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DEVIL IN A WHITE COAT: THE TEMPTATION OF FORENSIC EVIDENCE IN THE AGE OF *CSI*

J. HERBIE DIFONZO & RUTH C. STERN*

*"Physical evidence cannot be wrong. It doesn't lie. It's not influenced by emotion or prejudice. . . . [I]t's not confused by the excitement of the moment."*¹

INTRODUCTION: *CSI* VS. REALITY

On October 13, 2006, a couple and their two small children were found shot to death on a desolate stretch of Florida highway.² Police found tracks along the roadway belonging to a van or sport utility vehicle.³ Concluding that the killer and the victims may have been traveling together, police also noted that the victims may have been lying down or kneeling when shot.⁴ The mother's defensive posture indicated that she had tried to shield the children from the bullets with her body.⁵ No footprints were found in the vicinity and the only physical evidence on the scene consisted of bullet fragments and casings.⁶ A surveillance camera on a

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1. *CSI: Crime Scene Investigation: A Bullet Runs Through It* (Part 2) (CBS television broadcast Nov. 17, 2005), available at <http://www.crimelab.nl/transcripts.php?series=1&season=6&episode=8> (emphasis added).
2. Abby Goodnough, *Two Adults and Two Children Are Found Shot to Death Alongside a Florida Highway*, N.Y. TIMES, Oct. 14, 2006, at A8.
3. *Id.*
4. *Id.*
5. *See id.*
6. *Id.*

nearby pole had not been operating that night.⁷ Two witnesses who heard a rapid succession of loud pops at 2:30 a.m. on that day were unsure of what they heard and went back to bed.⁸

To all appearances, this lonely roadway represents the most arid of forensic landscapes: a crime scene yielding few, if any, clues. One wishes for a crime scene investigation team, like one of the teams so popular on television, that could magically unearth all sorts of tell-tale evidence, read the tire tracks as if they were an account of the incident in Braille, discover traces of the killer's DNA on a previously overlooked fragment of debris, and divine the details of the horror from the posture and condition of the bodies.

But the actual police will rely on far more pedestrian investigative techniques to try to solve this crime. They will inspect the family's Jeep Cherokee, recovered several days later,⁹ for clues left behind by the killer. Having obtained a search warrant,¹⁰ they will explore the family's home to find out who the victims were, and who and what they knew to try and piece together the pattern of their lives at the time of their deaths. Police will interview the friends, relatives, and acquaintances of the deceased to discover possible enemies or connections to other people and events. In the end, even if a suspect is arrested and indicted, the forensic evidence at trial will likely be inconclusive, conflicting, and not at all what viewers of *CSI* routinely see.¹¹

For television's *CSI* team, the crime scene is all the investigative universe required. And, most assuredly, the television crime scene investigators would produce a far more positive and persuasive result than the police. For one thing, they regard the testimony of ordinary people as so patently worthless that they will not stoop to ponder issues of credibility. In fact, *CSI* investigators "often seem to ignore the problem of determining whether or not someone is lying by instead going after 'real' evidence, like microfibers."¹² In the world of *CSI*, valuable forensic evidence is there for the taking. It is never contaminated, and human error never compromises

7. *Id.*

8. Goodnough, *supra* note 2.

9. Terry Aguayo, *Florida: Vehicle of Slain Family Is Found*, N.Y. TIMES, Oct. 17, 2006, at A15.

10. *Slain Family Had Recently Moved to Florida*, N.Y. TIMES, Oct. 15, 2006, § 1, at 32.

11. Forensic evidence in real life surfaces far less often than on television. For example, less than ten percent of the homicide cases in Baltimore involve fingerprints or DNA evidence. *Voir Dire: Beware the 'CSI Effect,'* NAT'L L.J., Aug. 2, 2004, at 13 (reporting estimate of Donald Giblin, Deputy Chief of Baltimore State Attorney's Homicide Division).

12. Tom R. Tyler, *Viewing CSI and the Threshold of Guilt: Managing Truth and Justice in Reality and Fiction*, 115 YALE L.J. 1050, 1058 (2006).

its analysis.¹³ The *CSI* team's techniques are always accurate, they never inculcate the wrong person, and no member of the team is ever personally motivated to lie or fabricate evidence.¹⁴ Their conclusions are supposedly always grounded in sound science and unerring technology. Never would one of them engage in hazarding "merely an educated guess."¹⁵

CSI and other similar forensic shows are immensely popular. In the 2006 season, all three *CSI* shows (*CSI: Crime Scene Investigation*, *CSI: NY*, and *CSI: Miami*) were ranked within the top seven most popular TV shows, with a total of approximately 25,000,000 viewers in the 2005-2006 season.¹⁶ Their fame has exalted the status of forensic science to godly heights. Legal commentators worry that the *CSI* show has invaded real-life courtrooms, raising the expectation of jurors as to the quality of evidence to be presented.¹⁷ Prosecutors complain that the "CSI Effect"¹⁸ has led jurors to require no less than conclusive forensic proof before they will convict.¹⁹ Defense attorneys, in turn, worry that forensic evidence, viewed by jurors

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13. See Craig M. Cooley, *Reforming the Forensic Science Community To Avert the Ultimate Injustice*, 15 STAN. L. & POL'Y REV. 381, 388 (2004) ("What the forensic science community and Hollywood refuse to inform their consumers and viewers is that while forensic science can effortlessly identify serial offenders it can just as easily inculcate a wholly innocent person."); Kimberlianne Podlas, "The *CSI* Effect": *Exposing the Media Myth*, 16 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 429, 437 (2006) ("On its own, scientific evidence can be rather seductive. In conjunction with *CSI*, it becomes insurmountable.").
 14. See Podlas, *supra* note 13, at 441.
 15. *Id.* at 438 (citing Richard Willing, 'CSI Effect' Has Juries Wanting More Evidence, USA TODAY, Aug. 5, 2004, at A1).
 16. See Nielsen Ratings Historic Network Television by Week: Oct. 9-Oct. 15 (Oct. 17, 2006), http://tviv.org/Nielsen_Ratings/Historic/Network_Television_by_Week/2006#October. Several other TV series which showcase forensic investigation are also in the Nielsen top-twenty listing. *Id.*; *Something to Cry About: Nielsen Ratings for '05-06*, <http://www.tv.com/veronica-mars/show/24272/something-to-cry-about-nielsen-ratings-for-05-06/topic/11423-254420/msgs.html> (last visited Mar. 9, 2007) (citing Nielsen ratings posted on http://www.hollywoodreporter.com/thr/television/feature_display.jsp?vnu_content_id=1002576393); see also Richard Catalani, *A CSI Writer on the CSI Effect*, 115 YALE L.J. POCKET PART 76, 76 (2006), <http://yalelawjournal.org/images/pdfs/34.pdf> (describing the popularity of forensic crime dramas).
 17. Kit R. Roane & Dan Morrison, *The CSI Effect*, U.S. NEWS & WORLD REP., Apr. 25, 2005, at 48, available at <http://www.usnews.com/usnews/culture/articles/050425/25csi.htm>.
 18. For a detailed analysis of the CSI Effect, see Simon A. Cole & Rachel Dioso-Villa, *CSI and Its Effects: Media, Juries, and the Burden of Proof*, 41 NEW ENG. L. REV. 435, 447-54 (2007).
 19. Roane & Morrison, *supra* note 17.

as infallible, will be nearly impossible to challenge.²⁰ At the same time, defense counsel are reported to be “capitalizing on the popularity of shows like *CSI*, seizing on an absence of forensic evidence, even in cases where there’s no apparent reason for its use.”²¹ Prosecutors respond by practicing “defensive law,”²² explaining the absence of certain evidence, such as fingerprints, through expert witnesses or in closing argument.²³

As yet, any evidence of an actual *CSI* Effect is merely anecdotal. There is no empirical data supporting an “anti-prosecutor *CSI* Effect,”²⁴ nor have any verifiable studies measured the influence of the media on lawyers, judges, and juries.²⁵ If, however, *CSI* and its progeny inspire a certain level of wishful thinking in jurors, it would not be so surprising. The dazzling promise of *CSI* contrasts sharply—and problematically—with the barrenness of the Florida highway stretch where those four family members died. Crime scenes are sometimes mute, often deceptive. The principal appeal of *CSI* “lies in its ability to simplify the messy uncertainties of real-world crime.”²⁶ As explained by Oregon District Attorney Josh Marquis, “[p]eople are interested in good and evil and right and wrong.’ . . . ‘They’d like to think that it can be ascertained, that there really are such things as objective truths.’”²⁷

Ironically, the soaring popularity of *CSI* parallels a growing realization that forensic techniques contain very little in the way of science.²⁸ Unlike other sciences, which continually practice self-scrutiny, forensic science does not engage in error detection.²⁹ Furthermore, the “forensic science community’s incestuous affiliation with law enforcement”³⁰ delimits its role to that of a service provider to a consumer who makes specific inquiries about evidence. Rather than science produced by scientists, the forensic community delivers “subjective determinations

20. See Podlas, *supra* note 13, at 437-38.

21. Roane & Morrison, *supra* note 17.

22. Janine Robben, *The ‘CSI’ Effect: Popular Culture and the Justice System*, 66 OR. ST. B. BULL., Oct. 2005, at 9-11, available at <http://www.obsar.org/publications/bulletin/05oct/csi.html>; see Mark Hansen, *The Uncertain Science of Evidence*, 91 A.B.A. J. 48, 53 (July 2005).

23. Karin H. Cather, *The CSI Effect: Fake TV and Its Impact on Jurors in Criminal Cases*, 38 PROSECUTOR 9, 13 (Mar.-Apr., 2004).

24. See Podlas, *supra* note 13, at 460; Tyler, *supra* note 12, at 1083.

25. Jill Schachner Chanen, *Stay Tuned*, 90 A.B.A. J. 44, 48 (Oct. 2004).

26. Tyler, *supra* note 12, at 1065.

27. Robben, *supra* note 22, at 10.

28. Cooley, *supra* note 13, at 390-91.

29. *Id.* at 393, 397.

30. *Id.* at 398.

by law enforcement trained technicians.”³¹

This Article explores the two versions of the putative CSI Effect, and argues that *both* are likely to result in an increasing—and misleading—focus on factors other than the actual evidence presented at trial. Indeed, the larger and more trenchant problem with any CSI Effect is the confusion of forensic techniques with actual scientific inquiry. Part I of this Article examines the two contenders for the title of CSI Effect, and concludes that both versions shift the factfinder’s focus away from the totality of the evidence in the case. The oft-debated question whether the CSI Effect favors prosecutors or the defense is arguably far less important (particularly since the Effect may cut in either direction under different circumstances) than the adverse consequences *either* variant has on the process of evaluating the corpus of evidence at trial.

In Part II, this Article contends that the most significant problem posed by the CSI Effect is the misleading presentation of forensic evidence in the guise of scientific truth. Forensic technicians do not testify as other witnesses—even experts—do, with their work and opinions subject to human fallibility. Nor is their evidence to be evaluated in the context of all other types of evidence, both direct and circumstantial. Instead, forensic proof arrives in the courtroom inappropriately labeled as a scientific bullet for solving crime. Forensic analysis aspires to the benefits of a scientific label, while rejecting the burdens of adhering to scientific norms.

In light of this conflict over the scientific status of the forensics field, Part III explores the increasingly difficult role of judges and juries in navigating and assessing the current flood of forensic evidence. Distinguishing between science and pseudo-science is proving an increasingly arduous task. Judges and jurors must today become scientifically-minded error-detectors, a role unsuited to many. The Article concludes with the hope that the most important CSI Effect, one that may outlast the success of televised crime scene investigators, would be a fundamental reevaluation of the nature and role of forensic evidence in the courtroom.

31. *Id.* at 391.

I. HOW CSI EVIDENCE MIGHT, IN FACT, LIE

Detective Jim Brass: "We got the eyewitnesses lined up, ready to go."

Gil Grissom: "Testimonials, Jim? I don't consider that evidence."³²

A. The Case for the Prosecution

In the rendering of the CSI Effect, to which many prosecutors and others subscribe, the TV series leads jurors to have unrealistic expectations about the utilization of forensic techniques—not to mention the size of forensic budgets—in the routine cases which make up the vast majority of every assistant district attorney's caseload.³³ Thus, we are told of solid prosecutions undone by the irrational juror expectation that a wide range of top-shelf forensic capacity is on-call for every criminal case, no matter how

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32. *CSI: Crime Scene Investigation: Blood Lust* (CBS television broadcast Dec. 5, 2002), available at <http://www.crimelab.nl/transcripts.php?series=1&season=3&episode=9z>.
 33. MARICOPA COUNTY ATTY'S OFFICE, *THE CSI EFFECT AND ITS REAL-LIFE IMPACT ON JUSTICE 2* (2005), available at <http://www.maricopacountyattorney.org/Press/PDF/CSIReport.pdf> ("Recent reports indicate that this top-rated show may have a significant impact on the real criminal justice system in the future by creating unrealistic expectations in jurors' minds about the type of physical evidence that must be produced at trial in order to achieve proof beyond a reasonable doubt."); Tresa Baldas, *Lawyers Report Jurors Gone Wild: Misconduct Mars Trials; Fixes Sought*, 27 NAT'L L.J. 1, 14 (May 16, 2005), available at <http://www.law.com/jsp/article.jsp?id=1116493511186> (quoting New Jersey prosecutor Paul DeGroth to describe prosecutorial belief that jurors are demanding unnecessary forensic evidence, who stated, "I make it part of my opening now to say, 'This is not *CSI*. This is not *Law & Order*.'"); Cather, *supra* note 23, at 10 ("[T]he *CSI*-type shows . . . have made juries more demanding of the prosecutors and the police." (quoting Illinois prosecutor Mike Wepsiec)); Robben, *supra* note 22 ("Jurors expect the kind of conclusive evidence they see on '*CSI*,' . . . [a]nd when they don't have it, it could be a defense verdict." (quoting trial consultant Laura Dominic)); Martha Graybow, *Prosecutors See 'CSI Effect' in White Collar Cases*, REUTERS, Sept. 24, 2005, available at <http://www.redorbit.com/modules/news/tools.php?tool=print&id=250029> ("Jurors schooled in crime investigations through watching TV dramas expect prosecutors to show them sophisticated forensic evidence—even in white-collar trials—making it tough for the government to prove cases . . ."); Alan Boyle, *Crime Sleuths Cope With 'CSI' Effect: Forensic Experts Dogged by TV Expectations*, MSNBC, Feb. 20, 2005, <http://www.msnbc.msn.com/id/7003715/print/1/displaymode/1098> ("Prosecutors tend to fear the '*CSI*' Effect on juries, because juries now have an unrealistic expectation of what the laboratory will do. They wonder why wasn't everything tested, when in fact not everything needs to be tested." (quoting Max Houck, Director of the Forensic Science Initiative at West Virginia University)). Of course, not all prosecutors agree that *CSI* has made their jobs harder. See, e.g., Cather, *supra* note 23, at 9 (reporting that prosecutors "are split" on the existence and consequences of any *CSI* Effect).

minor, or how routinely resolved through traditional police means.³⁴ And we learn that “[j]urors often ask questions about evidence using terms or language not used at trial, like ‘mitochondrial DNA,’ ‘latent prints,’ ‘trace evidence,’ or ‘ballistics.’”³⁵ Forty-five percent of prosecutors responding to one survey opined that, when both scientific and non-scientific evidence existed, “the jury focused so much on presented scientific evidence that they paid too little attention to unscientific evidence,” such as lay witnesses and police testimony.³⁶ Seventy-two percent of prosecutors in the same study suspected that jurors whose “expertise” was derived from viewing forensic crime series “unduly influence other jurors who do not watch the shows.”³⁷

The false sense of “expertise” asserted by jurors is not derived solely from the television show. Each *CSI* series has its own website, “where viewers can play detective and are introduced to a list of forensics techniques that have the potential to be inapplicable, completely fictional, prohibitively expensive, or misunderstood.”³⁸ Nor are *CSI* games missing from the mass market. *CSI: Crime Scene Investigation—The Board Game* “emulates the popular show on television and allows players to experience the excitement of solving a crime.”³⁹ Players in this game “assume the role of Crime Scene Investigators in a race to collect . . . evidence from all seven Crime Lab Divisions: Interrogation, Autopsy, Identification, Trace, Ballistics, Forensics, and DNA.”⁴⁰ Similarly, *CSI Miami: Crime Scene Investigation—The Board Game* reinforces the show’s theme that people lie and thus cannot be trusted, but forensic evidence never errs and is the only safe route to the truth: “You will quickly learn that each suspect is capable of deceit. By rolling the *CSI: Miami* die you will follow the evidence, identify the killer and reveal the truth.”⁴¹

34. MARICOPA COUNTY ATTY’S OFFICE, *supra* note 33, at 12-13.

35. *Id.* at 12.

36. *Id.*

37. *Id.*

38. Cather, *supra* note 23, at 9.

39. *CSI: Crime Scene Investigation—The Board Game*, <http://www.amazon.com/CSI-Crime-Scene-Investigation-Board/dp/B00018H66M> (last visited Mar. 23, 2007) (quoting manufacturer’s description).

40. *Id.*

41. *CSI Miami: Crime Scene Investigation—The Board Game*, <http://www.amazon.com/CSI-CSI%253a-Miami-Board-Game/dp/B0006114ZG> (quoting product description). The same *leitmotif*, that forensic techniques supply the *only* evidence worth considering, is apparent in the product description accompanying the show’s DVD releases. For example, the DVD release of *C.S.I. Crime Scene Investigation - The Complete Sixth Season* describes the series as “a fast-paced drama about a passionate team of forensic investigators trained to solve crimes the old-fashioned way—by

Essentially, the prosecutors' complaint is born of a sense that juries are toying with the evidence, playing along with Gil Grissom and his forensic colleagues, and expecting that ordinary police efforts will yield extraordinary results, as they do on television. But there is another way to view a possible CSI Effect.

B. The Defense Case

Defense attorneys and their allies in this debate respond that "it is equally plausible to argue that watching *CSI* has, in fact, the opposite effect on jurors—increasing their tendency to convict defendants."⁴² In this telling of the CSI Effect, jurors witness the product of sloppy, incompetent forensic analyses, but they are mesmerized by the supposed expertise of the technician on the stand, and fall prey to the unrevealed magic of what appears to be science personified.⁴³ Defense attorneys worry about the CSI Effect "because they think that the jurors come in and have this view of science as this juggernaut, this infallible objective method that is always right and spells doom for their client."⁴⁴ DNA and some (but far from all) other forensic procedures do "work," of course. But that functional accuracy masks a deeper flaw in the process of receiving and evaluating evidence.

DNA, for example, appears to be everlasting and immutable. But the durability of genetic identity supplies no confirmation that any particular DNA introduced at trial has been appropriately collected, analyzed, and preserved, nor whether the testimony regarding the DNA "match" will be truthful or accurate. In fact, DNA's gleaming reputation is not justified by the history of forensic misapplication and outright fraud: "The record is littered with slapdash forensic analyses often performed by untrained, underpaid, overworked forensic technicians operating in crime labs whose workings reflect gross incompetence or rampant corruption."⁴⁵

examining the evidence." DVD: *CSI: Crime Scene Investigation - The Complete Sixth Season*, <http://www.amazon.com/C-S-I-Crime-Scene-Investigation-Complete/dp/B000H7JCGY> (last visited Mar. 23, 2007) (product description).

42. Tom R. Tyler, *Is the CSI Effect Good Science?*, 115 YALE L.J. POCKET PART 73 (2006), <http://yalelawjournal.org/images/pdfs/33.pdf>.
43. See J. Herbie DiFonzo, *The Crimes of Crime Labs*, 34 HOFSTRA L. REV. 1, 2-7 (2005) (detailing instances of errors in crime lab processing of forensic evidence).
44. Boyle, *supra* note 33 (quoting Max Houck).
45. DiFonzo, *supra* note 43, at 2; see William C. Thompson, *Tarnish on the 'Gold Standard': Understanding Recent Problems in Forensic DNA Testing*, CHAMPION Jan.-Feb. 2006, at 10-12, available at <http://www.nacdl.org/public.nsf/0/6285f6867724e1e685257124006f9177?OpenDocument> (cataloging the problems with DNA testing to include "the uneven quality of forensic DNA laboratories," "an unexpectedly high rate of laboratory errors involving mix-up and cross-contamination

Tom R. Tyler, professor at New York University, has noted that any CSI Effect would add to the quantum of “widespread evidence indicating that people already overestimate the probative value of scientific evidence.”⁴⁶ Lisa Steele, co-chair of the Forensic Evidence Committee for the National Association of Criminal Defense Lawyers, opined that *CSI* is making potential jurors “less skeptical about the potential for forensic error or fraud.”⁴⁷ *CSI* may also “assist[] prosecutors by showing only the investigation and leaving the impression that the trial is a mere formality.”⁴⁸ Tyler argues that there is a

consistent tendency to overestimate accuracy. . . . [Which] suggests that people are not just bad at evaluating evidence but rather are motivated to see evidence as probative. . . .

It follows that when people are more highly motivated to resolve a crime and provide justice for the victim, they will also be more highly motivated to overestimate the probative value of the evidence. The desire to legitimate a desired verdict will vary depending upon the situation. When the motivation to legitimate a verdict is present, however, one way to effectively justify the verdict is to view the evidence as strong. The motivation to believe more strongly in the probative value of the evidence can be combined with the lowering of the threshold for conviction.⁴⁹

These tendencies favoring the prosecution may also be seen in the proliferation of new and untested forensic techniques utilized by prosecutors, an advantage compounded by an imbalance in forensic and monetary resources available to each side in a criminal trial.⁵⁰

C. Steering the Jury Away from the Evidence as a Whole

Most likely, any CSI Effect will be found to point in different directions on different occasions. When a jury concludes that the police failed to conduct tests which the jury believes were essential, the jury may well raise the ante on the prosecutor’s burden. But when the prosecution

of DNA samples,” and “dishonest DNA analysts who falsify test results”).

46. Tyler, *supra* note 12, at 1068.

47. Simon Cole & Rachel Dioso, *Law and the Lab*, WALL ST. J., May 13, 2005, at W13, available at <http://www.opinionjournal.com/taste/?id=110006686>.

48. Tyler, *supra* note 12, at 1073.

49. *Id.* at 1070.

50. See, e.g., Alex Wade, *Silence in Court: Forensic Science on Trial*, GUARDIAN (London), Oct. 3, 2004, at 20, available at <http://www.taipetimes.com/News/editorials/archives/2004/10/03/2003205389> (describing a funding imbalance and “controversial” forms of forensic technology relied on by the prosecution in Europe and the United States).

presents a jury with clear forensic testimony pointing to guilt, that jury may well be disinclined to challenge the magic bullet of what they believe to be pure science, and may fail to consider the possibility of erroneous forensic testing or testimony.⁵¹ But whether the CSI Effect favors prosecutors or the defense is less critical than the harmful consequences of *either* version on the process of evaluating the corpus of trial evidence.

What *both* versions of the CSI Effect share is an inappropriate focus on one component of the evidentiary mass, with a concomitant diminution of attention on all the rest. *CSI*'s credo "is that dispositive forensic evidence almost always exists to prove the guilt of the true perpetrator and to exculpate the innocent."⁵² If forensic proof can establish the case entirely and without fail, why waste time on extraneous matters such as circumstantial evidence, eyewitness testimony, or statements by the accused or other witnesses? And why would any asserted defense be worth considering? How could one or a half-dozen alibi witnesses possibly counter the dead aim of a DNA match?

There are a great number of documented examples of forensic disaster, cases in which the promise of forensic perfection exploded.⁵³ But the average jury is not exposed to the track record of forensic science in the courtroom. The common perception is to the contrary: "[W]hen DNA evidence implicates you, you are nailed, and a conviction is a foregone conclusion."⁵⁴ Jurors are often in awe of a forensic expertise whose underpinnings remain a mystery, but whose conclusions, as they are told weekly on *CSI* and its televised cousins, are a modern marvel of crime

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51. See, e.g., Cole & Dioso, *supra* note 47 ("Prosecutors claim that the show makes juries less inclined to convict because they have inflated expectations for the comprehensiveness, sophistication and clarity of forensic evidence—all those threads and fibers and DNA traces left behind at crime scenes. But the effect could work the other way, too. Defense attorneys contend that the show makes juries inclined to convict because it portrays forensic evidence as unambiguous and more certain than it is."); Amy J. McMaster, *CSI Effect: Yet Another Excuse for Juror Apathy?*, NAT'L L.J., Aug. 31, 2005, <http://www.venable.com/docs/pubs/1409.pdf> ("On the one hand, jurors may be over-inflating the relevance and reliability of scientific evidence to avoid finding reasonable doubt. Conversely, where scientific evidence is open to interpretation, jurors may be too quick to equate this with the presence of reasonable doubt.").
52. Robert P. Mosteller, *Evidence History, the New Trace Evidence, and Rumblings in the Future of Proof*, 3 OHIO ST. J. CRIM. L. 523, 536 (2006). Mosteller deems forensic evidence "a modern day version of Perry Mason's cross-examination when the guilty party had no alternative but to confess under Perry's examination." *Id.*
53. See *infra* notes 113-18 and accompanying text.
54. James Herbie DiFonzo, *In Praise of Statutes of Limitations in Sex Offense Cases*, 41 HOUS. L. REV. 1205, 1232 (2004) (quoting Rob Warden, Director of the Center on Wrongful Convictions at Northwestern University School of Law).

solution. "After hearing maybe an hour or two of testimony about how sophisticated and accurate the testing process is, and all of the steps they've gone through by the lab personnel, without really understanding the concept of DNA, they understand the very simplistic notion that 'it's a match.'"⁵⁵

Given the very bad press accorded eyewitness and other direct testimony in recent years, it should come as no surprise that forensic evidence, which presents itself as free from the human stain, should appear in the ascendant. Eyewitness testimony has come under increasing fire as a reliable evidentiary tool, as the number of overturned convictions based on eyewitness identification continues to grow.⁵⁶ False confessions have similarly received broad publicity for their disastrous impact.⁵⁷ For

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55. Steve McVicker & Roma Khanna, *Lab Chief's Testimony in 3 Cases Questioned; Court Transcripts Show HPD Work Was Wrong*, HOUSTON CHRON., Mar. 29, 2003, at A37 (quoting attorney Will Outlaw); see also *Armstead v. State*, 673 A.2d 221, 238 n.26 (Md. 1996) "[J]uries are no more capable of understanding probability statements than they are of interpreting any other piece of highly technical information." *Id.* (quoting letter from R. Lewontin, 372 NATURE 398, 398 (1994)).
 56. See, e.g., Edward J. Imwinkelried, *Commentary* to EDWARD CONNORS, ET AL., CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL xii, xiv (1996) (describing numerous wrongful convictions due to erroneous eyewitness testimony); Gary L. Wells & Elizabeth A. Olson, *Eyewitness Testimony*, 54 ANNUAL REV. PSYCHOLOGY 277, 277 (2003) ("Recent DNA exoneration cases have corroborated the warnings of eyewitness identification researchers by showing that mistaken eyewitness identification was the largest single factor contributing to the conviction of these innocent people."); Correy E. Stephenson, *Lineups Under Fire as DNA Evidence Exonerates Eyewitness Identifications*, DAILY REC. (St. Louis, Mo.), May 28, 2006, at A1, available at http://www.findarticles.com/p/articles/mi_qn4181/is_20060528/ai_n16433195 (noting view of Stephen Saloom, policy director at the Innocence Project in New York, that erroneous eyewitness identification contributed to three-quarters of the 175 convictions nation-wide that have been discredited by DNA evidence). This criticism is not new. In 1967, Justice William Brennan wrote that "[t]he vagaries of eyewitness identification are well-known; the annals of criminal law are rife with instances of mistaken identification." *United States v. Wade*, 388 U.S. 218, 228 (1967).
 57. See The Innocence Project: False Confessions, <http://www.innocenceproject.org/understand/False-Confessions.php> (last visited Mar. 13, 2007) ("In a disturbing number of DNA exoneration cases, defendants have made incriminating statements or delivered outright confessions. These cases demonstrate that a confession or admission is not always prompted by internal knowledge or guilt, but may be motivated by external influences."); Rob Warden, *The Role of False Confessions in Illinois Wrongful Murder Convictions Since 1970*, NORTHWESTERN UNIVERSITY, CENTER ON WRONGFUL CONVICTIONS, May 12, 2003, <http://www.law.northwestern.edu/depts/clinic/wrongful/FalseConfessions2.htm> (reporting study showing that 59.5% of the forty-two wrongful murder convictions in Illinois since 1970 rested in

example, the 1989 New York case, in which five African-American youths were accused of the rape of the “Central Park Jogger” during a “wilding” spree, received far-reaching coverage, in part because of the horrific brutality of the attack.⁵⁸ Despite the absence of any eyewitness identification or physical evidence linking any of the accused to the crime, all five youths were convicted on the strength of their statements admitting to involvement in the crime.⁵⁹ Thirteen years later, a serial rapist and murderer came forward to admit that he alone was guilty of the crime. Unlike the DNA from any of the convicted youths, this man’s DNA did match that recovered from the victim.⁶⁰ After a lengthy investigation, the Manhattan District Attorney who had obtained the convictions recommended that all five be overturned.⁶¹

The outstanding successes of the Innocence Project and the notoriety of many reversed convictions have showcased the dazzling superiority of DNA over the testimony of eyewitnesses and the confessions of the accused. It would not be surprising if public opinion has shifted in assessing which types of evidence may generally be relied upon in criminal cases.⁶² Of the three—forensic, eyewitness, and documentary—only forensic evidence claims to be beyond the pale of human error, and thus

whole or in part on false confessions); see generally Richard J. Ofshe & Richard A. Leo, *The Decision to Confess Falsely: Rational Choice and Irrational Action*, 74 DENV. U. L. REV. 979 (1997) (providing a broad overview on the reasons why defendants falsely confess).

58. See Lynnell Hancock, *Wolf Pack: The Press and the Central Park Jogger*, COL. JOURNALISM REV. (Jan./Feb. 2003), available at <http://www.cjr.org/issues/2003/1/rapist-hancock.asp> (describing how the media attention resulted in “[t]he image of savage kids rampaging through the city’s streets . . . branded into the national consciousness”); Sidney H. Schanberg, *A Journey Through the Tangled Case of the Central Park Jogger*, VILLAGE VOICE (New York), Nov. 20, 2002, available at <http://www.villagevoice.com/news/0247,schanberg,39999,1.html> (describing press coverage as “wall-to-wall.”).
59. See Elaine Cassel, *The False Confessions in the Central Park Jogger Case: How They Happened, and How to Stop Similar Injustices from Happening Again*, FINDLAW, Dec. 17, 2002, <http://writ.news.findlaw.com/cassel/20021217.html> (describing the defendants’ statements and the lack of other evidence).
60. See Robert D. McFadden & Susan Saulny, *A Crime Revisited: The Decision; 13 Years Later, Official Reversal in Jogger Attack*, N.Y. TIMES, Dec. 6, 2002, at A1 (“Contradicting a longstanding theory that the jogger had been gang-raped, the report said that an 11-month re-examination of the case had found DNA and other persuasive evidence that the woman had been brutally beaten, raped and left for dead by one man, Matias Reyes, a murderer and serial rapist who confessed last January that he alone had attacked the jogger.”).
61. News Release, District Attorney-New York County (Dec. 5, 2002), <http://www.manhattanda.org/whatsnew/press/2002-12-05.htm>.
62. This question obviously calls for empirical study.

inherently trustworthy.

II. THE TEMPTATION OF FORENSIC EVIDENCE

*"We're making forensics and forensic investigators into heroes."*⁶³

The CSI Effect, anecdotal and untested as it is, may well be as much a creature of the media as it is a direct product of the television series. At the same time, it would be a mistake to underestimate the power of popular culture: "TV has become our principal storyteller, transmitting legal norms or, arguably, creating them."⁶⁴ Real-life forensic scientists appear anxious to distinguish themselves from their fictional *CSI* counterparts. In particular, they seek to present themselves as independent, unbiased professionals. For instance, John Jay Tobin, Jr., director of the Forensic Sciences Division of the Maryland State Police Crime Laboratory, denies that his lab favors the State Police.⁶⁵ Tobin maintains that, as a "civilian employee," his job is to "examine the evidence given to [the lab] . . . no matter what it shows."⁶⁶ He adds that his lab has "exonerated a lot of people."⁶⁷ Dr. Cyril Wecht, Pennsylvania's Allegheny County Coroner, similarly affirms that his lab is "not philosophically biased toward the prosecution in any way. We're not part of the prosecutorial team."⁶⁸

But other sources paint a sharply contrasting picture of the crime labs' fealty. The lack of independence is often cited as a limitation on the police crime labs' trustworthiness. Forensic technicians in such labs may view themselves not as neutral investigators, but as "police in lab coats," part of the police intent to convict the suspect.⁶⁹ The question of bias in state-run crime labs is a longstanding and problematic one:

[T]he preponderance of well-qualified forensic laboratories are located with the resources of the State. . . . They work hand in hand with the police from the beginning of an investigation Is the [expert] witness who has his job and salary controlled by the State completely free from pressure, conscious or

63. Clarence Walker, *CSI (T.V. Crime Dramas) Affects the American Criminal Justice System*, AmericanMafia.com (June 2005), http://www.americanmafia.com/Feature_Articles_301.html (quoting Elizabeth Devine, co-producer for *CSI*).

64. Cole & Dioso, *supra* note 47.

65. Paul Peirce, *Inside the Crime Lab*, PITTSBURGH TRIB.-REV., June 27, 2004, at A1, available at http://www.pittsburghlive.com/x/pittsburghtrib/s_199831.html.

66. *Id.* (omission in original).

67. *Id.*

68. *Id.*

69. Editorial, *Testing Questions/HPD Crime Lab Measures Not Instilling Confidence*, HOUSTON CHRON., Feb. 14, 2003, at A40.

unconscious, to be entirely impartial?⁷⁰

The conclusion that most forensic evaluators are institutionally predisposed to favor the prosecution is neither recent nor surprising. Forensic analysis “grew up in the criminal law. The exigencies imposed on it by police and prosecutors molded it into its contemporary shape.”⁷¹ Pro-prosecution bias is reflected in every step of the forensic process.⁷² Generally, police “offer a detailed narrative of the crime and an inventory of whatever other inculpatory evidence they have against the suspect on the request form used to order a particular scientific test.”⁷³ That the crime lab is expected to cooperate with the investigation is often made explicit. Heads of police crime labs sometimes report “that they have been told to find a certain result. Now that’s not strange, because the loyalty of the scientist is not to science there; it’s to his job. If he wants to be loyal to science, he better get a job somewhere else.”⁷⁴

Given the strong occupational bias of forensic evaluators employed at police crime labs, the risk of skewed judgment and results is significant.⁷⁵ This bias favoring conviction of targeted suspects is acknowledged by defense⁷⁶ and by law enforcement sources,⁷⁷ as well as by some forensic

70. M.A. Thomson, *Bias and Quality Control in Forensic Science: A Cause for Concern*, 19 J. FORENSIC SCI. 504, 509-10 (1974).

71. Michael J. Saks, *Merlin and Solomon: Lessons from the Law’s Formative Encounters with Forensic Identification Science*, 49 HASTINGS L.J. 1069, 1091 (1998). A crime lab’s milieu conditions the operant norms tending to a particular result. See David Johnston & Andrew C. Revkin, *Report Finds F.B.I. Lab Slipping From Pinnacle of Crime Fighting*, N.Y. TIMES, Jan. 29, 1997, at A1 (“Scientists at the laboratory said they were often stifled in an operation run by nontechnical field agents who had little knowledge of science and who regularly altered reports to help prosecutors.”).

72. See Randolph N. Jonakait, *Forensic Science: The Need for Regulation*, 4 HARV. J.L. & TECH. 109, 160-62 (1991) (observing that the suggestive manner in which evidence is presented to forensic scientists by the police, along with the natural “prosecutorial orientation of many forensic scientists,” results in examiners who might unconsciously believe the suspect is guilty and thus could arguably “skew subjective judgments” throughout the forensic process).

73. Peter J. Neufeld, *The (Near) Irrelevance of Daubert to Criminal Justice and Some Suggestions for Reform*, 95 AM. J. PUB. HEALTH S107, S111 (2005); see also Jonakait, *supra* note 72, at 160 (noting that evidentiary material is often presented to the analyst “in a needlessly suggestive manner,” accompanied by police memos pointing to the guilt of a particular suspect).

74. Stephen G. Michaud, *DNA Detectives*, N.Y. TIMES, Nov. 6, 1988, § 6 (Magazine), at 70 (quoting Oliver C. Schroeder, professor emeritus at University of Cleveland School of Law).

75. Jonakait, *supra* note 72, at 161.

76. See, e.g., Steve McVicker & Roma Khanna, *DNA Find Sparks Call for Review: New Look at Policies in DA’s Office Urged*, HOUSTON CHRON., Mar. 11, 2003, at A11

analysts themselves.⁷⁸ Generally dubbed “tunnel vision,”⁷⁹ this structural bias leads investigators to “focus on a suspect, select and filter the evidence that will ‘build a case’ for conviction, while ignoring or suppressing evidence that points away from guilt.”⁸⁰

The valid scientific basis of DNA testing may, paradoxically, lead to unwarranted reliance on the forensic results in a particular case. The unsuspecting juror is led to believe that the science behind DNA typing assures procedural regularity, faithful readings, and accurate testimony in actual cases. This misplaced faith in forensic technology dispenses with the need to consider carefully any corroborating or contradictory evidence presented. Forensic labs and investigators are, like the rest of humanity, loath to admit their errors. But the record of sloppy and inaccurate testing procedures resulting in wrongful convictions is mounting year by year.⁸¹ At

(“One of the biggest problems of the Houston crime lab is that they were much more concerned with being a servant to the police and prosecutors than they were to science.” (quoting Innocence Project founder Peter Neufeld)).

77. See, e.g., Roma Khanna, *HPD Chief Proposes Independently Run Crime Lab*, HOUSTON CHRON., Apr. 3, 2003, at A1 (“Should a complex evidence, [sic] like DNA, be presented solely by the prosecution or should it be processed by a neutral entity that is not employed by either side?” (quoting Houston Police Chief C.O. Bradford)).
78. See Glen Martin, *Grand Jury’s Stinging Denouncement of S.F. Crime Labs: Report Cites Small Staffs, Old Equipment*, S.F. CHRON., June 7, 1996, at A19 (reporting opposition of San Francisco Crime Lab Chief Frank Norris to transfer of authority over crime labs to the district attorney’s office). In Norris’s experience, prosecutors “sometimes try to exert too much pressure on the labs’ ‘They can lose their objectivity, because they want to convict.’” *Id.*
79. Keith A. Findley & Michael S. Scott, *The Multiple Dimensions of Tunnel Vision in Criminal Cases*, 2006 WIS. L. REV. 291, 292 (describing a psychological process which “leads investigators, prosecutors, judges, and defense lawyers alike to focus on a particular conclusion and then filter all evidence in a case through the lens provided by that conclusion”).
80. Dianne L. Martin, *Lessons About Justice from the “Laboratory” of Wrongful Convictions: Tunnel Vision, the Construction of Guilt and Informer Evidence*, 70 UMKC L. REV. 847, 848 (2002).
81. See, e.g., DiFonzo, *supra* note 43, at 5-7 (highlighting examples of documented crime lab errors); Cooley, *supra* note 13, at 399-408 (detailing forensic fraud possibly leading to wrongful convictions); Paul C. Giannelli, *Fabricated Reports*, 16 CRIM. JUST. 49 (2002) (describing several “world-class [forensic] fabricators”); Paul C. Giannelli, *The Abuse of Scientific Evidence in Criminal Cases: The Need for Independent Crime Laboratories*, 4 VA. J. SOC. POL’Y & L. 439, 441 (1997) (“[M]ajor abuses in the use of scientific evidence have surfaced, including perjury by expert witnesses, faked laboratory reports, and testimony based on unproven techniques.”); Maurice Possley et al., *Scandal Touches Even Elite Labs: Flawed Work, Resistance to Scrutiny Seen Across U.S.*, CHI. TRIB., Oct. 21, 2004, at C1 (reporting on evidence of problems ranging from negligence to outright deception uncovered in recent years at crime labs in at least seventeen states).

bottom, the criminal justice system “does a poor job of distinguishing unassailably powerful DNA evidence from weak, misleading DNA evidence.”⁸²

The inadequate training and low educational qualifications of forensic analysts certainly play a role in the poor track record of police crime labs.⁸³ And the lack of certification or license requirements has also been cited to explain the often substandard performance of forensic laboratories.⁸⁴ The laboratory accreditation process remains voluntary in most states. Out of more than 1000 crime labs throughout the United States, only 330 have been accredited by the American Society of Crime Laboratory Directors (“ASCLD”) as of February 17, 2007.⁸⁵

To comply with accreditation standards, a crime lab must establish

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82. William C. Thompson et al., *Evaluating Forensic DNA Evidence: Essential Elements of a Competent Defense Review*, CHAMPION, Apr. 2003, at 16.
83. The catastrophic performance of the Houston Crime Lab, which the state was forced to shut down, may be an extreme example. But as the central forensics processing laboratory in the nation's fourth-largest city, its problems are worth noting. A 2003 investigation conducted by the HOUSTON CHRONICLE found that none of the DNA lab analysts were “qualified by education and training” to perform the job, “based on national standards and a . . . review of their personnel files.” Lise Olsen & Roma Khanna, *DNA Lab Analysts Unqualified: Review Finds Education, Training Lacking*, HOUSTON CHRON., Sept. 7, 2003, at A1. An independent audit by the Texas Department of Safety the previous year had found that one DNA “technical manager did not satisfy the degree requirements . . . because he had not studied statistics or population genetics.” Steve McVicker & Roma Khanna, *House Hearings on HPD Crime Lab to Focus on Audit*, HOUSTON CHRON., Mar. 3, 2003, at A15. The audit team's task was made more difficult because of the DNA lab's failure to “maintain records on the relevant qualifications, training skills and experience of all technical personnel.” *Id.* (quoting the audit report). The city's police chief admitted that the crime lab director was not “properly credentialed” and did not have a background in DNA testing. Steve McVicker & Roma Khanna, *D.A. Is Asked to Back Call for HPD Lab Probe: Rosenthal Cool to Resolution Seeking FBI Review of Cases*, HOUSTON CHRON., Mar. 14, 2003, at A33. The Harris County District Attorney admitted that the DNA lab had “been hiring people for years with simple biology degrees who have no (DNA) training.” Roma Khanna & Steve McVicker, *Bradford Knew of DNA Lab Problem: DA Denies Claim He, Too, Was Aware of Poor Conditions*, HOUSTON CHRON., Feb. 26, 2003, at A1.
84. See DiFonzo, *supra* note 54, at 1236-37 (discussing the connection between reliability problems and the lack of certification and competency standards).
85. Laboratory Accreditation Board, American Society of Crime Laboratory Directors, <http://www.ascl-d-lab.org/legacy/asclablegacylaboratories.html> (last visited Mar. 22, 2007) (listing of accredited laboratories); Press Release, San Francisco Police Dep't, SFPD Crime Lab Receives Accreditation (Sept. 6, 2005), available at http://www.sfgov.org/site/police_index.asp?id=34258 (noting that there are more than 1000 local, county, and state crime labs in the United States).

and maintain its independence and submit to scientific peer review.⁸⁶ Virginia's crime lab, once touted as a paragon, recently failed to survive even minimal scrutiny. The ASCLD propounded what was described as "a searing critique that should serve as a nationwide warning about the often shoddy and unprofessional standards that can afflict the criminal justice system via the crime labs of America."⁸⁷ The ASCLD report focused on the grossly mishandled case of Earl Washington, Jr., a mentally retarded prisoner on death row, just nine days away from execution.⁸⁸ Through the efforts of the Innocence Project, Washington was finally freed in 2005, after the botched DNA procedures at Virginia's nationally regarded crime lab were exposed.⁸⁹ Given the multitude of cases that crime labs handle every year, and the lethal levels of incompetence which have been documented, the notion that forensic analysts are truth-seeking scientists free from pro-prosecution bias seems strained and disingenuous. In the far-from-perfect universe of real-world laboratory testing, *CSI's* depiction of forensic flawlessness presents a distorted image of reality.⁹⁰

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86. See DNA Advisory Board Quality Assurance Standards for Forensic DNA Testing Laboratories, <http://www.cstl.nist.gov/div831/strbase/dabqas.htm> (last visited Mar. 22, 2007) (detailing standards for, inter alia, a quality assurance program; laboratory organization and management; forensic examiner certification; an "evidence control system to ensure the integrity of physical evidence"; DNA sample quality validation; forensic analytical procedures; equipment calibration and maintenance; "procedures for taking and maintaining case notes to support the conclusions drawn in laboratory reports"; administrative and technical reviews; proficiency testing; corrective action; audits; and environmental health and safety programs). See also Editorial, *Justice Under the Microscope*, N.Y. TIMES, May 16, 2005, § 6 at 70, (arguing that crime labs must be free from political pressure, and "kept truly independent and subject to credible review by scientific peers").
87. *Justice Under the Microscope*, *supra* note 86; see LAB. ACCREDITATION BD., AM. SOC'Y OF CRIME LAB. DIRS., LIMITED SCOPE INTERIM INSPECTION REPORT: COMMONWEALTH OF VIRGINIA DIVISION OF FORENSIC SCIENCE CENTRAL LABORATORY 16 (2005), available at <http://www.scientific.org/archive/VirginiaProblems/ASCLDLAB-AuditReport.pdf>.
88. LAB. ACCREDITATION BD., AM. SOC'Y OF CRIME LAB. DIRS., *supra* note 87, at 2-18.
89. See WBUR.org, *Fatal Flaws: The Case of Earl Washington*, <http://www.insideout.org/documentaries/dna/thestories3.asp> (last visited Mar. 19, 2007) (detailing the history of the case).
90. That the image from *CSI* is likely to stay distorted may be seen in the improbability of suggestions encouraging the shows to depict even a single occasion of mishandled forensic evidence leading to an erroneous conviction. The *New York Times* editorially recommended to "producers of television's crime lab heroics" that they "consider the tortured Earl Washington case for a plot-line leap into reality." *Justice Under the Microscope*, *supra* note 86. But such a plot would flatly contradict the show's fantastical premise. On *CSI*, "[y]ou never see a case where the sample is degraded or the lab work is faulty or the test results don't solve the crime." Richard Willing, *'CSI*

At its core, however, forensic testing does not have an image problem; it has a science problem. True scientists are innate skeptics. Only in failing to refute their hypotheses can they produce a viable theory. Occasionally, a “Eureka” moment may pepper their efforts, when a surprising discovery is made. But surprises are routinely followed by attempts to refute the discovery. Forensic analysts, on the other hand, can never shout “Eureka”: whether confirmatory or not, their conclusions are never a surprise. For a trained science professional employing the scientific method, the “Eureka” moment signals the beginning of the real work, the process of trying to prove the revelation wrong. In that same moment, the forensic scientist is confident that his work is done.

Science is classically defined as an organized body of knowledge with clearly enunciated principles.⁹¹ Forensic science constitutes “the application of the natural and physical sciences to the resolution of conflicts within a legal context.”⁹² While pure science concerns itself with a search for truth, forensic science is ostensibly “science exercised on behalf of the law in the just resolution of conflict.”⁹³ The distinction is philosophically problematic when truth becomes subordinate—or irrelevant—to the forensic quest for a “just resolution.” When properly practiced, forensic science should have room for both truth and justice. If, as claimed, forensic science is “an untidy, scruffy sort of discipline,”⁹⁴ perhaps it can improve its hygiene by more closely emulating real science and its methodologies. And if forensic analysis is unable to achieve documented levels of validity and reliability, perhaps it should stop calling itself science.

The “scientific method,” as opposed to “science,” is a process of inquiry.⁹⁵ It is most often identified with established scientific disciplines

Effect’ Has Juries Wanting More Evidence, USA TODAY, Aug. 5, 2004, at A1, available at http://www.usatoday.com/news/nation/2004-08-05-csi-effect_x.htm (quoting forensics expert Dan Krane). Craig Cooley once suggested a script to a writer for *CSI*, “one that would leave viewers questioning whether prosecutors convicted and sentenced to death the true offender.” Cooley, *supra* note 13, at 388. Cooley proposed “that the script highlight not only the many benefits of forensic evidence but also the various dangers involved in relying too heavily on such evidence Needless to say, neither the writer nor the producers wanted anything to do with such a script.” *Id.*

91. John I. Thornton & Joseph L. Peterson, *The General Assumptions and Rationale of Forensic Identification*, in *SCIENCE IN THE LAW: FORENSIC SCIENCE ISSUES 4* (David L. Faigman et al. eds., 2002).

92. *Id.*

93. *Id.*

94. *Id.* at 3.

95. See *id.* at 13 (explaining that “science” and the “scientific method” are concepts “at best loosely related”).

such as chemistry, physics, geology, and biology, among others.⁹⁶ True scientific methodology “is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry.”⁹⁷ In Karl Popper’s classic formulation, “the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.”⁹⁸ What Popper essentially means is that truth is not a determinable scientific proposition. Only if repeated attempts at refutation fail, may a working hypothesis survive for another day.⁹⁹

The scientific method may be “unassailable,”¹⁰⁰ but forensic analysts do not generally study or utilize it.¹⁰¹ As a result, what a scientist would deem a hypothesis is often elevated in the forensic realm to the status of a deductive conclusion, “when in fact it is a statement awaiting verification through testing.”¹⁰² But forensic procedures are rarely, if ever, subjected to meaningful testing.¹⁰³ Peer review systems are alien to forensic analysts, and even the forensic techniques “accepted by a broader scientific community . . . are not used in such a way that would reveal their methodological flaws, if any.”¹⁰⁴ Forensic investigators often deal with “unique and highly unusual events” whereas other sciences are concerned with “the usual and the typical, and with the manner in which things generally happen.”¹⁰⁵ The assumption of “discernible uniqueness” at the

96. See *id.* at 15.

97. Michael D. Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation*, 86 NW. U. L. REV. 643, 645 (1992). Interestingly, the United States Supreme Court cited this very quotation as part of its explanation of scientific knowledge in its scientific evidence gatekeeper decision. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593 (1993).

98. KARL R. POPPER, *CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE* 37 (5th ed. 1989) (emphasis removed).

99. See John I. Thornton, *Courts of Law v. Courts of Science: A Forensic Scientist's Reaction to Daubert*, 1 SHEPARD'S EXPERT AND SCI. EVIDENCE Q. 475, 479-80 (1994) (discussing Popper's tests).

100. Thornton & Peterson, *supra* note 91, at 14.

101. *Id.* at 15. See Randolph N. Jonakait, *The Meaning of Daubert and What That Means for Forensic Science*, 15 CARDOZO L. REV. 2103, 2116-17 (1994) (contrasting “reliable science” with “forensic science”); Thornton, *supra* note 99, at 484-85 (“I find that many forensic scientists, even those who are entirely competent in their profession, have an exceedingly poor grasp of what constitutes the scientific method.”).

102. Thornton & Peterson, *supra* note 91, at 15.

103. Jonakait, *supra* note 101, at 2117.

104. *Id.*

105. Thornton & Peterson, *supra* note 91, at 15.

heart of forensic identification techniques not only “lack[s] theoretical or empirical foundations,” it has also been severely challenged as errors in proficiency testing come to light.¹⁰⁶

In “normal” science, students at the doctoral level are socialized into the “culture of science.”¹⁰⁷ This environment emphasizes rigorous methodology and caution in the interpretation of data.¹⁰⁸ Practitioners of forensic science, ninety-six percent of whom have only a bachelor’s degree or even less education, are rarely exposed to such an atmosphere of stringent self-questioning.¹⁰⁹ The consequences for professional standards are quite serious: “When individuals who are not steeped in the culture of science work in an adversarial, crime-fighting culture, there is substantial risk that a different set of norms will prevail.”¹¹⁰ Positive results, confirmatory of the prosecution’s case, have often been substituted for the actual negative or inconclusive results.¹¹¹ These consequences are dramatically illustrated by the role taken by forensic analysis in wrongful convictions. False or misleading testimony by forensic investigators is “the second most common contributing factor to wrongful convictions, found in 63% of those cases.”¹¹²

To date, the accuracy of the traditional forensic analysis has undergone little research.¹¹³ Forensic practitioners “often reject error rate estimates in favor of arguments that theirs is an error-free science.”¹¹⁴ The true error rates for forensic techniques are almost always unknown, and where they have been discovered, they are “shockingly high.”¹¹⁵ Investigators often assert their expertise in nothing more conceptually sophisticated than a judgment call, thus placing their pseudo-science outside the walls of replicability, a basic scientific premise. But the effort to exempt forensic analysis from the evaluative measure of calculating error rates can be countered by consideration of proficiency testing. When juries are afforded evidence of a forensic match, “a proper assessment of the probative value of that match requires awareness of the chance that a

106. Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE 892, 892 (2005).

107. *Id.* at 893.

108. *Id.*

109. *Id.*

110. *Id.*

111. *See id.*

112. Saks & Koehler, *supra* note 106.

113. *Id.* at 894.

114. *Id.* An “error-free science” is, of course, a chimerical proposition, a negation of the basic tenets of science. *See supra* notes 95-99 and accompanying text.

115. Jonakait, *supra* note 101, at 2117.

mistake was made.”¹¹⁶ In particular, blind proficiency analysis greatly enhances the validity of the testing, where analysts believe that the material to be examined is part of their ordinary work load.¹¹⁷ Unfortunately, proficiency testing in the forensic sciences is “generally infrequent, internal, and unrealistic; blind tests are practically nonexistent.”¹¹⁸ Forensic analysis thus aspires to the benefits of a scientific label, while rejecting the burdens of adhering to scientific norms.

Without science, however, “there can be no forensic science.”¹¹⁹ In fact, forensic technicians “need look no further than their newest sister discipline, DNA typing, for guidance on how to put the science into forensic identification science.”¹²⁰ Forensic DNA identification, when properly conducted, ensures validity and reliability at the outset. Each lot of DNA testing kits that arrives in a laboratory is quality controlled to make sure it performs to the manufacturer’s specifications. In addition, both positive and negative controls are run with each sample or series of samples. Positive controls help to determine whether the testing mechanism itself is performing to manufacturer specifications. Negative controls test for the presence of contaminants, such as the researcher’s own DNA.¹²¹ The underlying principle of forensic DNA identification is probability—how likely that a given genotype will occur in a population. Therefore, continued accuracy in DNA typing requires the maintenance of an extensive database of population variables.

But most forensic practices do not conform to the stringent standards of DNA analysis. Forensic hair comparison, for example, has not derived a population of variables to determine the probability of encountering a given hair in a given population.¹²² This technique does not easily lend itself to mathematical validation, but can be tested using extensive proficiency testing.¹²³ It is not clear, however, whether these standards are

116. Saks & Koehler, *supra* note 106, at 894.

117. *Id.*

118. *Id.*

119. Thornton & Peterson, *supra* note 91, at 17 (emphasis omitted).

120. Saks & Koehler, *supra* note 106, at 895.

121. The description in the text represents a prototype of effective forensic DNA identification. For further discussion of forensic DNA laboratory standards, see Frederick R. Bieber, *Science and Technology of Forensic DNA Profiling: Current Use and Future Directions*, in *DNA AND THE CRIMINAL JUSTICE SYSTEM* 23, 39 (David Lazer ed., 2004).

122. See Max M. Houck et al., *The Science of Forensic Hair Comparison and the Admissibility of Hair Comparison Evidence: Frye and Daubert Considered*, *MOD. MICROSCOPY J.*, Mar. 2, 2004, at 5, available at <http://www.modernmicroscopy.com/main.asp?article=36&page=1>.

123. See *id.* at 4, 8.

inappropriate to measure the accuracy of forensics, or whether practitioners resist them for other reasons. Given the current state of knowledge, however, a probabilistic approach to hair comparison is "fraught with complexity."¹²⁴ Moreover, because every case of hair comparison contains "different samples, different questions, and different solutions," an objective assessment of error rate is "impossible."¹²⁵ In hair comparison, "peer review" consists of merely having another "qualified examiner" go over the first examiner's results.¹²⁶ Establishing error rate is "less necessary" when a sample has not been altered or consumed and is available for re-testing by the defense.¹²⁷ But the absence of established error rate cannot be compensated for by the expectation that external validation may be available elsewhere. Crime labs have been shown to be untrustworthy in the proper storage and preservation of test samples.¹²⁸ Due to mislabeling or mishandling, samples may be unavailable to the defense, or they may be the wrong samples. Whether or not a defendant is able to re-test a specimen does not negate the necessity that the accuracy of the procedure itself be quantifiable.

That a forensic procedure borrows facts and principles from established scientific disciplines does not endow it with the imprimatur of science. Hair comparison is said to be "grounded in the most basic ideas of microscopy, biology, anatomy, histology and anthropology."¹²⁹ Yet, along with forensic practices such as ballistics, tool-mark, handwriting comparison, bite-mark, and voice-print identification, it depends on visual comparisons and/or highly subjective, impressionistic analyses.¹³⁰ Nevertheless, although they warrant "precious little scientific foundation," these tests have been credited with "marked empirical validity."¹³¹ Their very subjectivity, long usage, and acceptance by the courts provide a self-sustaining rationale. The perpetuation of these procedures has done away with the need to re-examine their assumptions to discern a basis in scientific principles. Routine usage and acceptance relieves forensic technicians from "the additional burden of justifying from scratch[] the

124. *Id.* at 5.

125. *Id.* at 8.

126. *Id.*

127. *Id.*

128. See DiFonzo, *supra* note 54, at 1248-69 (describing many instances of defective storage and preservation of forensic samples by crime labs).

129. Houck et al., *supra* note 122, at 1-2.

130. Where available, mitochondrial DNA sequencing ("mtDNA") may provide an effective complement to microscopic hair comparison. See *id.* at 5-6. It is especially useful in kinship analysis or where a comparison sample of a decedent is unavailable and that of a mother or sibling may be obtained. See Biebert, *supra* note 121, at 33.

131. Thornton, *supra* note 99, at 482.

procedures that for years have practically been the furniture of their consciousness.”¹³²

To an individual who has been wrongfully convicted by any of the above procedures, the well-furnished consciousness of the forensic evaluator supplies small comfort. In order to call itself science, forensic examiners must engage in continually conducting experiments to “test the core assumptions of their fields.”¹³³ In addition, forensics must devise a “probabilistic approach” to identification.¹³⁴ As in DNA analysis, this approach requires constructing databases on the frequency with which variables occur in different populations.¹³⁵ Such practices may engender the development of viable, efficient computer-assisted “pattern recognition programs” for forensic identification.¹³⁶

When a forensic “science” cannot or will not adopt scientific criteria, perhaps it should simply give up the pretense of being scientific. Hair comparison, while not providing “absolute positive identification,” may yield evidence of association between a test sample and a known individual.¹³⁷ As such a tool, it may exclude certain individuals from having been at the scene, or demonstrate similarities between individuals and evidence left at the scene. As long as hair comparison experts, along with similar forensic comparison technicians, make no claim to having found “a match,” their testimony can be given its proper weight and considered along with the other evidence. But powers of observation, no matter how astute, do not assume scientific proportions.

Forensic scientists may protest that their disciplines are not amenable to the scientific method, to routine re-testing of their assumptions, and to error-rate analysis and probabilistic approaches. But *CSI* and its televised progeny have placed forensics at center stage for nearly fifty-eight million viewers a week.¹³⁸ Such visibility has exposed some of the vaunted techniques’ most troubling deficiencies. Whether forensics withers or blossoms under such intense illumination, the “time is ripe” for rigorous re-evaluation, for discarding notions of “uniqueness and perfection,” and replacing them with sound empirical analysis.¹³⁹ Becoming the object of hero-worship is tempting, but perhaps it is precarious to exclaim, in the words of one forensic lab director, “how can you not be delighted with a

132. *Id.*

133. Saks & Koehler, *supra* note 106, at 895.

134. *Id.* at 893.

135. *Id.* at 895.

136. *Id.*

137. Houck et al., *supra* note 122, at 1.

138. See *supra* text accompanying note 16.

139. Saks & Koehler, *supra* note 106, at 895.

program or show where your particular career endeavor is glorified every week for an hour on television?"¹⁴⁰

III. THE TEMPTED: JURIES AND GATEKEEPERS

*"[C]omplete hogwash."*¹⁴¹

Forensic scientist Thomas Mauriello has estimated that forty percent of the forensic techniques depicted on *CSI* do not exist.¹⁴² For those that do exist, judges, the evidentiary gatekeepers, must determine whether there is adequate basis for admissibility. Juries, in turn, must weigh the evidence and assess its probative value. Often, juries must analyze forensic evidence in conjunction with other, more prosaic types of evidence, such as eyewitness testimony or confessions. In the age of *CSI*, the need for judges and juries to intelligently evaluate all types of testimony is more crucial than ever.

By now, *CSI* has found its way into several judicial opinions. At least one court has held it permissible for a prosecutor to dismiss defense counsel's reference to an absence of evidence by arguing that "this is not *CSI*."¹⁴³ Similarly, another court found no prejudice when a prosecutor, during voir dire, distinguished between television shows and real-life investigations.¹⁴⁴ It is, however, impermissible for a prosecutor to

140. Peirce, *supra* note 65 (quoting Allegheny County Coroner Cyril Wecht).

141. Mark Hansen, *Believe It or Not*, A.B.A. J., June 1993, at 64 (quoting Professor Melvin Lewis's description of forensic "shoeprint" evidence, which was admitted in approximately twenty criminal cases before being scientifically debunked).

142. Cole & Dioso, *supra* note 47.

143. Cole v. State, 194 S.W.3d 538, 545-46 (Tex. Ct. App. 2006).

144. State v. Latham, No. 92,521, 2005 WL 1619235, at *2 (Kan. Ct. App. July 8, 2005) (unpublished opinion). The challenged remarks by the prosecutor included the following:

There's quite a few people [sic] watch *CSI*. Extremely popular.

CSI is a bunch of you know what. Okay. It doesn't happen that way. Okay. First of all, [sic] *CSI* investigator with the Wichita Police Department is an evidence collector. They go in, they pick up evidence, they bring it out, they bag it, they sort it, they put it in the proper place, make sure it gets to a certain place. They don't do any investigation, they don't do any talking to anybody or anything like that.

So the guy on *CSI* who's now a heart throb and everything else, this William Peterson [the actor playing Gil Grissom], that might be—make for a good TV show, but that's not reality, okay. And, in one of the shows, I think they even had where a guy was knifed and they poured some kind of substance into the wound to determine what the knife was, what kind of knife or where it was. That would be great if we could do that. That would be

“trivialize” the reasonable doubt standard by “comparing it to a purportedly unnecessarily burdensome ‘television’ standard.”¹⁴⁵ In that case, the prosecutor, alluding to *CSI*, averred that, while the State might have procured fingerprint evidence on TV, “this isn’t TV, this is real life.”¹⁴⁶ The court found that the prosecutor’s comments improperly suggested that “fingerprint evidence may be required to meet the burden of proof during fictionalized television programs but that same requirement has no bearing on the jury’s determination of reasonable doubt at trial.”¹⁴⁷

Long before the advent of *CSI*, one observer noted the magical effect of science on jurors:

Scientific evidence impresses lay jurors. They tend to assume it is more accurate and objective than lay testimony. A juror who thinks of scientific evidence visualizes instruments capable of amazingly precise measurement, of findings arrived at by dispassionate scientific tests. In short, in the mind of the typical lay juror, a scientific witness has a special aura of credibility.¹⁴⁸

There is, however, no real consensus as to just how vulnerable juries are to the sway of scientific evidence. It has been asserted that “jurors overweigh the probative value of science,” giving it far greater credence than is warranted by its statistical value.¹⁴⁹ Others find no evidence of “‘white coat syndrome’ in which jurors mechanistically defer[] to certain experts because of their field of expertise.”¹⁵⁰ Research indicates that jurors retain

fabulous. But you can’t. Okay. In all the years I [sic] been doing this, I’ve never had—that’s just not something that—technologically [sic] is not there yet.

Does anybody here think that they’re gonna hear like *CSI* evidence here in this courtroom? Nobody’s indicating that that is a concern for them.

Id. The appellate court held that the prosecutor’s comments were not prejudicial, but were “made in an effort to point out the differences between real world investigations and those seen on television shows.” *Id.*

145. *Boatswain v. State*, No. 408,2004, 2005 WL 1000565, at *2 (Del. Mar. 30, 2005) (unpublished opinion).

146. *Id.*

147. *Id.* The error was, however, deemed harmless and the conviction was allowed to stand. *Id.* at *3.

148. Peter J. Goss et al., *Clearing Away the Junk: Court-Appointed Experts, Scientifically Marginal Evidence, and the Silicone Gel Breast Implant Litigation*, 56 *FOOD & DRUG L.J.* 227, 228 (2001) (quoting Edward J. Imwinkelreid, *Evidence Law and Tactics for the Proponents of Scientific Evidence*, in *SCIENTIFIC AND EXPERT EVIDENCE* 33, 37 (1981)).

149. Tyler, *supra* note 12, at 1063.

150. Daniel W. Shuman & Anthony Champagne, *Removing the People from the Legal Process: The Rhetoric and Research on Judicial Selection and Juries*, 3 *PSYCHOL.*

their capacity for rational decision-making when faced with complex expert testimony and do not “resort to irrational, extralegal solutions” in deciding cases.¹⁵¹ Juries, in fact, “may well be as discerning as judges.”¹⁵² Rather than complex legal concepts and evidence, it is the “trial process itself” that creates an “impediment to jury comprehension and understanding.”¹⁵³ In an effort to improve juror participation during trials, Arizona has instituted several reforms. These include allowing jurors to take notes during trial, to conduct pre-deliberation discussions of the evidence in civil trials, and to submit written questions.¹⁵⁴ As a result of these reforms, jurors, judges, lawyers, and litigants have expressed “increased satisfaction with the judicial process.”¹⁵⁵

There are, however, no reforms able to counteract the effect of specious or misleading forensic evidence on judges and juries. The lack of scientific training on the part of most judges and jurors often renders them “incapable of distinguishing between sound science and pseudo-science.”¹⁵⁶ A steady diet of false, contradictory, or undeveloped science can grossly impair a jury’s trust in experts, as well as its ability to intelligently evaluate the evidence. Within the past several years, commentators in the UK have noted an apparently “anti-CSI Effect,” in which “[p]ublic belief in experts appears to be at an all-time low.”¹⁵⁷ A recent English trial was marred by ineffective guidance by a judge where jurors were “thoroughly confused” by conflicting medical testimony.¹⁵⁸ The readiness of judges to admit dubious forensic evidence such as ear-print analysis, facial mapping, and analysis of lip-reading from video footage constrains jurors to “draw conclusions that the evidence can’t bear.”¹⁵⁹ As the forensic sciences trumpet more and more varieties of expertise, often

PUB. POL’Y & L. 242, 255 (1997).

151. *Id.* at 256.

152. *Id.*

153. Robert D. Myers et al., *Complex Scientific Evidence and the Jury*, 83 JUDICATURE 150, 152 (1999), available at http://www.ornl.gov/sci/techresources/Human_Genome/publicat/judicature/article10.html.

154. *Id.* at 153.

155. *Id.* Colorado has also been at the forefront of jury reform, while the Seventh and Ninth Federal Circuit Courts are studying similar measures. Gene Johnson, *States Weigh Ideas to Improve Juries*, SEATTLE TIMES, Mar. 26, 2006, at B2, available at http://seattletimes.nwsource.com/html/localnews/2002890274_juries26.html?syndication=rss. The American Bar Association has added its voice to the call for jury reform, “intensifying a national dialogue among judges, lawyers and scholars.” *Id.*

156. Goss et al., *supra* note 148, at 227.

157. Wade, *supra* note 50.

158. *Id.*

159. *Id.*

not based on science, such evidence is “increasingly becoming the whole story in a trial.”¹⁶⁰ For judges, juries, and police investigators, not to mention criminal defendants, there is significant risk of adhering to science too closely “when the scientists are building a science, not following a science.”¹⁶¹ The onus falls squarely on judges to filter out expert testimony of questionable worth before it can sway, misinform, or bewilder a jury.

Good science can, and should, be persuasive. DNA testing, when performed properly, is “the most remarkable forensic tool we have ever had.”¹⁶² Bad science, on the other hand, can be a fountain of harm. Because jurors “seek a form of justification that is plausible and compelling to bolster their own desire for certainty,” it is essential that scientific evidence be truly worthy of belief.¹⁶³ The rapid pace at which new technologies are developed and adopted outstrips sober examination of their reliability.¹⁶⁴ Yet, it is not only new or emerging technologies that call for a healthy degree of circumspection and scrutiny. Older, generally accepted forensic practices, including fingerprinting, hair comparisons, handwriting analysis, bite-mark evidence, tool-mark identification, and comparative bullet-lead analysis have also come into question.¹⁶⁵ Although challenges under the *Daubert* trilogy¹⁶⁶ have rarely blocked admissibility, “they have exposed the lack of empirical support for many commonly employed forensic techniques.”¹⁶⁷

When police investigating a homicide later find a suspect with a gun, the forensic possibility arises that the suspect might be inculcated by a

160. *Id.* One example of an extremely unusual forensic procedure involved “brain fingerprinting.” The Iowa Supreme Court defined this branch of forensics as one that “provide[s] information about what the person has stored in his brain.” *Harrington v. State*, 659 N.W.2d 509, 516 n.6 (Iowa 2003). According to the forensic expert in that case, the procedure established that the defendant’s “brain did not contain information about [the victim’s] murder.” *Id.* Moreover, the expert testified that the brain fingerprinting “confirm[ed] that [the defendant’s] brain contained information consistent with his alibi.” *Id.*; see Becky McCall, *Brain Fingerprints Under Scrutiny*, BBC NEWS, Feb. 17, 2004, <http://news.bbc.co.uk/2/hi/science/nature/3495433.stm> (reporting on the “controversial technique for identifying a criminal mind using involuntary brainwaves that could reveal guilt or innocence”).

161. Wade, *supra* note 50.

162. Margaret A. Berger, *The Impact of DNA Exonerations on the Criminal Justice System*, 34 J.L. MED. & ETHICS 320, 322 (2006).

163. Tyler, *supra* note 12, at 1071.

164. Richard S. Schmechel et al., *Defending with (and Against) Forensic Evidence: A Call to Share Resources*, CHAMPION, Aug. 2005, at 39.

165. Hansen, *supra* note 22, at 51.

166. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593 (1993); *Gen. Elec. v. Joiner*, 522 U.S. 136, 146 (1997); *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 158 (1999).

167. Hansen, *supra* note 22, at 51.

match between the firearm and bullet fragments and casings found at the scene. The integrity of forensic ballistics identification, however, seems to vaporize on close examination. In *United States v. Green*,¹⁶⁸ the court allowed a tool-mark identification expert to testify as to his observations of the evidence but not his conclusions that the shell casings came from a particular weapon.¹⁶⁹ Noting that “[t]his reliance on long-standing use of ballistics evidence in the courts is troubling [and that] [i]t runs the risk of ‘grandfathering in irrationality,’”¹⁷⁰ the court nevertheless was constrained by precedent to admit the testimony.¹⁷¹ As for the qualifications of the government’s expert, the court was dismayed by his lack of certification,¹⁷² the absence of any blind testing,¹⁷³ and the lack of an error rate analysis.¹⁷⁴ The credentials of the defense expert did not fare much better. While recognizing that “the *Daubert-Kumho* standard does not require the illusory perfection of a television show (*CSI*, this wasn’t),” the court lamented that the admissibility standard imposed upon it, as well as on courts across the country, was far less than rigorous.¹⁷⁵

Juries, judges, and devoted viewers of *CSI* may be blissfully unaware of the “undeniable correlation between dubious forensic science and wrongful convictions.”¹⁷⁶ More than one-third of DNA exonerations involved defective forensic evidence other than DNA.¹⁷⁷ How can juries reconcile their need for closure, certainty, and objectivity with the prevalence of such flawed forensic procedures? More and more, we require them to resist the temptations of seemingly scientific truths and become self-questioning, error-detecting scientists themselves. Prosecutors and defense counsel struggle for ways to educate jurors while trying to retain some mastery over the adversarial process. The “confirmatory” outlook of the current forensic science community is “inconsistent with the disconfirmatory mindset” of real science.¹⁷⁸ Yet prosecutors must meet the burden of proof beyond a reasonable doubt. To openly acknowledge errors

168. 405 F. Supp. 2d 104 (D. Mass. 2005).

169. *Id.* at 108-09.

170. *Id.* at 123.

171. *Id.* at 108, 123. Specifically, the court observed that “every single court post-*Daubert* has admitted this testimony, sometimes without any searching review, much less a hearing.” *Id.* at 108.

172. *Id.* at 109.

173. *Id.* at 115-16.

174. *Green*, 405 F. Supp. 2d at 116.

175. *Id.* at 109.

176. Cooley, *supra* note 13, at 389.

177. *See Berger, supra* note 162, at 322.

178. Cooley, *supra* note 13, at 427.

as integral to science could “spell disaster.”¹⁷⁹ Clearly, “the relationship between law, science, and technology has been and is both an essential alliance and a reluctant embrace.”¹⁸⁰

CONCLUSION: DEFROCKING THE DEVIL

The investigation into the deaths of the Florida family-of-four, whose execution-style killing begins and ends this Article, resulted in multiple arrests two weeks after the crime.¹⁸¹ Law enforcement authorities concluded that the slain father “was probably involved in drug trafficking.”¹⁸² After the bodies were found on the highway, a search of the family’s home uncovered indicia of drug selling, including “suspected drug ledgers”¹⁸³ and plastic packaging used to wrap illegal drugs. Investigators linked the suspects to the father through references in the ledgers. A subsequent search of the home where three of the suspects lived turned up crack cocaine, ecstasy, and drug packaging materials, as well as more than a dozen firearms, including an AK-47 assault rifle. When the suspects were arrested, one of them was carrying a photograph of the murdered father. In short, the police investigation concluded that the father, his wife, and their two small children were killed “for drugs, money or both.”¹⁸⁴ Forensic evidence analysis played no role in the arrests, just good, old-fashioned police investigative techniques.

Ambiguity and inconsistency are often inherent in criminal trials. Jurors, while adhering to the reasonable doubt standard, are charged with sorting out and resolving these contradictions. They are, after all, the final arbiters of credibility. We do not assist them in this difficult task by plying them with junk science. In turn, jurors must know that psychological certainty is not always desirable and sometimes hazardous to the innocent. Justice, no matter how earnestly juries might crave it, is not so freely and readily dispensed by so-called forensic experts. First, the crime scene must offer up evidence capable of forensic analysis and identification. Second, the methods employed to analyze and identify the evidence must comport with valid and reliable scientific principles. In the absence of both

179. *Id.* at 394.

180. Valerie Stewart & Susan Zucker, *Sharing Knowledge to Promote Justice*, 52 FED. LAWYER 28, 29 (2005).

181. Brian Skoloff, *Drug Connection Seen in Florida Slayings*, CHI. TRIB., Oct. 27, 2006, available at <http://www.chicagotribune.com/news/custom/newsroom/chi-061027-florida-slayings,1,793697.story?track=rss>.

182. *Id.*

183. *Id.*

184. Foxnews.com, *Police: Father of Slain Florida Family Was Likely Involved in Drug Trafficking*, FOX NEWS, Oct. 28, 2006, <http://www.foxnews.com/story/0,2933,226056,00.html> (quoting Sheriff Ken Mascara).

requirements, vindication is not within the power of juries to give. Perhaps the most important CSI Effect, one that may outlast the success of televised crime scene investigators, would be a fundamental reevaluation of the nature and role of forensic evidence in the courtroom.