

Genetic Witness: Science, Law, and Controversy in the Making of DNA Profiling

By Jay D. Aronson

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DNA profiling is a method of identifying a person's unique genetic makeup, comparing it to another genetic sample, and identifying the probability of whether that person's DNA matches the sample. Today this process is widely known and accepted in the United States as it commonly appears on news reports and television shows. Labeled the "CSI effect", programs like CBS's Crime Scene Investigation have led jurors to a foregone conclusion that DNA evidence is always available, accurate, and that certain crimes require the government to introduce DNA evidence in order to find the defendant guilty.¹ This expectation, however, does not take into account the contentious history of DNA profiling and the contemporary issues found in crime laboratories throughout the country. While the availability and necessity of DNA profiling are important issues, the accuracy of the process has been vigorously challenged with regard to its admissibility and weight as evidence in criminal trials. Despite the continuing potential for the mishandling of evidence, both prosecutors and innocence projects praise the technology for its ability to inculcate or exonerate suspects of a crime. In *Genetic Witness: Science, Law, and Controversy in the Making of DNA Profiling*,² Jay Aronson presents the history of DNA profiling as lawyers, scientists, and law enforcement fought between endorsement of and challenges to the technology during the late 1980s and early 1990s.

¹ See e.g., Kit R. Roane, *The CSI Effect*, U.S. NEWS & WORLD REPORT, April 25, 2005, Vo. 138 Issue 15, at 48.

² JAY D. ARONSON, *GENETIC WITNESS: SCIENCE, LAW, AND CONTROVERSY IN THE MAKING OF DNA PROFILING* (Rutgers University Press 2007).

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Aronson's research and writing focuses on the legal and political history of genetic identification. His prior works examining DNA profiling, *DNA Fingerprinting on Trial: The Dramatic Early History of a New Forensic Technique*, *The Starch Wars and the Early History of DNA Profiling*, *Technologies of Justice: The Emergence of a Fundamental Right to Post-Conviction DNA Testing*, and *History of DNA Typing* all appear to be a build up to the issues Aronson presents in his latest piece.

DNA profiling developed simultaneously in both the United Kingdom and United States in the early 1980s. British geneticist Alec Jeffreys, who is generally credited with discovering the procedure, came upon this discovery by accident. Private industry was first to promote DNA profiling with the two main companies, Cellmark and Lifecodes, using their own variations on the procedure. The scientific community, however, could not test the validity of these procedures because they relied on statistical data that each company held as proprietary information. Aronson raises the concern that scientific procedures are traditionally challenged for accuracy within the scientific community through the peer review process before they are held out to the rest of the world as proven techniques. DNA profiling is unique in this regard because it was not initially subjected to scientific peer review before it was introduced in criminal proceedings.

Rather than being subjected to open peer review, tests of the reliability of DNA profiling were first brought by defense attorneys in *Frye* hearings. A *Frye* hearing refers to an evidentiary proceeding in which the judge considers the scientific community's general acceptance of a particular scientific procedure and determines the procedure's reliability as evidence in court.³ During these hearings, experts fought over the validity of the procedures and their general acceptance within the scientific community. Aronson points out, however, that many of the

³ *Frye v. United States*, 293 F. 1013 (1923) *overruled by* *Daubert v. Merrell Dow Pharm.* 509 U.S. 579 (1993).

experts were employees of or associated with the companies promoting the use of DNA profiling. He criticizes these early *Frye* hearings in which many experts presented the technology as scientifically accepted when complete peer review was not yet possible. Most of these hearings resulted in the DNA evidence being admitted into court. These battles, however, eventually led to the companies releasing their statistical data and the scientific community's peer review of DNA profiling.

With the issues concerning the private companies' procedures in the open, interested parties sought government oversight in the industry. Some felt the Federal Bureau of Investigation ("FBI") should take command while others thought a non-law enforcement body would be better suited for an oversight role. In 1988, a year and a half after the private companies began offering DNA profiling, the FBI started to provide law enforcement with DNA profiling services. The FBI unofficially took charge of the technology putting in place a set of voluntary guidelines and trainings. The defense community criticized these actions because the FBI actively sought to exclude non-forensic scientists from the decision making process. While Aronson is generally supportive of the FBI's role, he joins the defense community's criticism of the FBI's approach because its method would only be peer reviewed by those involved in its development; full peer review had still not occurred.

Once the FBI gained control of the market, the contention surrounding DNA profiling continued to heat up. Referred to as "the DNA wars", the FBI and scientific community squared off on the proper manner of calculating population substructure. Population substructure refers to those groups within a racial category, and is important in DNA profiling for calculating the probability that an individual's DNA will randomly match another's within the same racial subgroup. Within the context of the *Frye* hearings challenging this issue, Aronson describes the

heated debate over whether the FBI's procedure was generally accepted in the scientific community. Aronson examines this debate as it took place not only in the courtroom, but also in scientific journals. The scientific debate that occurred in the journal *Science* was the peer review Aronson was looking for all along. This debate, however, did not end the controversy.

In an attempt to end the controversy the National Research Council ("NRC") issued a report examining DNA profiling in April of 1992. While most of the findings in the report were accepted, the report developed a "ceiling principle" for determining the probability of a random match within a racial group that was criticized as both irrational and unnecessary. Aronson believes the DNA community was generally confused over the impact of the NRC report and its use in legal hearings. The debate continued as the FBI pushed the NRC to accept its standards. In 1993, the NRC issued a second report adopting most of the FBI's interpretations. While this report was criticized for being biased, it did contribute to ending the DNA wars. Aronson points out that the authors of the second NRC report were "stacked" by the FBI, while the first NRC report was written by scientists representing diverse interests, a point he believes is contrary to general scientific principals. Regardless, in 1994 the DNA identification Act was passed. Along with establishing the national DNA data bank, the Act required the FBI to institute an advisory board to provide guidance on conducting DNA profiling.

Aronson credits several other factors for ending the DNA wars. In *Daubert v. Merrell Dow Pharmaceuticals*,⁴ the Supreme Court announced a new standard for testing the admissibility and weight of scientific evidence. Aronson argues *Daubert* is less stringent than the prior *Frye* standard, resulting in DNA evidence almost always being admitted. Another shift in the controversy surrounded the O.J. Simpson murder trial. Among Simpson's infamous defense team were two of the defense attorneys who spawned much of the legal challenges to

⁴ 509 U.S. 579 (1993).

DNA evidence. These attorneys decided not to challenge the reliability of DNA profiling during his trial. Rather, they attacked the police department for mishandling the evidence. Aronson views this strategy as a dramatic change in the acceptance of DNA evidence in criminal proceedings with many defense attorneys following suit. The ultimate close to the DNA wars was the development of a new procedure called short tandem repeat analysis. This procedure is highly computerized and the margin of error is significantly less than that of prior methods.

Based on all of these considerations, both prosecutors and innocence projects highly regard DNA evidence. While the technology is far better than it originally was, Aronson insists problems still persist today. There are many accounts of laboratory technicians not following proper procedures or outright manipulating data to obtain a desired result. The history of DNA evidence is not closed, but for the moment it is widely accepted and used around the country.

Written from a skeptic's point of view, this book presents the contentious history of a technology many consider non-controversial. Aronson does an excellent job of breaking down the interested parties and how they influenced the development of DNA profiling. Many of the developments were happening simultaneously, but needed to be addressed separately. Further, the non-technical reader should not shy away from this book. While scientific discussion is necessary throughout, Aronson kept his audience in mind and after such segments he would always recapture the main point by stating, "in other words...."

Aronson's premise is that the development of DNA profiling is controversial because it was fostered by non-scientists. Rather than being objectively tested by the scientific community, DNA profiling was first tested in court rooms by experts entrenched on one side or the other. Aronson credits the defense community for holding the scientists' proverbial feet to the fire and admonishes the scientific community for its delay in acting. Nonetheless, he is critical of all of

those involved, including the courts and experts, because many were biased in their “objective” positions. Further, the technology still has its imperfections. He claims that instead of DNA profiling being developed into a scientific truth it has been developed into a legal truth, with the latter being less “true” than the former. The result is a technology used and accepted as absolute when it still does not measure up to scientific standards imposed in other areas.