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FORENSIC SCIENCE OR FORGETTABLE SCIENCE?

Craig M. Cooley

I am an investigator with the Office of the State Appellate Defender's Death Penalty Trial Assistance Division ("DPTA") in Chicago, Illinois. I have been with the DPTA for the past three years where I have worked on more than fifteen capital cases. I also had the opportunity to work on various cases that were affected by Governor Ryan's commutations and pardons. Prior to law school and my work with the DPTA I received my graduate degree in forensic science at the University of New Haven.

My main research at the DPTA and during law school has dealt with forensic science and miscarriages of justice. I have spent countless hours researching those injustices where it appears that forensic fraud or misidentifications played a likely role in an innocent person's wrongful conviction. After studying these injustices, principally the capital cases, I came to the unsettling conclusion that we have two broken systems within the criminal justice system. Not only is the capital punishment system broken, so

too is the forensic science system. More importantly, we essentially have a broken forensic science system attempting to support and maintain the broken capital punishment system. As a result, before we can realistically consider implementing various capital punishment reforms, significant efforts must be made to rectify the reoccurring problems evidenced within the forensic science community.

Given this reality, I was surprised by the Committee's reliance on forensic science given the current state of affairs in forensic science for several reasons. First, our nation's crime labs are in complete disarray, especially in those states where the machinery of death is most prolific. For instance, consider the innumerable problems with the Houston Crime Lab and the Oklahoma City Crime Lab. While these two examples may be unique given their breadth and scope, it would be foolish to assume that these two labs stand alone when it comes to experiencing problems like forensic fraud, examiner incompetence, or insufficient funding. To the contrary, these problems have surfaced in crime labs throughout the country.

My second and third concerns are intertwined with one another. The notion that scientific evidence is highly accurate is premised on two assumptions: (a) scientists are performing the work, and (b) science is actually being practiced. Unfortunately, forensic science is not only comprised of few scientists, there is little science in forensic science. Put simply, forensic science has become forgettable science simply because those who invented the so-called forensic sciences forgot the science and weren't scientists.

With respect to my second concern, a distinction must be made between "scientists" and "technicians." To guarantee objectivity, scientists design blind tests to discover whether a certain outcome is a legitimate byproduct of the expected amalgamation of variables, or by the chance intrusion of an impurity. Technicians, on the other hand, merely follow prescribed routines, and are not expected to understand their underlying fundamentals. Technicians know how, but not why. Forensic science, for the most part, is comprised of technicians. This distinction is by no means intended to disparage the many hard working forensic technicians and examiners that comprise the forensic science community. Instead, it's highlighted to accentuate that forensic examiners are unable to "think outside the box" and develop experiments to test certain (prosecutorial) hypotheses, as they lack the requisite scientific education to do so. Forensic technicians must also have a firm grasp of statistics. This is essential because behind every opinion rendered by a forensic examiner there is (or should be) a statistical basis. As a result, forensic technicians are frequently unable to provide accurate statistics that support their opinions.

My third concern deals with the fact that there is little science in forensic science. Notwithstanding DNA, the other individualizing techniques (e.g. fingerprints, toolmarks, handwriting, etc.) aren't legitimate sciences. More importantly, those who invented these purported sciences were law enforcement investigators who thought repeated assertions of individuality equated to science. Turn of the century investigators viewed these identification techniques not so much as a means of establishing truth, but as a useful mechanism in building a case against a suspect. The individualizing forensic techniques are concerned with associating an item or mark located at a crime scene to the one and only source of that item or mark to the elimination of all others in the world. The fundamental belief held by forensic examiners is that objects or marks encompass sufficient disparities that on satisfactory inspection one object can't be mistaken for another. Individuality is supported by three premises: (1) numerous forms of biological and physical entities exist in unique, one-of-a-kind form; (2) these entities

leave equally distinctive traces of themselves; and (3) the methods of observation, measurement, and inference employed by forensic examiners are adequate to link these traces back to the one and only source that produced them.

When one seriously evaluates the three premises that support the identification sciences it becomes clear that individuality isn't a legitimate scientific expectation: First, probabilistic models cannot prove absolutes, such as that no two objects or marks are alike. While an object or mark can never be unique per se—physical features do have certain distinguishing qualities also known as a discrimination potential—according to its frequency of occurrence; the more frequently it occurs, the less characteristic it is. Ascertaining a feature's discriminatory potential, however, requires a vast amount of data collection to identify frequency rates (i.e. base rates). This research, unfortunately, hasn't been carried out. The second premise, which is Locard's Transfer Principle, has never been empirically substantiated. Thus it's an untested theory awaiting verification. The third premise deals with the "task at hand" reliability, which is whether, in this given case, the examiner correctly matched the crime scene fingerprint (or whatever forensic evidence is at issue) to the defendant's fingerprint. "Task at hand" reliability can be calibrated by way of blind proficiency test. Regrettably, the forensic science community has exhibited an unrelenting intolerance for mandatory, blind-proficiency testing. More significantly, when proficiency testing is undertaken and the results are made public (which is rare), they suggest that examiners, even veterans, don't fully understand the scientific principles and procedures that they're testifying about in court.

Given these well known problems with forensic science, the question becomes: Why would we try to rely on forensic science at this point in time to try and rectify the various capital punishment problems? I can only think of two reasons. One, the Governor, like many American television viewers, has been convinced by "CSI." The forensic science community has done a good job portraying an image of infallibility. I think every network has a show that glorifies the forensic sciences. And the people consulting for these network shows are forensic scientists. While it is good to have consultants on shows like this, these episodes may at times go outside the boundaries of science and reality.

The second reason I suspect the Committee puts such reliance on forensic science is based on the work of the Innocence Project. The Innocence Project uses one of the legitimate sciences in forensic science, DNA, to exonerate wrongly convicted individuals. So it's likely that the Committee thought: "If we can use science to exonerate, we can use science to find people guilty." However, there is a fundamental difference between making an inclusionary decision and an exclusionary decision. Inclusionary decisions, particularly in the identification sciences need "base rate data." As mentioned above, you're basically making a probability statement of how likely this bite mark came from the defendant. But we don't have any base rate data for these areas. More importantly, very few forensic practitioners have a firm understanding of statistics. Finally, inclusionary determinations suffer from observer effects, or examiner bias, which is a huge problem that the forensic science community has not addressed effectively.

Exclusionary decisions, on the other hand, are quite different in that they don't require statistical decision making and they generally can be made rather quickly. For instance, if even one loop or whorl doesn't correspond to a crime scene fingerprint one can say with absolute certainty that the two prints don't match up. Observer effect errors are more vexing than deliberate fraud and misconduct, as they are often impercep-

tible. To fall prey to these unconscious effects, examiners typically must (a) confront an ambiguous stimulus capable of producing varying interpretations and (b) be made aware of an expected or desired outcome.

With respect to ambiguity, the individualizing forensic sciences are top heavy with subjectivity and uncertainty. For example, many, if not all, forensic identifications are premised on an examiner's unyielding belief that his or her experience is all that is required to render an absolute identification. In regards to expectation, forensic examiners encounter many circumstances that undoubtedly, yet unnoticeably, lay seeds of expectation into their frame of mind. For instance, forensic examiners simply don't receive the physical evidence when assigned a new case. Instead, investigators frequently supplement forensic examination requests with detailed reports that generally convey superfluous information about the crime, victim[s] and/or defendant[s]. Though investigatively relevant, this information is unnecessary when performing the overwhelming majority of forensic identifications.

When one considers the subjective nature of forensic examinations and the imperceptible yet powerful influences of observer effects it should be readily apparent that the individualization sciences (excluding DNA in certain situations) can rarely, if ever, provide conclusive scientific proof that strongly corroborates a capital defendant's guilt.

One of the first sentences in the Commission's Report says there can be no serious problems with the collection, analysis, or preservation of physical evidence or associative evidence before we can hand down a capital punishment. If that is the standard, very few defendants will be subjected to capital punishment. Let's start with the collection of physical evidence. There are no standards for death scene investigations. The way we conduct death investigations is very similar to third world countries. Who is collecting the evidence? The Ph.D. scientist in the lab, is not collecting and maintaining the samples. In addition, the crime scene people are typically cops who want to move into a crime-lab technician position. Thus, those collecting and preserving the evidence that will or can send someone to death are generally law enforcement trained cops. More importantly, there are no standards in evidence collection; most of the time these individuals collect evidence on gut instinct. So the collection of evidence is very questionable because we don't know what samples are being collected, or why they are being collected.

For example, if you're a homicide investigator and you have investigated five homicides between spouses, and the husband is always found guilty, you're going to approach that crime scene with an expectation. The investigator is going to subconsciously or consciously look for evidence pointing toward the husband. So the collection of physical evidence at crime scenes is a problem that needs to be addressed within the forensic community. How do we go about this? Do we need trained forensic technicians or do we just let the police collect anything they find? There needs to be some sort of systematic collection.

Beyond the issues involved in the collection of evidence, there are also preservation issues. I've worked three capital cases where the main evidence or a large amount of the evidence was lost or misplaced. For example, I had a case that involved an arson where a trailer home burned down and killed two children. One would think that they would have saved the trailer so that somebody could examine the burn patterns. The defendant claimed that it wasn't arson, but that it was accidentally caused. If preserved, the court could have evaluated the defendant's claim. But, the trailer was destroyed the day after the fire. Another case I am familiar with involved a prosecutor who had to

“de-death” the case because, literally, 75% of the evidence was lost by a little county police department. This points out a separate issue: the big Massachusetts State Police or the Illinois State Police generally do great jobs at crime scenes compared to the rural county police departments. Not every agency can be like Dr. Selavka’s or the Illinois State Police.

My last concern deals with the mounting evidence that suggests unsubstantiated forensic techniques and rogue forensic examiners have played significant roles in a growing number of wrongful convictions. The current statistics demonstrate that forensic science is a close second behind eyewitness identification as the foremost factor in capital and non-capital wrongful convictions. The mounting evidence of forensically caused injustices demands that we investigate whether unproven forensic techniques or the actions of rogue forensic examiners have actually played a role in or led to the ultimate injustice—executing an innocent person. Many contend there is strong evidence indicating that poor or fraudulent forensic science led to the wrongful executions of Roger Coleman, Joseph O’Dell, Malcom Rent Johnson, and Todd Willingham.

Serious capital punishment reform can only truly begin once the forensic science system has undergone a complete metamorphosis. Forensic science reform must start and end with two crucial elements—funding and science. During the past decade, the financial incapacities of our nation’s crime labs have been repeatedly exposed. Inadequate funding has led to shoddy crime labs employing antiquated technology. This in turn has caused massive backlogs with respect to DNA and other forms of forensic testing. Similarly, insufficient funding has caused a high amount of turn over in our nation’s crime labs because of poor salaries. Forensic science undergraduate and graduate education has also been negatively impacted by inadequate funding. Consequently, if our nation’s criminal justice systems expect crime labs to be institutions of science and forensic practitioners to be meticulously driven and analytically nimble scientists who can carry out the necessary empirical research that can substantiate (or invalidate) the various claims made by forensic examiners, federal and state governments must start to funnel more funding into the forensic science community