debates about the development of DNA databases and the use of DNA for postconviction reviews.

Trusting Justice

On May 1, 1990, Roy Criner was convicted of the 1986 murder and rape of Deanna Ogg and sentenced to ninety-nine years in prison. Seven years later, a DNA test conducted on the semen left on Ogg's body excluded Criner as its source. However, a

state district court decision to grant Criner a new trial was overturned in a five-to-four decision by the Texas Court of Criminal Appeals, which offered the theory that Ogg might have had consensual intercourse prior to being raped by Criner and that Criner might have worn a condom or not ejaculated. Three years later, a cigarette butt from the crime scene was tested: It contained DNA from Ogg and the individual who was the source of the semen on Ogg's body—*not* Criner, thus undermining the appeals court's theory. In July 2000, the Texas Board of Pardons and Paroles, at the request of the prosecutor, recommended that Criner be set free.[6]

The Criner case highlights the potential of DNA to identify, postconviction, who did *not* commit a crime by demonstrating that crime scene evidence that is almost certainly from the perpetrator of the crime does not match the individual convicted of the crime. The area of postconviction exoneration has received far more press, but far less policy action, than the development of DNA databases.[7]

The over 140 convict exonerations in the United States that have resulted from postconviction DNA analysis since 1989 raise two serious questions about the U.S. criminal justice system. The first question is whether the system is receptive to evidence that it has erred in a particular case. The second is whether these exonerations highlight systematic fault lines in the system itself.

The Criner case is indicative of a lack of receptivity of the system to postconviction application of DNA analysis. This is likely in part because DNA evidence, in principle, can be incorporated into the normal process of appealing a guilty verdict. However, this is, at most, just part of the story. As Margaret Berger highlights in chapter 6, the "system" has always placed a high priority on finality and has created a set of barriers to the introduction of new evidence in a case. The importance of finality is at least partly a result of resource constraints, combined with the natural tendency of evidence to "depreciate" over time. Yet DNA evidence does not (necessarily) depreciate. Institutions built around this depreciation principle are thus a poor fit with DNA technology. The question, then, is how to recalibrate our institutions to match this powerful technology. This is the question that Berger takes up in detail.

The most prominent institution that has developed around the issue of postconviction DNA analysis has been the Innocence Project. Barry Scheck and Neufeld started the Innocence Projects in 1992 at the Cardoza School of Law. The success of the Cardoza program led to the founding of forty-one other Innocence Projects, most between 1999 and 2002. The success of the Innocence Projects has created pressure on public officials to sponsor review programs. Thirty-nine states have

passed statutes to facilitate postconviction review based on DNA technologies, including a number of state programs to facilitate access. Also, a few district attorneys around the country have begun reviews of convictions that were returned prior to access to DNA technology; the first to initiate such a review was Paul Pfingst of San Diego in 2000. Strikingly, although increased statutory rights of convicts to access to DNA evidence have facilitated postconviction review, none of the exonerations to date has been the result of either a state-run or DA-run postconviction review program.

This troubling observation raises two obvious questions: (1) Why has the use of DNA to exonerate convicts been slow to spread? and (2) why, where there have been proactive government-sponsored programs, have virtually no convicts been exonerated?

The most obvious explanation is that resources are limited. Simply because the technology allows something to be done does not mean that it should, since there will be opportunity costs to any use of resources. Notably, though, as Berger points out, existing government programs have not been resource-intensive; furthermore, exonerations actually save resources because of the cost of taking care of prisoners. A more plausible explanation is that there are no powerful constituencies within government who are in favor of reviewing old cases. In fact, postconviction review is dangerous to incumbent officials because of the possibility that it will reveal errors by individuals and the system. It is perhaps unsurprising, therefore, that those review programs that have sprung up were started with a significant lag after DNA evidence became routinely available in the courtroom (about 1993).

DNA Databases: The Architecture of Security and Trust

On March 3, 1986, Debbie Smith was abducted from her home in Williamsburg, Virginia, robbed, and raped. The subsequent police investigation reached a dead end, until a sudden breakthrough on July 26, 1995: the newly-entered DNA profile of a prisoner, Norman Jimmerson, matched the semen collected from the rape kit. Jimmerson was subsequently convicted and sentenced to two life sentences plus 25 years with no chance of parole. As Debbie Smith testified:

> For the first time in six and a half years, I could feel myself breathe. . . . Finally, I could quit looking over my shoulder. No longer did I have to drive around in circles hoping a neighbor would drive by so I could get the courage to get out of my car to go into my own front door if no one else was home. Unfamiliar noises no longer left me panic-stricken. I no longer scanned faces in a crowd to see if he was following me. Suicide was no longer a considera-

tion. And finally, my husband is grateful that I don't wake him up anymore in the middle of the night with the ear-piercing screams.[8]

In 1984, 13-year-old Heidi Marie Fredette's body was found dumped by the side of Highway 36 in Tehama County. She had been strangled, stabbed and sexually assaulted.

Fifteen years later, evidence taken at the time of her death was analyzed as part of the state Department of Justice's "old and cold" program. A DNA fingerprint of the rapist was completed and compared against the DNA databank of known felons in Berkeley.

A cold hit was made to David James McIntosh, 53, whose genetic profile was in the databank because of a conviction for kidnapping, rape and assault with intent to commit rape. McIntosh was just days away from being released from Folsom State Prison, but he is now being prosecuted for murder, kidnapping and murder by torture of Heidi, and will be eligible for the death penalty.[9]

The development of a national DNA database, starting in 1990 and accelerating in 1994 with the DNA Identification Act, has created a scenario in law enforcement in which perpetrators of crimes may be ensnared by minute biological traces they have left behind at the scenes of their crimes, as Jimmerson and McIntosh were. In fact, according to the FBI, through March 2004, 16,100 crime investigations in the United States had been aided through convict DNA databases.[10] This likely represents a tiny fraction of the potential investigative potential of the national DNA database: the United Kingdom (with a fifth of the population of the United States), which developed a national database earlier than the United States, claims to have seven to eight hundred investigations aided per week—a rate that, every six months, exceeds the total hits in the *history* of the U.S. program![11]

These numbers, in fact, understate the potential value produced by DNA databases, because they do not count (1) the number of cases in which likely suspects have been excluded (saving both the potential suspect some distress and the police investigative resources); (2) investigative resources saved because of the shortened investigations resulting from cold hits; (3) societal costs from additional crimes committed by perpetrators who either would not otherwise have been caught or would have been caught later; and (4) the deterrent effect of a DNA database. Given these potential public benefits from DNA databases, it is unsurprising that DNA database laws authorizing the creation of DNA databases rapidly spread through all fifty, states during the 1990s. Perhaps because of the rapid spread, there are substantial state-to-state variation's in DNA database laws with respect to (1) resources devoted to the databases; (2) criteria for inclusion in the database; and (3) regulation of privacy-related issues.

The variation among states in resources devoted to DNA databases is reflected in an enormous state-to-state variation in database effectiveness. In fact, most of the investigations aided by the database through the end of 2003 were in four states:

Virginia, Florida, New York, and Illinois.[12] In contrast, Louisiana, with the widest statutory mandate for inclusion in the database in the country, as of the end of 2003 had not aided a single investigation (largely because of a lack of resources devoted to actually placing samples in the database).[13]

The categories of criminals are included (in principle) in the database also varies substantially from state to state. As the concluding chapter discusses, some states at one end of the spectrum include only very narrow categories of offenders (typically those convicted of felony sex crimes) in the database, whereas those with broader criteria allow for the inclusion of all individuals arrested for a felony. There has been a strong trend in recent years toward broader inclusion, such that most recent laws designate all felons for inclusion in the database.

These trends presents some interesting puzzles, particularly: (1) Why has database legislation spread so rapidly (as compared to postconviction relief)?; and (2) why, in contrast, has the allocation of resources to databases moved more slowly? These questions are addressed, in part, by the following story by Christopher Asplen, who was executive director of the National Commission on the Future of DNA Evidence at the time he told it:

> I was speaking to the National Conference of State Legislatures on this particular issue, and I was giving it to them very strongly. I was really sticking to them the issue that, hey folks, it's very clear. This saves lives.
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> I gave them the whole tangible implication speech. I gave them the Debbie Smith story. I laid it out all for them, and I said what you've done is you have done what is often done in state legislation—you've created an unfunded mandate, and the effect of that is that we're going to lose lives, et cetera, et cetera.
>
> One of the legislators raises his hands, stands up at the end of the question-and-answer period and he says, wait a minute. He says, let me explain to you how this works. He says we're all pro–law enforcement. But let me tell you how we have to deal with the allocation of limited resources. Law enforcement comes to us and they say here's our list of the top things that we want funded, and we go and we give law enforcement their top three. As soon as your issue gets into the top three, your issue will get funded, but don't tell us we're doing something wrong here until law enforcement is telling us they really need it.[14]

The symbolic value of DNA databases is pretty clear: They are about monitoring dangerous criminals. The cost of legislation that simply authorizes—but does not fund—a DNA database is zero. It is when resources are to be allocated to databases that could go elsewhere that the system pushes back: The same resources could be used to cut taxes, improve schools, and so on. In fact, the key constituency for directing resources toward databases is law enforcement—and as Asplen's anecdote makes clear, the opportunity cost of resources spent on a database is borne largely

by law enforcement. Requests for funds for creation, support, or expansion of a database will displace something else that law enforcement puts on its list of legislative funding priorities, and these are often items that have stronger advocates embedded within the law enforcement community. For many states, therefore, the key impetus for the expansion of their databases has been federal funding.

The success of DNA databases at identifying perpetrators of crimes has at this point created a self-reinforcing dynamic for the growth of these databases, which has been exponential in the last three years. Ironically, although the expansion of state DNA databases creates an incentive to invest further resources into the system, it also puts greater burdens on the long-run political-ethical calculus undergirding the system. As reiterated throughout this volume, DNA is revealing. It may reveal where you have been. It may reveal what you look like. It may reveal your propensity for getting a particular disease. It reveals who you are related to and may reveal your relatives' propensity for getting a particular disease. As the database expands, it may prompt some people to push back against the database, as well as to protect the data that have already been collected, particularly as the database begins to include individuals not convicted of any crime, like arrestees and suspects. The backlash is likely to be even greater if law enforcement includes in the databases samples collected from potential suspects of crimes who were subsequently excluded from having contributed the crime scene samples and samples collected in "DNA dragnets." It can be expected to be especially strong if the system begins to search for "near misses" to identify close relatives of those in the databases, the number of which could considerably exceed the number of individuals "officially" in the databases. The design imperative of DNA databases will necessarily shift from providing security, for which it has been optimized up to this point, to ensuring the trust of the public, which will increasingly find itself directly or indirectly included in the database. It is this balance of security and trust that Barry Steinhardt (chapter 9), Amitai Etzioni (chapter 10), Viktor Mayer-Schönberger (chapter 11), and D. H. Kaye and Michael Smith (chapter 12) address.

Trusting Science

Barry Scheck: One question. Would it make any difference if you started the research the other way and you said, all right, let's look at pedophiles which is a particularly troubling kind of crime? We even have the United States Supreme Court Opinion and a number of statutes that say that Courts can permanently incarcerate people who have been convicted

of pedophilia if they find they have an inherent—and you can easily read into that term "genetic"—basis for the disorder. And please also bear in mind that what might be interesting information in the abstract to geneticists, please remember we as lawyers and judges in the system, we will take the smallest association and use it for release decisions, for guilt or innocence determinations because in many ways it looks like and arguably could be better than a lot of the data that comes into Court or might seem that way.

So would you have any inherent, Dr. Watson, ethical objections to just saying let's take all the convicted pedophiles and study those blood samples?

James Watson: If you could find something, I don't see necessarily the harm. As a scientist, you have to ask, well, are you wasting your time. But I think you're more or less saying we shouldn't get knowledge because the legal and judicial system is bad, and lawyers get off people. So I mean it seems to me that the failure of the legal system shouldn't be that we shouldn't find out the basis of behavior which is pretty scary.[15]

The final institution that developments in the use of DNA technology in criminal justice challenge is science. What are the boundaries that science should erect between itself and the criminal justice system? The goal of maximizing scientific knowledge may, at times, be inconsistent with the needs of the criminal justice system. And the ethical limits that science constructs in its search for knowledge (see chapters 7 and 8) may also be inconsistent with the needs of the criminal justice system. How, in turn, will science be shaped by its encounter with the justice system? The dynamite question is, will genetics offer insight into bases of criminal behavior? If so, how will the criminal justice system use that information? Should "genetically determined predispositions" enter into decisions about guilt and innocence (my genes made me do it)? Might genetic tests be the basis of preemptive incarceration? Might genetic tests offer a road map for preventing antisocial behavior?

Garland Allen documents, in chapter 13, repeated (and generally unsuccessful) efforts to understand the genetic bases of behavior. In chapter 4, Simon Cole discusses serious endeavors to connect physical attributes to criminal behavior (e.g., whether particular "swirl patterns" in fingerprints are correlated with criminal behavior). There is a much broader and deeper scientific consensus that our genetic makeup is related to our behavior (even if, as Allen argues, the relationship between the two is too complicated to untangle) than there has ever been with respect to the relationship between swirl patterns and criminality. There is thus a critical conjunction of scientific consensus (regarding the connection between behavior and genetics) and the criminal justice system (collecting genetic material from individuals who have been convicted of particular criminal behavior). This conjunction

connects directly to the issue, mentioned earlier in the chapter, searching DNA databases for near misses: Broad swaths of our society may find themselves under "genetic surveillance" because they share genes with someone who has been convicted of a crime. The ideology of genetic determinism readily supports such scrutiny: Those who share genes with criminals are at higher risk for engaging in criminal behavior. In chapter 14, Troy Duster connects views about genetic determinism to racial imbalances in the U.S. criminal justice system: If crime is viewed as genetically determined, and certain racial groups are disproportionately detained in criminal investigations and convicted of crimes, then it might be a small and dangerous leap to explain this disparity as genetically determined.

Closely following this issue is that of trusting science in the criminal justice system. The laboratory capacities that the criminal justice system has developed are often dependent on, and controlled by, the law enforcement community, which typically has a stake in the results of the analyses conducted by those laboratories. Academic scientists have developed a sophisticated (if not always successful) set of safeguards to buffer researchers from the demands of those with stakes in the outcomes of their research. The criminal justice system has little in the way of such buffers; it instead leans heavily on the adversarial processes of the courtroom to bring to light any biases or flaws in the science. Such reliance is problematic, however, especially where resources on the defense side are not available to critically examine the science underlying the prosecution's case.

Conclusion

The thoughtful incorporation of technology into our society requires the act of imagining the obvious. It requires an active evaluation of our values as a society, of how our society can and should be reshaped by the technology, and of how the technology should be shaped by our society. These are acts of imagination, because they require conjecture upon conjecture as to how social institutions and technology coadapt, the plausible alternatives for which are countless. They are acts of imagining the obvious, because after the future plays out, the path we have taken will seem obvious and inevitable. However, in fact, there is a set of alternative paths before us. The role of public discourse (as Stephen Breyer and Sheila Jasanoff discuss in chapters 2 and 15, respectively), and of a volume such as this, is to help define these alternative visions.

Notes

1. Peter Neufeld, statement, roundtable on "Privacy: Processes and Structures" ("DNA and the Criminal Justice System" conference, John F. Kennedy School of Government, Harvard University, Cambridge, Mass., November 21, 2000). The proceedings of the conference are available online at www.dnapolicy.net.

2. Bruce Bodowle, statement, roundtable on "Development of DNA Technology: What It Makes Possible, What It Will Make Possible" ("DNA and the Criminal Justice System" conference, John F. Kennedy School of Government, Cambridge, Mass., November 20, 2000).

3. Paul R. Billings, ed., *DNA on Trial: Genetic Identification and Criminal Justice* (Woodbury, N.Y.: Cold Spring Harbor Laboratory Press, 1992).

4. Richard C. Lewontin and Daniel L. Hartl, "Population Genetics in Forensic DNA Typing," *Science* 254 (1991). A 1996 National Research Council report's assessment that adequate methodologies existed to deal with population substructure reflects the current scientific consensus. See National Research Council, Committee on DNA Technology in Forensic Science: An Update, *The Evaluation of Forensic DNA Evidence* (Washington, D.C.: National Academies Press, 1996).

5. David Lazer, "The Diffusion of DNA Databases" (working paper, National Center for Digital Government, John F. Kennedy School of Government, Cambridge, Mass., 2004).

6. Bob Burtman, "Free at Last," *Houston Press*, August 3, 2000.

7. David Lazer, "The Diffusion of DNA Databases" (working paper, National Center for Digital Government, John F. Kennedy School of Government, Cambridge, Mass., 2004).

8. Debbie Smith, testimony before the Subcommittee on Government Efficiency, Financial Management and Intergovernmental Relations, *How Effectively Are State and Federal Agencies Working Together to Implement the Use of New DNA Technologies?* 107th Cong., 1st Sess., June 12, 2001.

9. Charlie Goodyear and Erin Hallissy, "State Boosts Felon's DNA Database; Crime-Fighting Cache Becomes Largest in U.S.," *San Francisco Chronicle*, June 25, 2001.

10. See www.fbi.gov/hq/lab/codis/aidedmap.htm.

11. See www.forensic.gov.uk/forensic/entry.htm.

12. See www.fbi.gov/hq/lab/codis/aidedmap.htm.

13. There has been a dramatic increase in resources devoted to Louisiana's DNA database since early 2002 as a result of a serial killer who left DNA at each of the scenes of his crimes; the database was initially of no use in tracking down the killer because of the lack of samples in it. This provided an impetus to the state legislature to allocate resources to the database.

14. Christopher Asplen, statement, roundtable on "Public Deliberation of Complex Issues: DNA in the Criminal Justice System as a Case Study" ("DNA and the Criminal Justice System" conference, John F. Kennedy School of Government, Harvard University, Cambridge, Mass., November 21, 2000).

15. James Watson, testimony before the National Commission on the Future of DNA Evidence ("DNA and the Criminal Justice System" conference, John, F. Kennedy School of Government, Harvard University, Cambridge, Mass., November 19, 2000).