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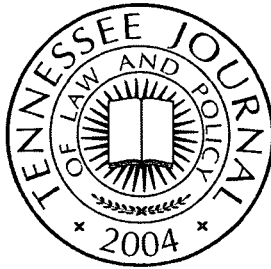
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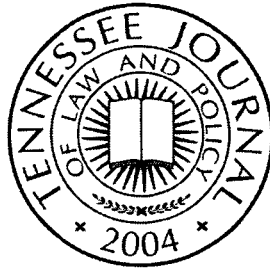
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A CHECKLIST

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KEYNOTE ADDRESS

EVOLVING TRENDS IN FORENSIC SCIENCE

*Margaret A. Berger*¹

This address will focus on the 2009 report (“the Report”)² of the National Academy of Science Research Council (“NRC”), which was commissioned by Congress to look at evolving trends in forensic science. Understanding what is happening in the forensic sciences is very complicated because of the wide variations that exist in different jurisdictions. There are federal laboratories, state or regional laboratories, county laboratories, and municipal laboratories. Almost all public crime laboratories examine controlled substances, and many examine firearms and tool marks. A majority of laboratories also screen biological samples, usually in preparation for DNA analysis, and examine forms of trace evidence. Many forensic examiners do not work in a traditional laboratory, however. They work within law enforcement offices and primarily conduct crime scene investigations, especially fingerprint examinations and bloodstain pattern analyses, and sometimes perform other forensic functions.

The fragmented nature of the forensic enterprise has made it difficult to study and to improve its principal product: evidence on which courts can confidently rely so

¹ Trustee Professor of Law, Brooklyn Law School; Member, National Academy of Sciences Committee on Identifying the Needs of the Forensic Sciences Community.

² COMMITTEE ON IDENTIFYING THE NEEDS OF THE FORENSIC SCIENCES COMMUNITY, NATIONAL RESEARCH COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009). All references not otherwise identified are to this report. Any direct quotations have been cited.

that the guilty are identified and the innocent are not erroneously convicted. The Report found many problems. Among the disturbing findings was that much forensic evidence introduced in criminal trials has not undergone any meaningful scientific validation and that many forensic professionals are not adequately trained or funded. The result is that faulty forensic evidence may, at times, lead to erroneous convictions of innocent persons, leaving the real perpetrators free to commit additional crimes. Furthermore, improvements in forensic science would undoubtedly assist homeland security in carrying out its missions.

I. Lack of Scientific Validation

Two important questions must be considered in deciding whether the conclusions of a particular forensic technique should be admitted in a courtroom: (1) Is the technique scientific, and (2) do practitioners of the technique avoid interpretations that become tainted by error, bias, or the lack of proper procedures?

Let us see what these questions mean. A large number of the techniques used in forensic laboratories are not informed by the culture of science. As the Report concluded, “Many of the processes used in the forensic science disciplines are largely empirical applications of science—that is, they are not based on a body of knowledge that recognizes the underlying limitations of the scientific principles and methodologies used for problem solving and discovery.”³

Let me give you an example. Years ago, before 9/11, I was on a committee that was supposed to investigate whether one could add anything to black or smokeless gun powder so that if it was used to make a pipe bomb, it would

³ *Id.* at 38.

be easier to trace where the pipe bomb was manufactured. Initially, I thought that gunpowder was a product of the Industrial Revolution and that it was made according to a formula. But, apparently, making gunpowder is like making wine. It has a cellulose base, which varies depending on the vegetable material that is used. Then different ingredients are added to this base so that every batch of black and smokeless powder is somewhat different. A technician who worked for the Bureau of Alcohol, Tobacco, and Firearms, a government agency that investigates pipe bomb incidents, had the idea of collecting samples from facilities that make black and smokeless powder. After a pipe bomb incident, one could compare the powder in the pipe bomb with the collected samples and derive useful information about the vicinity in which the bomb was likely made.

A “scientific” approach would proceed in a different manner. It would consider how large a sample one needed to collect, whether the sample needed certain characteristics, and what kind of training and accreditation are necessary for the persons engaged in collecting and comparing the samples.

The Report examined a number of the major forensic sciences in detail, and the NRC was disturbed to find that many are based on “observation, experience, and reasoning without an underlying scientific theory. . . .”⁴ Let us look at some of the fields the Report examined.

A. DNA Evidence

The profound effect of DNA⁵ evidence on our criminal justice system is a remarkably recent development. In Great Britain, a seventeen-year-old mentally challenged

⁴ *Id.* at 128.

⁵ deoxyribonucleic acid

hospital kitchen porter confessed to a rape-homicide. DNA testing showed that the same person had committed two rape-murders. The kitchen porter could not have perpetrated the second crime because he was in custody at the time it was committed. DNA testing eventually identified the person who had committed both of the crimes. From the very beginning, DNA evidence was used not only to convict but also to acquit. As of this writing, the Innocence Project, which investigates allegations of wrongful convictions, has identified 250 cases in which DNA evidence shows that the inmate did not commit the crime for which he or she was incarcerated.⁶

DNA testing differs from other forensic techniques in a number of ways. Unlike the other forensic sciences, which are products of law enforcement efforts and play no role outside the legal system, forensic DNA testing is a byproduct of cutting-edge science. From the beginning, the scientific community has been involved in validating the use of DNA for forensic science. By 1996, only ten years after DNA's courtroom debut, the National Academy of Sciences had already convened two committees to issue recommendations on using DNA within the forensic enterprise. Eminent scientists served on these committees and testified at judicial hearings on the admissibility of DNA evidence in court. The other forensic sciences had to wait until the NRC Report was issued in 2009 before persons in the scientific community weighed in on their claims.

It is not only the scrutiny to which DNA testing has been subjected that has led to its becoming the "gold standard" for forensic evidence. It is also the nature of DNA itself. DNA has enormous variability. Before the forensic use of DNA, the scientific community had agreed

⁶ See The Innocence Project, <http://www.innocenceproject.org> (last visited May 2, 2010).

that no individuals other than identical twins have identical DNA profiles. Therefore, it has been possible to develop statistical models of the likelihood that a person would have the particular genetic pattern found at the crime scene. That does not mean, however, that DNA evidence is infallible. Its reliability will depend on how it is collected and analyzed. Problems have been reported at a number of laboratories over the handling and interpretation of DNA and with “drylabbing”⁷—the falsification of scientific results. In addition, there may be statistical issues, for instance, in dealing with mixed samples when a number of persons jointly committed a rape. Still, unlike other forensic techniques, DNA evidence is a child of science as compared to some of the other forensic disciplines examined in the Report.

B. Friction Ridge Analysis

One of the most controversial aspects of the Report is its treatment of fingerprints, palm prints, and sole prints, the analysis of which is collectively known as friction ridge analysis. In the United States for over a century, examiners have claimed that when they compare prints left by a suspect (the latent print) with prints taken from that suspect, they can accurately conclude that a match exists and that only the suspect could be the source of the latent print. Indeed, fingerprint evidence is undoubtedly thought by many to be the bedrock of forensic science. Examiners work in laboratories or are part of police identification units that go directly to crime scenes.

There are, of course, large databases of fingerprints. Most of you in this audience have probably had fingerprints taken. However, it is not true that if your latent print is

⁷ STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD, *supra* note 2, at 193.

found, a computer will compare the latent crime scene print with a print taken from you and unerringly determine whether there is a match. Actually, friction ridge analysis depends a great deal on subjective interpretations.

Since 1959, the technique used in friction ridge analysis has been described by the acronym ACE-V: “Analysis, Comparison, Evaluation, and Verification.”⁸ Nowadays, computers are often part of this process because they can be used to generate candidates for comparison. The process begins with the examiner taking a detailed look at the latent print, which is often in the form of a digital image, and then making a visual comparison of the latent print with the known prints. Source determination is made when the examiner concludes based on his or her experience that a sufficient quality and quantity of friction ridge detail agrees between the latent and known print. Verification occurs when a second examiner, who may be aware of the first examiner’s conclusion, agrees.

The ACE-V method does not specify a standard test protocol for which features of the prints must be compared. Unlike the case with DNA analyses, population statistics for fingerprints have not been developed, and there seem to be endless permutations of loops, whorls, arches, and deltas.

The friction ridge community continues to assert that the ability to see and assess the details in a latent print is an acquired skill, which depends on lengthy experience and training, such as working at the FBI laboratory. Some in the community argue that the ACE-V method leads to a zero error rate, though the claim that any human process has a zero error rate is absurd. Consequently, when testifying in court, examiners usually speak in terms of absolute certainty and refuse to express their conclusions in probabilistic terms.

⁸ *Id.* at 137.

A number of recent events have undermined this claim of absolute certainty. One is the Brandon Mayfield case.⁹ After terrorist attacks on commuter trains in Madrid, Spain, the Spanish authorities sent the Federal Bureau of Investigation (“FBI”) digital images of partial latent prints found on plastic bags that contained detonator caps. The FBI determined that an Oregon attorney, Brandon Mayfield, who was known to be sympathetic to radical causes, made the prints. Mayfield was arrested and jailed. After Spanish authorities alerted the FBI to additional information, the FBI sent two examiners to Spain, and it was eventually concluded that Mayfield had been misidentified. He received two million dollars in compensation.

A second development has been increasing research on contextual bias. After the Mayfield debacle, psychologist Itiel Dror, affiliated with a university in Great Britain, obtained copies of latent and known prints that fingerprint examiners had compared and found to match. Dror sent the prints back to the examiners and told them that they were from the Mayfield case. Most of the examiners then changed their minds and said that the prints did not match. The only thing that had changed was the context in which the prints were compared. These developments led a Maryland state court judge to refuse to allow fingerprint evidence in a death penalty case on the ground that the ACE-V methodology was “a subjective, untested, unverifiable identification procedure that purports to be infallible.”¹⁰

⁹ See *Mayfield v. Gonzales*, No. Civ. 04-14-1427-AA, 2005 WL 1801679 (D. Or. July 28, 2005).

¹⁰ *State v. Rose*, No. K06-0545 (Md., Baltimore Co. Cir. Oct. 19, 2007).

**C. Other Pattern/Impression Evidence:
Shoeprints and Tire Tracks**

The hypothesis on which examiners in the fields of pattern and impression rely is that shoes and tires pick up wear characteristics that individualize them. Over time, further changes take place so that elapsed time after the crime may affect an examiner's conclusions and certainty. Although it may be possible to identify class characteristics, there is no consensus about the number of individual characteristics needed in order to attribute a shoe or tire to a specific source. Examiners who seek to testify in terms of individualization are making experience-based conclusions unsupported by research data. At this time, examiners in these fields have not addressed what research needs to be done and by whom. Much more research is needed in this field.

D. Bite Marks

We can see the difference between a discipline that is rooted in science and one that is not if we look at a discipline such as forensic odontology, which is concerned with analyzing the bite marks that are at times found on victims of homicide, sexual assault, and child abuse. In these often sensational cases, there is a good deal of pressure on prosecutors to identify the perpetrator. Evidence of bite-mark comparisons is often introduced in these cases with the claim that the comparison shows a conclusive and unique match. But are bite-mark comparisons a valid forensic technique?

The Report pointed to a large number of problems. In the first place, the uniqueness of bite marks has never been established. No large study of large populations has ever been conducted to establish the uniqueness of bite

marks, and there is no central database. Furthermore, human skin may not accurately register bite marks, and the marks can be distorted by the elasticity of the skin. A final conclusion that the bite mark allows the unconditional identification of the perpetrator is not warranted.

Under some circumstances, bite-mark comparisons may be useful in excluding a suspect. For instance, suppose that a small child is covered with bites as unfortunately sometimes happens. If evidence is available that a very limited number of persons have access to the child, it may be possible, by examining this small group's bite marks, to exclude those whose bites could not have made the marks on the child. However, this is a much more limited use than claims that a bite-mark comparison allows the identification of the one person in the world who is responsible for the crime. This is clearly a field in which additional research is badly needed.

E. Analysis of Hair Evidence

Prosecutors have, for over one hundred years, sought to introduce hairs found at the crime scene to identify the defendant. DNA analysis does not work unless the root of the hair is present. Forensic hair examiners traditionally resorted to microscopic hair analysis. They would collect samples of hair from the suspect and then compare these hairs microscopically with the hair found at the crime scene. There are no studies that establish the frequency with which hair patterns are distributed among populations. Nevertheless, we know from transcripts of trials that hair examiners, at times, claim that in the thousands of examinations they have conducted, they have never seen as close a match as with the pubic hair found in this case. This testimony can be extremely prejudicial when it is the only evidence that seemingly ties the defendant to the crime scene.

It is possible to subject hairs to a mitochondrial DNA (“mtDNA”) examination, but this type of examination is of limited use because all persons with a female ancestor in common share the same mtDNA profile. Microscopic hair evidence may be of some use in excluding suspects and assisting in criminal investigations, but using it to identify a particular defendant is highly questionable. Testimony regarding microscopic hair analysis had been introduced in many of the cases in which convictions were set aside based on nuclear DNA evidence.

F. Controlled Substances

The analysis of drugs rests on a strong scientific basis. Examiners use methods of classical analytical chemistry and best practices that have been adopted in the United States and worldwide. Problems in this field stem not from the science that is employed but from the reporting of results. Often, too little information is furnished to enable a lawyer for the accused to understand and ask questions about what was done. Developments in the law may resolve some of these problems.

G. Questioned Document Examination

Questioned document examiners, who are also referred to as forensic document examiners or handwriting experts, compare a questioned item, such as a ransom request, a bomb threat, or a codicil to a will, with an item that was written by the suspect. The NRC Committee agreed that there may be a scientific basis for handwriting comparison, at least when there was no intention to forge or obfuscate, but that more research needs to be done.

H. Explosives Evidence and Fire Debris Analysis

Most of the analysis of explosions is based on well-established chemistry. Arson investigations are more troublesome. Though there clearly was a fire in which persons may have been killed, leading to a prosecution for murder and the possibility of a death penalty, the critical question may be whether an accelerant was used to start the fire or whether the fire started accidentally. The NRC Committee heard testimony about the paucity of research to date on reliably establishing that a particular fire was deliberately set.

I. Summary

This brief summary of the NRC Committee's conclusions about the scientific validity of some of the most commonly used forensic techniques indicates that there is a dearth of good scientific research establishing the scientific bases and validity of many traditionally accepted forensic disciplines.

II. Accreditation, Certification, and Codes of Ethics

The Report also found another pervasive problem with the forensic sciences—inconsistencies and deficiencies in accreditation, certification, and standards.

A. Accreditation

An accredited laboratory has a management system in place that sets out acceptable practices for its various activities. It is primarily concerned with the management system, technical methods, and quality of the work a laboratory produces. It cannot be self-assessing. Oversight

must come from outside the participating laboratory to ensure that standards are rigorous and not self-serving. Only a few jurisdictions require that their laboratories be accredited. Identification units, those forensic entities outside crime laboratories, do not participate in accreditation systems. This means that a forensic discipline such as fingerprinting, which is largely conducted outside laboratories by identification units, is for the most part not subject to accreditation requirements.

Proficiency testing is often a part of accreditation. Proficiency tests can be blind, meaning that the test subject in the lab is unaware that the sample he or she is given for analysis is a test sample and not a real case, or the tests can be open or declared. Blind tests require a great deal of work and expense to prepare. Instead of working on pending cases, the examiner's time is spent preparing a test. Furthermore, it is hard to keep the test blind. Crime lab personnel often have relationships with law enforcement personnel, so it is easy to find out whether there is an actual case that corresponds to the materials the examinee is being asked to analyze. Another problem with proficiency tests is that they achieve very little if they are too easy, and a number of courts have recently complained that proficiency testing in some disciplines is not sufficiently rigorous.

B. Certification

In some fields of science, professionals, such as doctors and nurses, must be certified before they can practice. A certification requirement could mandate that all forensic scientists who practice and testify must be certified. Certification boards consisting of respected professionals could develop standards for education, training, and experience that would have to be met before a forensic scientist could become certified in a particular discipline. Passing some kind of written or oral

examination would also be part of the certification process. Certification, like accreditation, is voluntary in most states.

C. Codes of Ethics

There is no single code of ethics to which all members of the forensic science community subscribe. Some forensic society organizations do have codes, but they can be enforced only against someone who is a member of that organization. A national code and better enforcement mechanisms are needed.

III. The NRC Committee's Central Recommendation: Congress should establish an independent federal entity: The National Institute of Forensic Science ("NIFS")

The preceding material discusses some of the many weaknesses of our present forensic science enterprise. The malfunctions discussed—the lack of science in much forensic science and the imperfections in our laboratories—can have profound effects on lives in our country. The wrong people may go to prison or even to death row, and others who should be prosecuted will evade punishment. The NRC Committee found that courts could not correct this system and the dangers it poses by operating on a case-by-case basis. Instead, the Committee recommended that Congress establish a new independent federal entity. This entity cannot be part of the law enforcement community because forensic science must serve law enforcement officers, prosecutors, and defendants.

The National Institute of Forensic Science ("NIFS") would be charged with implementing the ideas and changes previously discussed. For instance, NIFS would competitively fund research demonstrating the validity of forensic methods and studies measuring the accuracy of

forensic analyses. It would develop mandatory best practices and standards for laboratories and for accreditation and certification.

Of course, this Report appeared just as the United States entered a severe budgetary crisis. Whether NIFS ever will be funded remains to be seen. However, its analyses and recommendations may have an effect on how forensic science is practiced even if NIFS is not created.

ESSAY

**A SHORT PRIMER ON THE ADMISSIBILITY OF FORENSIC
SCIENCE EVIDENCE IN TENNESSEE:
A CHECKLIST**

*Bernard A. Raum*¹

“[J]urors are quite capable of seeing through flaky testimony and pseudoscientific claptrap. . . . we should not waste our valuable time watching witch doctors, voodoo practitioners or *brujas* go through the entrails of dead chickens in a fruitless search for the truth.”²

For decades, aircraft pilots have been using pre-flight and approach-to-landing checklists rather than relying on their memory to ensure that everything has been done in its proper sequence. The use of this tool gives pilots the ability to fly their aircrafts safely and according to an established procedure. Similarly, most trial attorneys employ witness checklists during the in-court examination of their witnesses to ensure that all of the witnesses’ evidence has been fully presented and their exhibits have been properly marked and received in evidence. It is the intent of this presentation to suggest the use of another evidentiary checklist for attorneys: a forensic evidence admissibility checklist.

When confronted with proving or disproving facts at trial, many attorneys preliminarily conduct a mental checklist to determine whether each individual piece of

¹ Adjunct Professor of Forensic Evidence, Levin College of Law, University of Florida

² *People v. Williams*, 183 Cal. Rptr. 498, 502 (Cal. Ct. App. 1982) (Gardner, J. Concurring).

evidence, either physical or testimonial, is admissible. Often the answer is relatively simple, but finding that answer may be rather complicated with forensic science evidence; thus, the suggestion of a written checklist. If annotated at each stage, checklists such as this may also serve as the foundation for a memorandum to the court in support of either inclusion or exclusion of the particular evidence in question. An evidentiary checklist can be in any form that the attorney might prefer, but it should be short, using popular devices like talking point bullets. Each bullet then represents an admissibility hurdle that must be considered. The suggested bullets in this presentation are simply the rules of evidence themselves, listed in the logical order that the court will use to determine admissibility. At each point in the checklist where an admissibility issue arises, it is important to consider the relevant case law for meeting that rule's requirements.

THE CHECKLIST

I. The Discretion of the Court

The first consideration of admissibility for scientific evidence is the general proposition that it is the trial court that is vested with not only the authority but also the discretion to admit or exclude such evidence.³ Typically, the discussion regarding admissibility is not conducted within the hearing of the jury. Additionally, because of the

³ TENN. R. EVID. 104(a) ("Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b). In making its determination the court is not bound by the rules of evidence except those with respect to privileges."). *See, e.g.*, *State v. Ellwood*, 783 So. 2d 423, 427-430 (La. Ct. App. 2001) (where Dr. William Bass was qualified as an expert witness in the field of forensic anthropology).

potential for lengthy testimony and exhibits in the case of scientific evidence, the court's evidentiary hearing is often completed in advance of trial by way of a motion *in limine*.⁴ At any hearing concerning the admissibility of evidence, including scientific evidence, the proponent of that evidence bears the burden of proof by a preponderance of the evidence⁵ as to the underlying scientific principles and methodologies. The decision of the trial court to either admit or exclude evidence will not ordinarily be reversed on appeal unless the evidence preponderates otherwise,⁶

⁴ See, e.g., *Brown v. Crown Equip. Corp.*, 181 S.W.3d 268, 273 (Tenn. 2005); *State v. Scott*, 33 S.W.3d 74, 76 (Tenn. 2000); *Pimm v. Wickes Lumber Co.*, 845 S.W.2d 768, 769 (Tenn. Ct. App. 1992). Cf. *Pullum v. Robinette*, 174 S.W.3d 124, 139 (Tenn. Ct. App. 2004); *State v. Kiser*, No. E2005-02406-CCA-R3-DD, 2007 WL 4207903, at *374 (Tenn. Crim. App. 2007), *aff'd*, 284 S.W.3d 227 (Tenn. 2009).

⁵ *State v. Edison*, 9 S.W.3d 75, 77 (Tenn. 1999); *State v. Stamper*, 863 S.W.2d 404, 405 (Tenn. 1993).

⁶ See TENN. R. APP. P. 13. See, e.g., *McCutcheon v. TND Assocs., L.P.*, No. E2007-01073-COA-R3-CV, 2008 WL 1899984, at *2 (Tenn. Ct. App. 2008). (“In a non-jury case [. . .], we review the record de novo with a presumption of correctness as to the trial court's determination of facts, and we must honor those findings unless the evidence preponderates to the contrary. The trial court's conclusions of law are reviewed de novo and are accorded no presumption of correctness. A trial court's decisions regarding the admission of evidence will not be overturned absent a showing of abuse of discretion.”) (internal citations omitted). Under the abuse of discretion standard, a trial court ruling will not be disturbed if reasonable minds can disagree as to its propriety, and no abuse of discretion will be found unless the trial court applied an incorrect legal standard or reached a decision against logic or reasoning that causes an injustice to the party complaining. *Eldridge v. Eldridge*, 42 S.W.3d 82, 85 (Tenn. 2001). An abuse of discretion occurs when the lower court's decision is without a basis in law or fact and is therefore “arbitrary, illogical, or unconscionable.” *State v. Brown & Williamson Tobacco Corp.*, 18 S.W.3d 186, 191 (Tenn. 2000); see also *Edison*, 9 S.W.3d at 77; *State v. Odom*, 928 S.W.2d 18, 23 (Tenn. 1993).

where the trial court's discretion is arbitrarily exercised⁷ or is otherwise abused.⁸ In addition to the science involved, as part of this initial process the trial court will review the qualifications of any proposed expert witness.⁹

II. Relevance to the Inquiry

With this standard in mind, the next issue that a trial court will consider is whether the proposed evidence is relevant to the inquiry.¹⁰ If the evidence is not relevant, the inquiry stops there.¹¹ However, if the proposed evidence is deemed relevant, it is admissible, subject to other established rules of evidence and privilege.¹² The

⁷ *State v. Ballard*, 855 S.W.2d 557, 562 (Tenn. 1993); *Baggett v. State*, 421 S.W.2d 629, 632 (Tenn. 1967).

⁸ *Coe v. State*, 17 S.W.3d 193, 218 (Tenn. 2000).

⁹ *Brown v. Crown Equip.*, 181 S.W.3d at 274-75.

¹⁰ TENN. R. EVID. 401 (“‘Relevant evidence’ means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.”).

¹¹ *See State v. Mosley*, 200 S.W.3d 624, 630 (Tenn. Crim. App. 2005) (proffered testimony did not have any bearing on any fact that pertained to the defendant's guilt or innocence); *State v. Davis*, No. E2006-01450-CCA-R3-CD, 2007 WL 3245414, at *9 (Tenn. Crim. App. Nov. 5, 2007) (hypothetical question to an expert called for speculation).

¹² TENN. R. EVID. 402 (“All relevant evidence is admissible except as provided by the Constitution of the United States, the Constitution of Tennessee, these rules, or other rules or laws of general application in the courts of Tennessee. Evidence which is not relevant is not admissible.”). *See, e.g., State v. Matthews*, No. M2007-01755-CCA-R3-CD, 2009 WL 2391296, at *7 (Tenn. Crim. App. Aug. 5, 2009); *State v. Waggoner*, No. M2006-00553-CCA-R3-CD, 2007 WL 1341770, at *8 (Tenn. Crim. App. May 8, 2007); *Wicks v. Vanderbilt Univ.*, No. M2006-00613-COA-R3-CV, 2007 WL 858780, at *10 (Tenn. Ct. App. Mar. 21, 2007); *State v. Curtis*, No. W2006-02347-CCA-R3-CD, 2007 WL 4530821, at *12 (Tenn. Crim. App. Dec. 26, 2007). *See also* TENN. CODE ANN. § 24-1-201(b), which codifies the so-called spousal communication privilege.

requirements of this rule must be satisfied in order to admit the testimony of an expert witness or any scientific evidence.¹³ For example, in *State v. Odo*, the Tennessee Court of Criminal Appeals found relevant the testimony of Dr. William Bass, a forensic anthropologist at the University of Tennessee, who described wounds on the victim's skeleton as being consistent with the alleged murder weapon.¹⁴

In addition, the issue of relevance is often raised when the prosecution attempts to introduce autopsy photographs into evidence. In order for any photograph to be admissible, it must first accurately depict the scene.¹⁵ In Tennessee, the standard relevance rule for photographs is stated in *State v. Banks*: "The admissibility of photographs is a matter committed to the sound discretion of the trial court and will not be overturned on appeal without a clear showing of abuse of that discretion."¹⁶ Further, the Tennessee Supreme Court held that the admissibility of photographs of murder victims is within the discretion of the trial court after considering the relevance, probative value, and potential unfair prejudicial effect of such

¹³ *State v. Copeland*, 226 S.W.3d 287, 307 (Tenn. 2007) (admitting expert testimony for the defendant to determine the reliability of eyewitness identification); *State v. Ayers*, 200 S.W.3d 618, 622-23 (Tenn. Crim. App. 2005) (admitting expert testimony on gunshot residue patterns [GSR]); *State v. Price*, 46 S.W.3d 785, 809-10 (Tenn. Crim. App. 2000) (admitting DNA evidence). *Cf.* *State v. Campbell*, 904 S.W.2d 608 (Tenn. Crim. App. 1995) (denying admission of expert testimony from a psychologist regarding sexual abuse); *State v. Poole*, No. W2007-00447-CCA-R3-CD, 2009 WL 1025868, at *11 (Tenn. Crim. App. Apr. 14, 2009) (concluding that expert psychiatric testimony was irrelevant and inadmissible).

¹⁴ *State v. Oody*, 823 S.W.2d 554, 565-66 (Tenn. Crim. App. 1991).

¹⁵ *Phillips v. F.W. Woolworth Co.*, 867 S.W.2d 316, 318 (Tenn. Ct. App. 1992); *State v. Howard*, No. W2008-00208-CCA-R3-CD, 2009 WL 1034506, at *9 (Tenn. Crim. App. Apr. 17, 2009).

¹⁶ 564 S.W.2d 947, 949 (Tenn. 1978). *Banks* is the leading case in Tennessee regarding the admissibility of photographs.

evidence.¹⁷ Generally, “photographs of the corpse are admissible in murder prosecutions if they are relevant to the issues on trial, notwithstanding their gruesome and horrifying character.”¹⁸ The probative value of the evidence must be weighed against any unfair prejudice the defendant may suffer if the evidence is admitted, and the evidence may be excluded only if the unfair prejudice substantially outweighs the probative value.¹⁹ This rule has been applied in numerous circumstances, including determining admissibility of photographs of homicide victims and crimes scenes.²⁰

III. Exclusion of Relevant Evidence

There are occasions when evidence that is otherwise relevant is nonetheless subject to exclusion.²¹ For example,

¹⁷ State v. Blair, No. E2008-00073-CCA-R3-CD, 2009 Tenn. Crim. App. LEXIS 1032, at *22 (Tenn. Crim. App. Dec. 17, 2009) (paraphrasing *Banks*, 564 S.W.2d at 950-51).

¹⁸ *Id.* (quoting *Banks*, 564 S.W.2d at 950-51).

¹⁹ *Id.* (citing *Banks*, 564 S.W.2d at 951). See also State v. Vann, 976 S.W.2d 93, 102-03 (Tenn. 1998) (holding that the probative value in admitting a photograph depicting prior sexual abuse was not substantially outweighed by a danger of unfair prejudice); State v. Goodner, No. E2007-01048-CCA-R3-CD, 2009 WL 605141, at *23 (Tenn. Crim. App. Mar. 10, 2009) (concluding that admission of the victim’s photograph did not prejudice the defendant).

²⁰ State v. Carter, 114 S.W.3d 895, 903 (Tenn.2003) (concluding that photographs were relevant to establish the heinous, atrocious, or cruel aggravating circumstance of the murder); State v. Griffis, 964 S.W.2d 577, 594-95 (Tenn. Crim. App. 1997) (concluding that photographs showing the victim’s injuries were “relevant and highly probative”); State v. Hullom, No. M2006-01041-CCA-R3-CD, 2007 WL 1174904, at *4 (Tenn. Crim. App. Apr. 19, 2007) (concluding that photographs depicting injury to victim and bloody clothing were relevant); State v. Leverston, No. W2006-02304-CCA-R3-CD, 2007 WL 4245725, at *14 (Tenn. Crim. App. Dec. 3, 2007).

²¹ TENN. R. EVID. 403 (“Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair

admitting color photographs of a bruised, bloodied, nude, infant victim where the medical cause of death was not in dispute would be considered improper.²² The Tennessee Supreme Court has opined on the issue, saying:

Not all logically relevant evidence is admissible. Thus evidence, which would advance the inquiry but would also inflame or unduly distract the jury or require an undeserved expenditure of judicial time or unfairly surprise the opponent may not be admissible. The probative weight of evidence must be balanced against those attendant costs in determining that evidence should be admitted.²³

However, under TENNESSEE RULE OF EVIDENCE 704, testimony is not objectionable as evidence simply because it “embraces an ultimate issue to be decided by the trier of fact.”²⁴ Notwithstanding this provision, expert opinion testimony is “not admissible on an ultimate issue if the jury could readily draw its own conclusions on the matter without the aid of the witness’ opinion.”²⁵

prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.”).

²² *State v. Collins*, 986 S.W.2d 13, 20-21 (Tenn. Crim. App. 1998); *see State v. Young*, 196 S.W.3d 85, 105-06 (Tenn. 2006) (holding that photograph of victim was prejudicial and inadmissible).

²³ *Otis v. Cambridge Mut. Fire Ins. Co.*, 850 S.W.2d 439, 443 (Tenn. 1992) (internal citation omitted).

²⁴ TENN. R. EVID. 704. *See State v. Shuck*, 953 S.W.2d 662, 668 (Tenn. 1997).

²⁵ *State v. Turner*, 30 S.W.3d 355, 360 (Tenn. Crim. App. 2000) (internal citations omitted).

IV. Testimony by Experts²⁶

Formerly, historical discomfort with expert testimony centered on unscrupulous persons who were charlatans²⁷ masquerading as experts. Of course, until the twentieth century, it was often difficult to verify the qualifications of these individuals. With a new focus on detailed record keeping and the ability to research the backgrounds of individuals, this evil has been substantially confined. However, the accuracy of the so-called science was usually left to the judgment and credibility of the individual expert witness, as evaluated by the jury.²⁸ The difficulty with this proposition was that neither the jury nor

²⁶ TENN. R. EVID. 702 (“If scientific, technical, or other specialized knowledge will substantially assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise.”).

²⁷ “A person who makes elaborate, fraudulent, and often voluble claims to skill or knowledge. . . .” Dictionary.com, Charlatan, <http://dictionary.reference.com/browse/charlatan> (last visited Apr. 24, 2010). Synonyms: imposter, mountebank, fraud, phony, quack. *Id.* The term “charlatan” is apparently derived from the Italian word *ciarlatano* and originally referred to a native of the Umbrian village of Cerreto, which was known for its quacks. *Id.* The term later was used to describe those persons who set up booths in town squares to hawk remedies. See David Gentilcore, *Charlatans, Mountebanks and Other Similar People: The Regulation and Role of Itinerant Practitioners in Early Modern Italy*, 20 Soc. Hist. 297, 299 (1995) (noting that in city squares charlatans would “appear from all corners, performing tricks and skits, and selling trinkets and dubious remedies, all competing for the attention of the public”).

²⁸ *State v. Vasques*, 221 S.W.3d 514, 521 (Tenn. 2009) (“The credibility of the witnesses, the weight to be given their testimony, and the reconciliation of conflicts in the proof are matters entrusted to the jury as the trier of fact.”).

the judge in ruling on admissibility had any objective basis to determine the witness's scientific credibility.²⁹

The first real attempt to create some method for the court to gauge the validity of the science itself came in the watershed decision of the United States Court of Appeals for the District of Columbia in *Frye v. United States*.³⁰ The test for admissibility in *Frye* was a simple creation, implemented with no explanation by the court, and strictly involved determining if a consensus of the experts in a given field agreed that the science was valid.³¹ Thus, instead of relying upon the word of one expert, now the courts were asked to rely upon the words of a group of experts without any independent evaluation by the trier of fact.

The rapid advances and all-encompassing expansion of the scope and spectrum of the sciences in the last fifty years left the *Frye* standard behind. What the courts needed was a *methodology* of their own, in the language of the *courts*, that could be used to determine the validity of any scientific principle and its application to the particular issues in litigation. In 1993, the United States Supreme Court penned an elegant and insightful opinion in the case of *Daubert v. Merrell Dow Pharmaceuticals* that allowed a court for the first time to conduct its own independent review of the validity of a scientific principle before permitting a jury to hear any evidence based on the principle.³²

It is no mistake that the process outlined in *Daubert* closely mirrors the scientific method process that scientists themselves use to verify the validity of the results of their

²⁹ See *Frye v. United States*, 293 F.1013, 1014 (D.C. Cir 1923) (landmark case establishing an objective test for determining the admissibility of expert testimony).

³⁰ *Id.*

³¹ *Id.*

³² *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 592-94 (1993).

inquiries and their discoveries.³³ With this graceful leap, the courts were now able to view the actual making of the sausage. It was in this context that the Court in *Daubert* stated its goals:

The inquiry envisioned by [Federal Rule of Evidence] Rule 702 is, we emphasize, a flexible one. Its overarching subject is the scientific validity—and thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission. The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate.³⁴

As in any endeavor involving human interaction, the *Daubert* methodology is not foolproof; there are no absolute guarantees in the process. However, with the *Daubert* decision, the courts have moved much closer to today's scientific reality. With this background in mind, the next step is to examine the current framework for the treatment of expert testimony.

A. The Opinion Rule

Almost one hundred and twenty years ago in *Powers v. McKenzie*, the Supreme Court of Tennessee, in commenting on the qualifications of an expert witness as opposed to that of a lay witness, stated:

The true distinction between an expert and a non-expert witness, says Mr. Wharton, “is that the latter gives the results of a process of reasoning familiar to every-day life, and the former gives the

³³ *Id.* at 593.

³⁴ *Id.* at 594-95 (footnote omitted).

results of a process of reasoning which can be mastered only by special scientists.” It is obvious that, however an “expert” may be defined, he should, in order to give his opinion as an expert, have some special as well as practical acquaintance with the immediate line of inquiry. Where the line between an expert and a non-expert should be drawn must, under the varying conditions of cases and their environments, necessarily be laid down by the *judex fori*; and this court will not reverse on account of the judgment of the lower court as to whether a witness offered [to that court] is an expert, unless we can clearly see that he was in error in respect to the qualification of the witness, and that his error was injurious.³⁵

The modern Opinion Rule is based upon the common law “Opinion Rule,” sometimes called the “Pure Opinion Rule.” The Tennessee Supreme Court stated this rule succinctly only a few years after *Powers*:

While the general rule is that witnesses must speak to facts, yet, upon questions of skill or science, men who have made the subject matter of investigation the object of their particular study are competent to give their opinions in evidence. But they will not be permitted to state their opinion upon any point the jury has to decide. Deductions from facts belong to the jury, and

³⁵ 16 S.W. 559, 562 (Tenn. 1891). See *Otis*, 850 S.W.2d at 443 (“To give expert testimony, one must be particularly skilled, learned or experienced in a science, art, trade, business, profession or vocation. The expert must possess a thorough knowledge upon which he testifies that is not within the general knowledge and experience of the average person.”).

when the examination extends so far as to substitute the opinion of the witness, upon the very issue in controversy, for that of the jury, the province of that tribunal is unwarrantably invaded. *Necessity alone is the ground* upon which expert testimony rests, and the moment this necessity ceases, the exception to the general rule, which requires facts and not opinions from witnesses, ceases also. “Hence,” say the supreme court [sic] of Pennsylvania, in *Graham v. Penn Co.*, 139 Pa. 149, 21 A. 151 (Pa. 1891), “whenever the circumstances can be fully and adequately described to the jury, and are such that their bearing on the issue can be estimated by all men, without special knowledge or training, opinions of witnesses, experts or otherwise, are not admissible.”³⁶

Note, however, that the common law requirement of necessity has since been relaxed in Tennessee by the current provisions of Rule 702 of the Tennessee Rules of Evidence.³⁷ The requirement now is that such opinion testimony must *substantially assist* the trier of fact to understand the evidence or to determine a fact in issue.³⁸

Typically, a qualified expert may render an opinion, which is based upon his or her own training, education, and experience.³⁹ Under TENNESSEE RULE OF EVIDENCE 703,

³⁶ *Bruce v. Beall*, 41 S.W. 445, 448 (Tenn. 1897) (quoting *Graham v. Pennsylvania Co.*, 139 Ps. 149, 153 (Pa. 1891)) (emphasis added) (internal citation omitted). See, e.g., *Moon v. State*, 242 S.W. 39 (Tenn. 1921); *Fortune v. State*, 277 S.W.2d 381 (Tenn. 1955).

³⁷ See *State v. Shuck*, 953 S.W.2d 662, 668 (Tenn. 1997).

³⁸ *Id.* See also *State v. Campbell*, 904 S.W.2d 608, 616 (Tenn. Crim. App. 1995) (ruling that testimony of a psychologist would not “substantially assist” the trier of fact).

³⁹ *Hoy v. DRM, Inc.*, 114 P.3d 1268, 1282 (Wyo. 2005) (“If the [expert] witness is relying solely or primarily on experience, then the

this opinion may be based on what would otherwise be inadmissible hearsay⁴⁰ if “the type of hearsay is one that would be reasonably relied upon by experts in the situation.”⁴¹ It is, of course, this “basis of opinion” that is

witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts.”).

⁴⁰ TENN. R. EVID. 801(c) (“Hearsay’ is a statement, other than one made by the declarant while testifying at the trial or hearing, offered in evidence to prove the truth of the matter asserted.”). Hearsay is typically not admissible unless it falls under one of the established exceptions to the hearsay rule, delineated in TENN. R. EVID. 803, 804, and 805. *See, e.g.*, *State v. Williams*, 920 S.W.2d 247, 255-56 (Tenn. Crim. App. 1995) (admitting statements of a rape victim used in aid of medical treatment); *State v. Rucker*, 847 S.W.2d 512, 516 (Tenn. Crim. App. 1992) (admitting statements to a physician by a child abuse victim for treatment purposes). *But see Crawford v. Washington*, 541 U.S. 36, 68 (2004) (creating an exception to the admission of permissible hearsay where it would violate a criminal defendant’s Sixth Amendment right to confrontation and recognizing the concept of testimonial versus non-testimonial hearsay); *State v. Cannon*, 254 S.W.3d 287, 309 (Tenn. 2008) (holding that admission of the victim’s testimonial, out-of-court statements to an officer violated the defendant’s right of confrontation).

⁴¹ TENN. R. EVID. 703:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert’s opinion substantially outweighs their prejudicial effect. The court shall disallow testimony in the form of an opinion or inference if the

the crux of credibility and weight of the evidence determinations by the jury. Additionally, in forming his or her opinion, the expert may rely upon input, opinion, or findings from other experts, as well as facts, which are brought to that expert's attention by investigators or are based on the expert's first-hand knowledge.⁴²

If the expert's opinion is based upon facts adduced through the employment of a scientific theory, process, procedure, technique or methodology, then that theory or methodology must comply with the relevant rules of evidence that control the admissibility of scientific evidence.⁴³ If, however, an expert's opinion is based on a scientific principle or methodology already judicially or statutorily recognized for producing reliable results, then there is no need for a trial court to determine the

underlying facts or data indicate lack of trustworthiness.

See State v. Kennedy, 7 S.W.3d 58, 66 (Tenn. Crim. App.1999):

Clearly, Rule 703 contemplates that inherently reliable information is admissible to show the basis for an expert's opinion, even if the information would otherwise constitute inadmissible hearsay. Indeed, it is not uncommon for an expert witness's opinion to be based on facts or data that are not admissible into evidence, but are reliable. In determining the reliability of the underlying information, that underlying data must be such that experts in that field reasonably rely on them in forming the same kinds of opinions or inferences that the expert in this case did. Thus, Tenn. R. Evid. 703 provides that an expert may base an opinion upon clearly inadmissible hearsay, if the type of hearsay is one that would be reasonably relied upon by experts in that situation.

⁴² *See* NEIL COHEN, SARAH Y. SHEPPARD, & DONALD F. PAINE, TENNESSEE LAW OF EVIDENCE 7-63 (Lexis Publishing 4th ed. 2000).

⁴³ *Id.* at 7-32.

admissibility of that evidence.⁴⁴ The court may simply take judicial notice of the reliability of that science.⁴⁵

⁴⁴ TENN. R. EVID. 201 states:

Judicial notice of adjudicative facts

- (a) Scope of Rule. This rule governs only judicial notice of adjudicative facts.
- (b) Kinds of Facts. A judicially noticed fact must be one not subject to reasonable dispute, in that it is either (1) generally known within the territorial jurisdiction of the trial court or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned.
- (c) When Discretionary. A court may take judicial notice whether requested or not.
- (d) When Mandatory. A court shall take judicial notice if requested by a party and supplied with the necessary information.

See Fortune v. State, 277 S.W.2d 384, 385 (Tenn. 1955):

Generally speaking, judicial notice may be taken of any fact which is of common notoriety. The contrary of this is not so, however. A judge or juror cannot, in the name of judicial notice, substitute his own personal knowledge for evidence. There is a real distinction between a judge's personal knowledge as a private person, or knowledge acquired by him as a judge upon another trial, and his knowledge as a judge. As a judge, he should ignore what he knows as an individual or knowledge which has come to him upon another trial in which evidence was given to bring about that knowledge. Of course, no fixed rule can be laid down declaring what will be judicially noticed. In a general way courts will notice without evidence all facts that are part of the general knowledge of the country.

Nonetheless, the expert's opinion is subject to several challenges to its credibility: the underlying scientific theory, methodology, or laboratory analysis was not conducted properly; the individual laboratory analyst was not qualified to perform the testing or did not follow laboratory protocols; the laboratory was not certified or its quality control was deficient; the evidence being tested was not properly handled or stored—perhaps spoliation or alteration occurred; or the chain of custody of the evidence was compromised.⁴⁶ These direct challenges to an expert's opinion and thus to the expert's credibility should be conducted by cross-examination and by the production of countervailing evidence.⁴⁷ For the first time, jurors now

⁴⁵ See *Commonwealth v. Martin*, 290 S.W.3d 59, 66 (Ky. Ct. App. 2008); see, e.g., *United States v. Bonds*, 12 F.3d 540 (6th Cir. 1993) (the court approved the taking of judicial notice of the general acceptance of DNA and also offered an excellent early discussion of the analytical steps in the determination of the admissibility of scientific evidence in general); *Gordon's Transp. Inc. v. Bailey*, 294 S.W.2d 313, 333 (Tenn. Ct. App. 1956) (“[C]ourts will ordinarily take judicial notice of the operation and effect of natural laws and of nature's powers and forces, with the limitation that such notice is limited to those natural laws which are of universal occurrence, invariable in their action and of common knowledge.”) (internal citation omitted).

⁴⁶ TENN. R. EVID. 901(a) (“The requirement of authentication or identification as a condition precedent to admissibility is satisfied by evidence sufficient to the court to support a finding by the trier of fact that the matter in question is what its proponent claims.”). See, e.g., *State v. Cannon*, 254 S.W.3d 287 (Tenn. 2008); *State v. Rome*, No. W2006-00838-CCA-R3-CD, 2008 WL 2331018 (Tenn. Crim. App. June 5, 2008). Cf. *Scott*, 33 S.W.3d at 760 (“The purpose of the chain of custody requirement is to demonstrate that there has been no tampering, loss, substitution, or mistake with respect to the evidence. The identity of tangible evidence, however, need not be proven beyond all possibility of doubt, and the state is not required to establish facts which exclude every possibility of hampering.”) (internal citations omitted).

⁴⁷ See, e.g., *Fortune v. State*, 277 S.W.2d 381, 384 (Tenn. 1955) (“Thus when such [expert] witnesses are offered it will be a question of

have an objective standard to employ as they examine and gauge both the expert's credibility and the underlying scientific evidence.

B. The Impact of *Frye*⁴⁸ and *Daubert*⁴⁹

In light of the codification of Tennessee Rule of Evidence 702, the Supreme Court of Tennessee in 1997 determined that the admissibility test for scientific evidence announced in *Frye* was no longer applicable.⁵⁰ Instead, the Court in *McDaniel*, without having expressly adopted *Daubert's* non-exclusive criteria, established a new test loosely based upon those considerations.⁵¹ The Court enumerated the new test as follows:

A Tennessee trial court may consider in determining reliability: (1) whether scientific evidence has been tested and the methodology with which it has been tested;⁵² (2) whether the evidence has been subjected to peer review or publication; (3) whether a potential rate of error is known; (4) whether, as formerly required by *Frye*, the evidence is generally accepted in the scientific community; and (5) whether the expert's research in the field has been conducted independent of litigation.⁵³

their credibility which of course is attacked by searching cross examination as to training, etc.”).

⁴⁸ 293 F.1013 (D.C. Cir 1923).

⁴⁹ 509 U.S. 579 (1993).

⁵⁰ See *McDaniel v. CSX Transp., Inc.*, 955 S.W.2d 257, 262-64 (Tenn. 1997).

⁵¹ *Id.* at 265.

⁵² See *infra* Part IV-C for a discussion of the Scientific Method.

⁵³ *McDaniel*, 955 S.W.2d at 265.

The Court then offered further guidance for trial courts:

Although the trial court must analyze the science and not merely the qualifications, demeanor or conclusions of experts, the court need not weigh or choose between two legitimate but conflicting scientific views. The court instead must assure itself that the opinions are based on relevant scientific methods, processes, and data, and not upon an expert's mere speculation. . . .⁵⁴

We recognize that the burden placed on trial courts to analyze and to screen novel scientific evidence is a significant one. No framework exists that provides for simple and practical application in every case; the complexity and diversity of potential scientific evidence is simply too vast for the application of a single test.⁵⁵

Finally, the Court observed:

The trial court is not required to determine whether it agrees with the evidence and should not substitute its view for the trier of fact. It should allow the jury to consider legitimate but conflicting views about the scientific proof. Provided the evidence is scientifically valid, criticisms of it and opposing views may be elicited on cross-examination and/or established in the defendant's case.⁵⁶

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.* at 266.

However, there is no requirement that all these factors be considered in each case before allowing expert testimony.⁵⁷

C. The Five *McDaniel* Factors

1. The Scientific Method

If it can be demonstrated that there has been strong adherence to the principles of the Scientific Method in the development of any scientific principle or methodology, then that principle or methodology can be considered reliable and any conclusions generated by it can be considered trustworthy.⁵⁸ This is the underlying focus of the decision in *Daubert*, in which the Court noted the scientific method as the hallmark of science.⁵⁹

The scientific method, a concept dating back at least to Sir Issac Newton's practices, is a process that is the basis for scientific inquiry. The scientific method follows a

⁵⁷ See *Brown v. Crown Equip.*, 181 S.W. 3d at 277 ("The rigid application of the *McDaniel* factors to all expert testimony is problematic because all expert testimony may not 'fit' within the factors."). See, e.g., *Chandler v. Cracker Barrel Old Country Store, Inc.*, No. E2006-00956-WC-R3-WC, 2007 WL 1710572, ** 4-6 (Tenn. Workers' Comp. Panel May 8, 2007).

⁵⁸ *Gentry v. Mangum*, 466 S.E.2d 171, 174 (W.Va. 1995).

⁵⁹ *Daubert*, 509 U.S. at 593:

Ordinarily, a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested. "Scientific methodology today 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."

(quoting E. GREEN & C. NEESON, PROBLEMS, CASES, AND MATERIALS ON EVIDENCE 645 (1983)).

series of steps: (1) identify a problem that needs to be solved, (2) formulate a hypothesis, (3) test the hypothesis, (4) collect and analyze the data, and (5) make conclusions.⁶⁰ It is, therefore, no accident that great deference is given to the application of the scientific method in various disciplines within the field of forensic science. For example, in fire and arson investigations, the well-recognized National Fire Protection Association (NFPA), in its authoritative *Guide for Fire and Explosion Investigations* series, commences its in-depth discussion of the topic with a chapter offering detailed instruction to investigators on the applicability and use of the scientific method.⁶¹ Compliance with the procedures in the NFPA guide has formed the basis for admissibility of scientific fire and arson evidence in numerous cases around the United States.⁶² In addition, there are various published standards, which establish protocols and methodologies that are generally accepted within the worldwide scientific and industrial community.⁶³ It has also been suggested that where there is no scientific consensus among respected, well-credentialed scientists as to what is and what is not “good science,” the court’s responsibility might be to

⁶⁰ Labwrite Glossary, <http://www.ncsu.edu/labwrite/res/res-glossary.html> (last visited Mar. 2, 2010).

⁶¹ NFPA 921: GUIDE FOR FIRE & EXPLOSION INVESTIGATIONS ch. 4 (2008).

⁶² See, e.g., ANDRE A. MOENSSENS, ET AL., SCIENTIFIC EVIDENCE IN CIVIL AND CRIMINAL CASES 1274-78 (5th ed. 2007) (discussing the scientific method as it relates to the field of behavioral sciences).

⁶³ See ASTM International, <http://www.astm.org> (last visited Mar. 2, 2010). With the active participation of members of the scientific, legal, and educational communities, including members of the American Academy of Forensic Sciences, ASTM has established and published standards, which are applicable to the forensic sciences as well. *Id.* See also *Turner v. State*, 746 So. 2d 355 (Ala. 1998).

occasionally reject such expert testimony because it was not “derived by the scientific method.”⁶⁴

2. Peer Review or Publication

Commenting upon the concept of peer review, the Court in *Daubert* observed:

Another pertinent consideration is whether the theory or technique has been subjected to peer review and publication. Publication (which is but one element of peer review) is not a *sine qua non* of admissibility; it does not necessarily correlate with reliability, and in some instances well-grounded but innovative theories will not have been published. Some propositions, moreover, are too particular, too new, or of too limited interest to be published. But submission to the scrutiny of the scientific community is a component of “good science,” in part because it increases the likelihood that substantive flaws in methodology will be detected. The fact of publication (or lack thereof) in a peer reviewed journal thus will be a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.⁶⁵

It has been said that “[t]he role of peer review is ‘to promote the publication of well-conceived articles so that the most important review, the consideration of the reported results by the scientific community, may occur

⁶⁴ *Daubert*, 43 F.3d at 1316.

⁶⁵ *Id.* at 593-94 (internal citations omitted). See, e.g., 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, SCIENTIFIC EVIDENCE § 1.08, 43-44 (4th ed. 2007).

after publication.”⁶⁶ Further, that peer review “means publication in a *refereed* journal, such as SCIENCE, NATURE, or the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.”⁶⁷ Note, however, that the lack of peer review does not necessarily render an expert’s opinion unreliable.⁶⁸

3. Potential Rate of Error

The potential false positive rate of error of a scientific technique or test is significant in the forensic science context, while a false negative rate of error is important in the overall state of the science involved.⁶⁹ The existence of a known rate of error “is not a prerequisite under Tennessee law for the admission of expert testimony but is one of many considerations that the court may consider in its gate keeping functions.”⁷⁰ However, the Court advised in *Daubert* that “[I]n the case of a particular scientific technique, the court ordinarily should consider the known or potential rate of error, and the existence and maintenance of standards controlling the technique’s operation.”⁷¹ On remand of *Daubert*, the Ninth Circuit observed:

Peer review and publication do not, of course, guarantee that an expert’s conclusions reached are correct; much published scientific research is greeted with intense skepticism and is not borne out by further research. But the test under *Daubert* is not the correctness of the expert’s

⁶⁶ 1 GIANNELLI & IMWINKELRIED, *supra* note 60, § 1.08, at 44-45.

⁶⁷ *Id.* at 45-46.

⁶⁸ *Brown v. Crown Equip.*, 181 S.W. 3d at 278.

⁶⁹ 1 GIANNELLI & IMWINKELRIED, *supra* note 65, § 1.08, at 46-47.

⁷⁰ *Chandler*, 2007 WL 1710572 at *6.

⁷¹ *Daubert*, 509 U.S. at 594.

conclusions but the soundness of his methodology. That the research is accepted for publication in a reputable scientific journal after being subjected to the usual rigors of peer review is a significant indication that it is taken seriously by other scientists, i.e., that it meets at least the minimal criteria of good science. If nothing else, peer review and publication “increase the likelihood that substantive flaws in methodology will be detected.”⁷²

It should be noted that where the legislature has established the admissibility of a particular scientific test, the failure of the legislature to consider any known rate of error apparently does not impinge on the admissibility of any test results.⁷³

4. General Acceptance in the Scientific Community

This standard is, of course, the *Frye* standard.⁷⁴ By specifically adopting this standard, the Tennessee Supreme

⁷² *Daubert v. Merrell Dow Pharmaceuticals*, 43 F.3d 1311, 1318 (9th Cir. 1995) (internal citations omitted).

⁷³ *Cribbs v. State*, No. W2006-01381-CCA-R3-PD, 2009 WL 1905454, at *40 (Tenn. Crim. App. July 1, 2009).

⁷⁴ *See Frye*, 293 F. at 1014:

“The rule is that the opinions of experts or skilled witnesses are admissible in evidence in those cases in which the matter of inquiry is such that inexperienced persons are unlikely to prove capable of forming a correct judgment upon it, for the reason that the subject-matter so far partakes of a science, art, or trade as to require a previous habit or experience or study in it, in order to acquire a knowledge of it. When the question involved does not lie within the range of common experience or common knowledge,

Court implicitly adopted all pre-existing case law in Tennessee that interpreted and applied the *Frye* rule. As observed by the United States Supreme Court in *Daubert*:

“[G]eneral acceptance” can yet have a bearing on the inquiry. A “reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community.” Widespread acceptance can be an important factor in ruling particular evidence admissible, and “a known technique which has been able to attract only minimal support within the community,” may properly be viewed with skepticism.⁷⁵

Many reported opinions discuss the testimonies of forensic anthropologists. The subject matter of these testimonies

but requires special experience or special knowledge, then the opinions of witnesses skilled in that particular science, art, or trade to which the question relates are admissible in evidence.”

Numerous cases are cited in support of this rule. Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, *the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.*

Id. (quoting Appellant’s Brief) (emphasis added).

⁷⁵ 509 U.S. at 594 (quoting *United States v. Downing*, 753 F.2d 1224, 1238) (3d Cir. 1985) (internal citations omitted).

ranges over multiple factual areas, such as specific identification of the decedent, including age, gender, stature, and race;⁷⁶ identification of a defendant from a photograph or surveillance video,⁷⁷ using ear⁷⁸ and facial recognition points;⁷⁹ the comparison of weapons with wound patterns,⁸⁰ describing a skull fracture⁸¹ or that a head wound was consistent with a gunshot;⁸² method of disposal of a body;⁸³ time of death;⁸⁴ and cause of death.⁸⁵ Unfortunately, the vast majority of these opinions do not discuss the admissibility of such testimony *vel non*,⁸⁶ but

⁷⁶ See, e.g., *State v. Klindt*, 389 N.W.2d 670, 673 (Iowa 1986).

⁷⁷ *State v. Douglas*, 203 Conn. 445, 450 (Conn. 1987); *Penalver v. State*, 926 So.2d 1118, 1134 (Fla. 2006).

⁷⁸ *United States v. McClintock*, No. 05-441, 2006 WL 39241, at *6 (E.D. Pa. Jan. 5, 2006).

⁷⁹ *United States v. Fadayini*, 28 F.3d 1236, 1240-41 (D.C. Cir. 1994).

⁸⁰ *Colina v. State*, 634 So. 2d 1077, 1081 (Fla. 1994); *People v. St. Pierre*, 522 N.E.2d 61, 64 (Ill. 1988).

⁸¹ *St. Pierre*, 522 N.E.2d at 61.

⁸² *State v. Fasola*, 901 So.2d 533, 537 (La. Ct. App. 2005).

⁸³ *Tamme v. Commonwealth*, 973 S.W.2d 13, 36 (Ky. 1998).

⁸⁴ *State v. Phillips*, 659 So.2d 785, 788 (La. Ct. App. 1995).

⁸⁵ See *Wuornos v. State*, 644 So. 2d 1012, 1019 (Fla. 1994).

⁸⁶ For some recent Tennessee cases where the testimony of forensic anthropologists was received apparently under the “Opinion Rule,” see *Dellinger v. State*, 279 S.W.3d 282, 289-90 (Tenn. 2009) (Dr. William Bass’s testimony regarding time of death); *State v. Rogers*, 188 S.W.3d 593, 600 (Tenn. 2006) (Dr. Murray Marks found no evidence of trauma as would be expected had a car run over the victim); *State v. Davidson*, 121 S.W.3d 600, 606 (Tenn. 2003) (Dr. Murray Marks testified that trauma to the body was inconsistent with animal activity and also testified regarding the time of death); *State v. Bondurant*, 4 S.W.3d 662, 665 (Tenn. 1999) (Dr. William Bass “testified that he was 100 percent certain that the bones were human, 75 percent certain that they came from a male, over 50 percent certain that blunt trauma had been applied to the skull before it had been burned, and 90 percent certain that the bones had been in the ground no less than one nor more than fifteen to twenty years.”); *State v. Cross*, No. 03C01-9810-CR-00358, 1999 WL 1076958, at *5 (Tenn. Crim. App. Nov. 30, 1999) (Dr. William Bass identified the victim, trauma to victim’s skull, and

some cases do address this issue.⁸⁷ Needless to say, the reports of forensic anthropologists have been used by medical examiners and coroners to formulate their opinions on the time of death and the cause and manner of death.⁸⁸

5. Research Independent of Litigation

“The objective of the trial court’s gate keeping function is to ensure that ‘an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.’”⁸⁹ On remand from the United States Supreme Court, the Ninth Circuit in *Domingo* stated, “this court [has] explained that, if an expert did not conduct his or her own *research, independent of the litigation*, on the subject of the testimony, the district court must determine

identity of the murder weapon as a shotgun); *State v. Oody*, 823 S.W.2d 554, 558 (Tenn. Crim. App. 1991) (Dr. William Bass testified that wounds on a skeleton were consistent with a particular ax); *State v. Phillips*, 728 S.W.2d 21, 24 (Tenn. Crim. App. 1986) (Dr. William Bass testified regarding the victim’s time of death and two gunshot wounds to the victim’s head, whom he identified using known x-rays); *State v. Driver*, 634 S.W.2d 601, 604-05 (Tenn. Crim. App. 1981) (Dr. William Bass testified that scattered bones were that of the 17-year-old victim, whom he identified using dental charts).

⁸⁷ See, e.g., *State v. Miller*, 429 N.W.2d 26, 39-40 (S.D. 1988). The court addressed the admissibility of a forensic anthropologist’s testimony as to the type of instrument used to inflict certain head wounds on the decedent, ruling that based upon the expert’s experience and education, such testimony was admissible under *Frye*. *Id.*

⁸⁸ See, e.g., *Linn v. Fossum*, 946 So.2d 1032 (Fla. 2006).

⁸⁹ *Brown v. Crown Equip.*, 181 S.W.3d at 275 (quoting *Kumho Tire Co. v. Carmichael* 526 US 137, 152 (1999)).

whether there exists any “objective, verifiable evidence that the testimony is based on ‘scientifically valid principles.’”⁹⁰

The Ninth Circuit explained in *Daubert*:

One very significant fact to be considered is whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying. That an expert testifies for money does not necessarily cast doubt on the reliability of his testimony, as few experts appear in court merely as an eleemosynary gesture. But in determining whether proposed expert testimony amounts to good science, we may not ignore the fact that a scientist’s normal workplace is the lab or the field, not the courtroom or the lawyer’s office.⁹¹

The decisions in *Daubert* and *McDaniel* have given Tennessee courts a methodology for determining the validity and relevance of both scientific principles and the experts who purport to know and apply them.

V. Conclusion

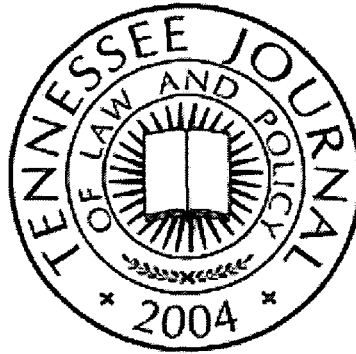
In summary, here is how an attorney’s checklist for the admissibility of forensic evidence might look:

⁹⁰ *Domingo v. T.K.*, 289 F.3d 600, 606 (9th Cir. 2002) (quoting *Daubert v. Merrell Dow Pharms., Inc.*, 43 F.3d 1311, 1317-18 (9th Cir. 1995)) (emphasis added).

⁹¹ *Daubert*, 43 F.3d at 1317.

- Admissibility is at the discretion of the court. *See* TENN. R. EVID. 104.
- Proposed evidence must be relevant to the inquiry. *See* TENN. R. EVID. 401, 402.
- Relevant evidence may still be subject to exclusion. *See* TENN. R. EVID. 403, 801, 803, 804, 805.
- Expert testimony to scientific knowledge that is not subject to judicial notice is subject to a scientific credibility analysis. *See* TENN. R. EVID. 201, 901.
 - ✓ The Opinion Rule—*see* TENN. R. EVID. 702, 703, 704.
 - ✓ *Daubert* Criteria—*see* 509 U.S. 579 (1993).
 - ✓ *McDaniel* Factors—*see* 955 S.W.2d 257, 262-64 (Tenn. 1997).
 1. The Scientific Method
 2. Peer Review or Publication
 3. Potential Rate of Error
 4. General Acceptance in the Scientific Community
 5. Research Independent of Litigation

Every lawyer and judge should be using a subconscious checklist in preparing and reviewing forensic evidence, but when preparing for trial, a written evidentiary checklist, such as the one described here, can help to ensure that evidence vital to your case is given the credibility it deserves.



**TENNESSEE JOURNAL OF LAW AND POLICY
AND
CENTER FOR ADVOCACY AND DISPUTE RESOLUTION**

SYMPOSIUM

**“ONE ADVOCATE’S ‘JUNK SCIENCE’ IS
ANOTHER ADVOCATE’S EVIDENCE:
FORGING NEW PATHS IN FORENSIC SCIENCE”**

**FRIDAY, MARCH 26, 2010
MORNING SESSION**

THE UNIVERSITY OF TENNESSEE COLLEGE OF LAW

WELCOME AND INTRODUCTION

DEAN DOUG BLAZE: I'd like to welcome everyone to this exceptional program on forensic evidence. I'm particularly excited because we finally combined two of the (what I consider, but you'll understand my bias) crown jewels of the University—both the College of Law and Center for Advocacy and Dispute Resolution of the law school and Dr. Bass and the work of the Body Farm and forensic anthropology—as the focus to pull this whole program together. We're particularly excited that this has happened.

I think putting these two together reflects the depth and the level of participation that we have in this program. We have some wonderful folks that will be with us today, including Dr. Bass, Professor Berger, Professor Bunde, and a whole host of folks. I will not try to list everyone.

I want to recognize the one person who is primarily responsible for this program, and that's Professor Penny White, the Alvin E. Overton Distinguished Professor of Law, and also Director of our Center for Advocacy and Dispute Resolution. It was her vision, her leadership, and her academic and professional reputation, candidly, that allowed this program to be put together. I just want everyone to thank Penny for everything she has done.

She will be the first to admit that she was ably assisted by the leadership of the TENNESSEE JOURNAL OF LAW AND POLICY, most particularly the Editor-in-Chief, Sally Goade, and the Symposium Editor, Monica Rice. And before I turn it over to Monica, I would also be remiss if we did not thank Mark Ensley for assisting in putting together the materials, assisting Penny, Monica, and Sally, and also Micki Fox, who is never in here to be thanked. But Micki Fox, who is our CLE Director, puts the whole thing together and makes sure that the folks in Nashville approve the program.

Welcome, it's going to be an incredible day. I'm looking forward to it, and I will turn it over to Monica Rice to continue with the introductions.

SYMPOSIUM EDITOR MONICA RICE: Good morning and welcome to the 2010 TENNESSEE JOURNAL OF LAW AND POLICY, along with the Center for Advocacy and Dispute Resolution's Spring Symposium: "One Advocate's 'Junk Science' is Another Advocate's Evidence: Forging New Paths in Forensic Science." My name is Monica Rice, and I am the Symposium Editor for the TENNESSEE JOURNAL OF LAW AND POLICY. We are very, very pleased to have you all here today, and we are certain that you will enjoy the various presentations that have been prepared.

I would like to give you a brief synopsis of how the morning symposium will run. This morning we're honored to have Dr. Bill Bass deliver our morning keynote address. Dr. Bass is a U.S. forensic anthropologist renowned for his research on human osteology and human decomposition. He has assisted federal, local, and non-U.S. authorities in the identification of human remains. He currently plays an active role in the forensic anthropology research facility, commonly known to you all as "The Body Farm." He has written numerous works, including the best-selling books DEATH'S ACRE and BEYOND THE BODY FARM. We are delighted to have such a renowned expert present our morning keynote.

To respond to the morning keynote, we are pleased to have a panel of esteemed and highly educated scholars deliver presentations of their own. We will hear from Professor Bernard Raum of Levin College of Law at the University of Florida. Professor Raum is a former prosecutor, receiving his J.D. from the University of Florida and his Master's of Forensic Science from George Washington University. He currently teaches Forensic

Evidence at Levin College of Law. Professor Margaret Berger of Brooklyn Law School will also join the panel. She is widely recognized as one of the nation's leading authorities on scientific evidentiary issues, specifically DNA evidence. She will also present our lunch keynote address. Lastly, Dr. Terry Bunde, Professor of Chemistry and Acting Chair of Natural Sciences at Maryville College, specializing in Biochemistry, Organic Chemistry and Spectroscopy.

As you can see, we have so many experts sitting on our panel this morning that in order to give everyone an equal chance to state their views, we are going to give each an allotted time of twenty minutes to present. And we do have time cards. After the panel presentations, we will open the floor for questions. When you stand to ask a question, please state your name for our court reporter. I would also once again like to remind you to fill out your evaluations and your CLE forms. So, once again, thank you for joining us. Thank you.

KEYNOTE ADDRESS
CRIME SCENE INVESTIGATIONS:
A PRIMER FOR LEGAL ADVOCATES

Dr. Bill Bass

DR. BILL BASS: I'm really impressed that there are so many of you that got up this early in the morning to see death and destruction. I mean it just isn't every day we get to see that. I really didn't know what to show you all, but I have a series of slides. Probably some of the audience has seen one or two of these cases before. I put these together to show you how important science is to gather evidence for court cases and so forth.

Now, I'm going to show you something else by the way. This is a really different form of old technology. I'm

going to use a Kodak carousel projector, which you cannot buy anymore. They don't make these things anymore. I'm not going to use a laptop and so forth. Everybody says, "You need to use a laptop. My gosh." So, I am about 200 years out of date with what you all are doing now. But I'm going to show you a lot better color crime scenes than what you would see otherwise.

I want to introduce you all to yourselves really, starting with the Tennessee Highway Patrol at the UT Hospital. And to show you that this has been a while ago. You know, at one time, I had dark hair. But not every case is as good as the next case, and this is a case for teaching you something. This is a case that starts in Clarksville, Tennessee. Clarksville is a town Northwest of Nashville. Fort Campbell is the closest thing to Clarksville.

This is the disappearance of a girl named Kathy Nishiyama.¹ Kathy Nishiyama's father was Japanese. He worked at Fort Campbell. Kathy Nishiyama's mother was an American. She was a sixteen-year-old high school girl making a little extra money by working at the Bonanza Steakhouse on two or three nights during the week. One night she does not come home from work. Her mother calls the police to state that Kathy is missing. And there is a massive search made for Kathy, and they cannot find her.

They find Kathy Nishiyama's car pulled off the bypass around Clarksville. If you don't know Clarksville, it doesn't have a bypass like we talk about. It's a road that comes down along the Cumberland River there. The car is locked, and they cannot find Kathy. About six weeks go by—a month and a half.

Clarksville is in Montgomery County. Now, the county west of Montgomery is Houston County—named

¹ See generally *State v. Hartman*, 42 S.W.3d 44 (Tenn. 2001); *Hartman v. State*, 896 S.W.2d 94 (Tenn. 1995); *State v. Hartman*, 703 S.W.2d 106 (Tenn. 1985); Donald F. Paine, *State v. Hartman: In Memory of Kathy Nishiyama*, 44:2 Tenn. Bar J. 11 (2008).

after Sam Houston, who fought right up that way a few miles. Kathy, when she was living, never really went to Houston County—had no reason to. But they find a cranial vault. Now, the cranial vault is the top of the skull. It's this thing here without a face. It's very typical of what happens if you die outside, not only in Tennessee, but all throughout the United States.

If you die outside, where the animals can get to you—the dogs, the coyotes, in East Tennessee the bears—all of these canines are interested in decaying human bodies. And they will eat on a body. Now, all of these have troubles, though, with the skull because the skull is too big to get their teeth around. But the face is easy to break off. What you will get then is a cranial vault without a face. As we go on, we will show you this.

By the way, I thought you all might like to see a case of a woman who was eaten by her dogs. I thought this would be a good one for getting the morning started right. And you're going to find what happens to the animals when they chew on dead people out there. They will eat the ends of the bones. They do not eat the shaft of the bone because there isn't any marrow, and the marrow is in the end of the bones. Proximal means the end closest to the head. Distal means the end farthest from the head. What you will see then are a lot of bone splinters. I'm going to show you what this means to you in the legal profession.

Now, the only person missing in the Northwest, Middle Tennessee area at this time is Kathy Nishiyama. Again, though, she never went to Houston County, so they didn't think it was her, but they wanted to check it out. They called Mike Dover, who was a Tennessee Highway Patrol helicopter pilot, and they asked Mike to bring the skull over to me to take a look.

While they are out there and while Mike is coming from West Tennessee over to Knoxville, they go out to a farm and find some more bones. So they call Mike and

say, “Will you bring Dr. Bass back with you?” And so we are getting to fly out there. Now, before I show you this, I want to give you just a little bit more academics, so you will understand what is going on.

If you all don’t mind, take your finger and feel right here at the edge of your nose. Run it back and forth, and you’ll feel a lump under there on both sides. What you’re feeling is the root of the canine tooth. The canine tooth has the largest root for the size of the crown of any tooth in the body. Now, if you come forward from that, toward the center line, you can’t feel this, but you can take your tongue—switch from your finger to your tongue now—and feel the back of your front teeth. This is the central incisor, that’s a lateral incisor, and that was the canine. You felt the canine with your finger. Now feel the incisor with your tongue. Most of you in here are going to have a flat surface in the back.

I’m looking around now. I’m trying to find an Asian, and I don’t see that many Asians. But if you have an Asian, Japanese, Chinese, Southeast Asian, Eskimo, or American Indian, all five of those individuals have a common ancestry. This common ancestry has a genetic characteristic in the incisor teeth known as shovel-shaped incisors. On the back of the tooth you will have the edges coming back. If you held the tooth by the root, it would look like a little scoop shovel. These were named in the late 1800s when we had coal fire furnaces. It does look like a little scoop shovel. If you’ve ever—most of you have never done this—but if you’ve ever put coal in a furnace, you don’t want a flat shovel because the coal falls off the edges of the shovel. What you want are edges so that you can keep the coal in there. And this is a little shovel-shaped incisor. The shovel-shaped incisors are found in roughly about ninety-six percent or more of Japanese, Chinese, Southeast Asians, Eskimos, and American Indians. All of those in the same group.

Now, we have no teeth here, so we can't use that right at the moment. But they decided, "Let's bring Dr. Bass back with you." We get out there, flying off, and we make one pass through the woods just before it's too dark to see. And, lo and behold, we find the crown. This is the part above—this would be the gum line right here, above the—on the front—on the incisor. Note the light shining off the tooth right here. Note the light is not shining off here on the sides. The reason for that is the sides are coming back toward us. This is a shovel-shaped incisor. This is why it's important to know all of these things when you're looking at evidence, so you'll understand what's there.

Note the little arrow here is pointing to a filling in the tooth. Most of us do not have fillings in our incisor teeth. We have fillings in our pre-molars and our molar teeth, but very few of us have fillings in our incisor teeth. This again is where your education kicks in. Knowing that Kathy Nishiyama has a Japanese father and an American mother, I thought, "I will bet you that Kathy Nishiyama carries the genetic traits for shovel-shaped incisors."

With this, what we need is a dental record. And so I said, "Hey, I think that this is probably Kathy Nishiyama, but there's a dental record. Do you know who Kathy Nishiyama's dentist was?" One of them said, "Yes, we do." About 8:30 that night, they called Kathy Nishiyama's dentist and said, "Would you go down to your office? Will you make a copy of Kathy Nishiyama's dental records, and we're going to send a Tennessee Highway Patrol helicopter pilot over to pick these records up." And he does. He goes down and comes back with this record right here. Note tooth number nine, which is a filling in the shovel-shaped incisor.

Now, very, very seldom do you ever identify the individual in the field. Normally, it takes weeks, months—not like CSI where it's done in an hour. I have, in my lab—it's about two blocks that way—I have about twelve

to fifteen individuals that I can tell you the sex, the age, the stature, the handedness, and all the inertia, but I can't give them names. Sometimes—I hate to say never—but sometimes it's years before we can make a positive [identification] in the cases. You're looking at an extremely rare case here.

This is about 11:00 o'clock at night by the time Mike Dover has flown over and brought the records back. These are some of the detectives and some district attorneys. And this is a picture of Kathy Nishiyama—nice looking young lady. My job is not only to identify individuals, but it is to figure out what happened to them. Why is Kathy Nishiyama in this rural farm in a county she never went to?

We begin to look. This is the skull. The eye orbit is right down here, and this is a depressed fracture. What you're looking for is, was she shot? Was she stabbed? Was she bludgeoned? What is the manner of death leading up to this skull or this cranial vault that we have?

Now, going on, this is the right maxilla. That's the little thing you were feeling just a little while ago. This is the canine tooth, and that's the root of the canine. This was made famous by the saber tooth tiger by the way. If you have a dog, you want to go home and do a little homework: get your dog, lift his lip up, look in there, and you'll see that the canine tooth extends down below the occlusal plane. It's the biting plane of the teeth. Or if you have a cat, cats are the same way. They don't like this, but this is all in the name of science, you see.

Note this is the lateral incisor. The central incisor is missing. Let's turn that just a little: there's your canine again. This is the lateral incisor. Note the little chip here in the lateral incisor. Note the root here still in the bone. This would be the right maxilla. This is the upper jaw. This area in the bone—this is a little bit more academic, but you all are sharp or you wouldn't be here today. This is the

alveolar portion of the maxilla. The alveolar portion of the maxilla and the mandible, which is now shown here, contains the root of the teeth. Note the tip of the tooth right there.

This situation that you see here can occur in two cases. It can occur if you're in your car, you're driving too fast, have a wreck, your face goes forward, your teeth hit the steering wheel, and it breaks your teeth out, driving them into the mouth, breaking the root off. Or it can happen if you're in a fight where somebody kicks you in the mouth or hits you in the mouth.

Now we're beginning to get a feel for what's going on here. This is the back of the skull. This would be the left parietal. This is the right parietal. And I think all of you know that the bones of the skull come together along jagged lines like this, called suture lines.

These jagged lines like that, they're all normal. This is the occipital bone here. Remember, she was missing about six weeks when we found this. Note the dry, ligamentous soft tissue. These would be the ligaments that were hooked onto the back of the skull. But note the little black arrow that's pointed to a straight line going here, going there, and going down here. That straight line runs down through here to the right temporal bone. This would be the ear.

Kathy Nishiyama was lying on her left side here on the ground. The man that killed her, a man named Eddie Hartman, who died, by the way, two years ago in the state penitentiary in Nashville. Eddie Hartman literally stomped on the side of her skull and broke the temporal bone out. That's probably the blow that killed her. All these others—the blow to the forehead, the kicking out of the teeth, and everything like this—would not have killed her. But this is a massive blow here.

Now, you want to write a report so that the law enforcement agents, who are going to deal with this,

understand what you're saying. You want it clear enough that they can find out what's going on. I didn't mention that this was a notable fracture, but note that she had lost three teeth and not just the one that we had been looking at. Whenever you do something like this, you want to make what's called an element inventory. You want to record everything that is found. Note in this case that the shaded parts are those that are present. That's what we were looking at a little bit before. This is the maxilla that you saw.

Look at the long bones. This is the humerus. These are the bones of the upper arm. The shaft of the right humerus, the proximal end, is gone. That's the end closest to the skull. The distal end is gone. That's the farthest from the skull. But you have the shaft of the bone. Every bone that you see—this is the left femur, proximal end missing, distal end missing. This—if you didn't know anything else about this at all—your first clue there is that, hey, this individual was attacked by dogs in the process of the decaying period. What you get here is the evidence that you need where the dogs have chewed the ends of the bones off.

Note that we never found the right femur. Suppose I go home this afternoon and the phone rings and it's the Houston County Sheriff's Office saying, "Hey, we found another bone out here. Is this another bone of Kathy Nishiyama, or is this an area where you have a serial killer, who is throwing bodies?" This is why you want to keep these records.

By the way, records like this do come up. I testified about three months ago in Murfreesboro, Tennessee, in a case that I first went to in 1982—a man who was killed along the edges of the lake in that area. We had cold case files, and eventually the guy was convicted. I went over to testify, and he was found guilty.

Kathy Nishiyama had lots and lots of dental records and dental things that we were able to match. We were able to make a positive identification. Now, also to show what had happened to her—I testified three times in this case. I testified first in the criminal court case, in which they found Eddie Hartman guilty, and they gave him the death penalty. Now, you all know—you know this a lot better than I do—that on all death penalties there is appeal after appeal.

The second one I testified in was a civil court case in which Kathy Nishiyama's mother and father sued. I've got to bring in something else here now that I have not brought in before—sued the Sheriff of Dickson County. Why Dickson County? At this time, the Sheriff of Dickson County had a nephew who wore boots, and he wore leather jackets, and he would get drunk, and he would get in fights and he'd stomp on people and so forth. He was in jail for being drunk and disorderly.

There was a deputy in Williamson County, in Dickson County, who had a farm and he needed some help. So he goes to the sheriff and asks the sheriff, "Can I have a trustee to go out and work on my farm tomorrow?" The trustee said, "Well, why don't you take my nephew?" And this is Eddie Hartman. The deputy takes Eddie Hartman out, and they work all day. When they get done at the end of the day, the sheriff is tired. He says, "Here, take the keys of the patrol car and go back to jail."

In Monopoly, you go directly to jail, but in real life, you don't have to do this. We now know from the ensuing investigation that Eddie Hartman, on his way back to jail in Dickson County, did not go directly to jail. He went through Clarksville on the way. We know that he stopped three other people who, when this broke in the newspaper, called and said, "Hey, that guy stopped me that night." And he stopped Kathy Nishiyama. He likes what he sees.

He is driving a patrol car with blue lights, but he does not have a uniform and he does not have a badge. But Kathy Nishiyama, a sixteen-year-old high school girl, is trusting of society. Society is going to protect me. In this case, it did not. He puts her in the back of the patrol car. And the next time we find Kathy, she is in this farm out in Houston County.

How do I know this? Because it takes us six weeks from the time Kathy disappears until we find the skeletal material. It takes another six weeks for the police to figure out what happened. Then they begin investigating the situation in Dickson County. We find, when they impound that patrol car and take the back seat out of it, there's a necklace under the back seat that Kathy Nishiyama's mother identifies as a necklace that Kathy had on the night she disappeared. So you can see how these things go.

The third case I testified in was on one of the appeals where Eddie Hartman appealed his death sentence. To make a long story short, as I told you before, Eddie Hartman died in the state penitentiary in Nashville about two years, weighing over 400 pounds. He got in prison and literally ate himself to death. I mean, that's the story. But knowing the shovel-shaped incisor, knowing that is a genetic tract of mongoloid individuals—Japanese, Chinese, Southeast Asians—then you can begin to put this together.

The Dean said we're talking about the Body Farm. I thought maybe I would show you just a little bit from the Body Farm—something again that will help those of you who have investigators in your office. You need to know about this because this is an area in which an awful lot of good, positive data for making identifications is missed because people don't know what happens.

In the decaying process, one of the things that happens—and it doesn't happen every time, but it'll happen in certainly half of the cases and maybe a little bit more—is we have what's called skin slippage. The epidermal layer:

this is the outside layer of the skin on the finger. This is what the print is on, the epidual layer, which will separate from the underlying dermis somewhere between the third and seventh day.

Now you have the dead body lying right there, decaying away. Finally, somebody smells it and says, “Something is dead out here.” Then people start looking, and they find this dead body. Then they call the police. And the police—I don’t know—whoever goes and picks up your dead bodies for you, they go out. They don’t know that this occurs, but what’s happened in that process is that the epidermal layer of the hand has sloughed off. This is called de-gloving, by the way, in the forensic area. Your best means of identifying that individual is not on the body. It has sloughed off and is lying at the decay scene. I won’t say the death scene because they could have been killed somewhere else, but where they were thrown out and decayed. The best means of telling that individual is what you’re going to see now.

I’m going to take you through this process. This, again, occurs between the third and the seventh day of decay, depending on the temperature. It would be quicker in the summer than it would in the fall. It looks like your hand does when you get in the hot tub too long. Note that the epidermal layer right here is separating from the underlying dermis. Although you just had breakfast and you had all those goodies out there and so forth to eat, I want to bring in a few more things. I want to ask you now, so I’m going to see how good of an observer you are.

You see that little white thing right there. There’s one right there, and there’s one right here, and a couple right along in there. What are those little white things?

AUDIENCE: Maggots

DR. BASS: Maggots. That's right—maggots. Now note that the maggots are down underneath the epidermal layer, in between the epidermal layer, which is here, and the underlying dermis. Why are they down under there? Because maggots are eaten by birds. If you're a maggot, you don't want to be eaten by a bird. Your mother didn't hatch you as a maggot and tell you, "Watch those birds now. You know, you don't want to get eaten by a bird." This is a protective mechanism for the maggot. This is a defense mechanism, and he's down under the skin trying to protect himself. And the skin is going away, sloughing off now.

This was taken at night. By the way, maggots don't like sunlight. For those of you who are in law enforcement or those of you who are lawyers who like to get out to the scene and you get out there in the daylight, you won't see many maggots because maggots don't like sunlight. They are down inside the body where it's dark. But you go out at night, and you will see the maggots all over the head like this. Here's our—this is our glove coming off—a little piece here. Going a little bit further, here's our hand, and that's the thing we've been watching. The hand you don't see. But again, there's the hand and here's our glove, de-gloving right over here.

How did this get from here over to there? I don't know. That happened one night when I wasn't there. I think the maggots decided, "Let's confuse Dr. Bass." So they run across and they take that [the de-gloved epidermal layer] over there and they put it there.

Now when the people come along to pick up the body, they don't know this has happened. They take it in, and it's very difficult to get fingerprints off this. The FBI can do that, but it's expensive and it takes a while. But if you know what happens in this situation, what you need to do is have your criminal investigator go out to the scene and take a little folding chair if he wants to. He can sit.

It's not the most appetizing place to go. But I mean, you know, this is science. And look for something like this. Pick it up and see—does it feel like a leaf or . . . dry skin doesn't feel like a leaf. It feels a little different from that. I didn't bring any dry pieces to pass around this morning, but you just trust me. If you want me to, I will give you some that you can play with sometime.

Anyway, bring this back. Put it in warm water overnight. The next morning when you come in—don't you do this, but get your investigator to do this. And have him put on his rubber glove and you can slip this guy's finger over your finger and you can identify him that way. I've done about six or eight of these in my career, so, it's something that works. And I think it would work more often if the people involved in crime scene investigations knew what was happening.

Now I want to take you to another case. This is a case in Williamson County. Anybody here from Williamson County, by the way? Oh, okay. Franklin is the county seat of Williamson County. I had a case in Williamson County many years ago of a confederate colonel who was killed and who had dug up Colonel Shy. Looking at the bones, I said, "Colonel Shy was a twenty-four to twenty-eight-year-old white male," and I said, "who had been dead a year." Colonel Shy was a twenty-six-year-old white male. So far, I'm 100 percent. But Colonel Shy was dead 113 years. I only missed it by 112 years. Every lawyer in Tennessee knows this. They always ask me if I've ever made a mistake. And yes, it's a good one. But I thought, "Hmmm, that's why we have a body farm is because we just didn't know enough about what happens to decaying bodies." So I began to do research.

Now this is a case of a woman who had a brain tumor. She was going to Vanderbilt, being treated for a brain tumor. She wore overcoats in the summer, and she talked to things in the trees and so forth. The neighbors

hadn't seen her for about two weeks. They call up the Williamson County Sheriff's Office, and they go out and they find that the house is an absolute clutter. She has three big dogs, two German shepherds and a collie. And they have punched holes in the screen and are coming and going. There are bone fragments on the floor, so they send the things over to me to see if I can identify her.

I did not go at first to this case. Something else came up, which I will show you in just a minute. We went up and did another inspection. That would be a good term to say. When we come back and close this gate, this will be the end of the case. Then I hate to tell you this. You all thought when you graduated from college, your exams are all over and you're not going to have to worry about this. But remember that I was—I really still am—of UT faculty and retired. It's hard to believe I've been retired for fourteen years, but time flies when you're trying to make a living with no money.

Anyway, I'm going to give you a final exam question for the lawyers. I can see people feeling all hot palms already, but I've got an exam this morning. It's a nice house. This, by the way, on about twelve acres and it has fountains and a swimming pool in the back. One of the Williamson County Detectives [in slide]. She [the victim] has on this shirt. Now, if you are a crime scene investigator, you're trained and you want to look at all this good stuff and look if the zipper is up. If the zipper were down, it would lead you to believe that maybe she was molested. Not any indication here. But what I want to call your attention to is this dark stain right here. That's not blood. That is the volatile fatty acid stain. When a body decays, the soft tissue liquefies, and it leaches out on the ground and will kill the vegetation right around a dead body. You go and you will see all the grass and things like that are dead. It will stain your clothing and so forth.

This is the normal decaying process, but the police didn't know this when I got there. When I looked at that, I said, "Hey, when this woman died, she fell face forward on the floor." Well, you can't say that. Nobody saw that. Nobody saw this death scene. We are now about two weeks after the death. But I can tell you how she fell. Note that the volatile fatty acid stain is on the front of the garment and not on the back. So she falls forward; she is decaying away. The fluids run down and stain the front of the garment. They thought I was crazy—if you teach in an academic institution, you really don't know anything about crime scene investigation. But I'm going to prove my point here in just a little bit more.

Now, she was fifty-four years old, and she loved safety pins. As a matter of fact, if you are fifty-four—whether you are held together with safety pins or not—Velcro has come in since this time, so we're all held together by Velcro now. But remember, she was crazy, so she must have had a fetish for safety pins or something.

Now, the sum total of what we have: a cranial vault. Have you ever seen one of those before? Yeah. Doesn't that make you feel warm and fuzzy? You know, I have been here for thirty minutes, and I can see what's going on. Sometimes you take your whole course. All semester you study; you still don't know what's going on. And here you've been in here thirty minutes, and already you can see what's going on.

Now, the shafts of the bone—what's that tell you? Run over by a truck? No, eaten by dogs or eaten by animals. It could be coyotes, but in this case, it's dogs. Add a tooth. We'll go ahead and look at this a little bit more—a painted toenail. How do I know that's a toenail? Because I'm a forensic anthropologist. I know these things. Bear with me. I'm going to show you. I mean, I'm going to give you evidence to show you that this is a toenail.

She has on an apron. What's that stain on the apron? Volatile fatty acid stain. Do women wear their aprons on the front or the back? The front. You see how you can reconstruct a death scene, even though nobody was there? But you've got to know the process that occurs when a body decays in order to be able to figure these things out.

Going on down, she had on pants and so forth—dyed hair, rubber band around the hair. We've seen another view of that. We know she was eaten by dogs because you've got a cranial vault again, and these are the tooth marks right here. Tooth marks on the edge. Since this case, by the way, we've been able to tell you—we can't tell you the species of dog—but we can tell you how big the animals were. In this case, the dogs were contained in a house where they could come and go. But if you're outside and just visited by any kind of critter that comes along, what we have done—and this is done in gray here—we have measured the tooth marks on the skull. Obviously big dogs have a bigger mouth, and smaller dogs have a smaller mouth. The teeth are going to be different. We can tell you what size animal frequented that individual.

Remember two weeks became material down here in the bottom. Let's see—there's another maggot right there. We'll show you a couple of other things here as we're going along. This is the forehead here. That's the frontal sinus. The skull has three layers: a hard outer layer, a middle layer known as diploe, and a hard inner layer. So you can think of the skull as a sandwich. In some areas of the middle layer of the diploe, you have air spaces. These are called sinuses, and that's a frontal sinus. This is the dura mater, the rubbery sack that goes around a skull. This is the mastoid process. We felt—by the way, remember—we felt our teeth. If you want to, you can feel right back through here and you'll feel a lump that goes out. It will be bigger in males than it is in females. It's going to be

difficult to—ask her, when you get done, if you can feel her mastoid process. This is a good way of getting to know a lot more people in the audience. By the end of the day, you'll go, "Great, great," and so forth.

Now, the reason the mastoid process is gone here is because it sticks out. And if it sticks out, the dogs can bite it off. The dogs get their teeth on this and bite off the bone that sticks out. This would be one here, and this is the other over there. There's your right ear hole, mastoid process chewed off. Remember, two weeks dry soft tissue here, tooth marks, and so forth. We won't get there. A fly comes along. I doubt any of you knew Steve Symes, who was one of my doctoral students. Steve worked for the medical examiner's office over in Memphis for about twenty years and then teaches up at Mercer College now. Steve took the best crime scene photographs of any student I ever had. This fly comes along. This is a female blowfly, and she smells this decay down in here and she wonders if this is a good place to lay her eggs. Instead of shooing her away, he took a picture of her. That's not a stick-on fly for the lawyers to see. Now, again, the shaft [of the bone in the slide].

Now, we made a positive identification of her. Not too difficult because remember, she was a patient at Vanderbilt and had a brain tumor and lots and lots of CAT scans of the skull. And so what we did was a skull here. We can take more CAT scans, more x-rays, and you can compare the after-death CAT scans and x-rays with the before death. And we made a positive identification.

Write a report and send it in. About two weeks go by; the phone rings one day, and there's this woman on the other end of the phone from a bank in Nashville. She says, "I hear you've identified Ms. _____" and so forth. I said, "Yes." And she said, "Did you find a \$7,000 diamond ring?" I said, "Well, no. How do you know she had a \$7,000 diamond ring?" She said, "Well, she had a diamond

ring valued at \$7,000 by her bank. If our bank can't find it, we have to pay the estate \$7,000." You all kind-of know my personality already. I kind-of laughed, and I said, "Well, you know, she was eaten by her dogs." And there's deathly silence at the other end of the phone, like, how did I get mixed up in this thing? We talked a little bit, and I said, "I tell you what I'll do. I'll call the Williamson County Sheriff's Office, and I will have them send some deputies out to pick up all the dog feces that they can find." Three days go by. The phone rings, and the Williamson County Sheriff's Office has thirteen pounds of dog feces. They have six pounds in one plastic bag and seven pounds in another. Can you bring it over? Yes, they can bring it over.

Now, this is a big deal in the Anthropology Department. It just isn't every day we get thirteen pounds of dog feces coming into the Anthropology Department, you see. We're all excited, and Deputy Barney arrives, you know. Deputy Barney is bent out of shape. I mean you can look at him and tell that he is bent out of shape. You know he's been out there for three days picking up dog turds, and that's not in his job description.

I thought, "I've got to make this deputy feel better." I turned around to the class, and I said, "You know, Deputy somebody brought in thirteen pounds of dog feces. Now, tonight what we've got to do, we have to soak these. And tomorrow when you come in, we have to squeeze each one of those to see if there's a ring in there." You should have seen Deputy Barney's face light up. I mean there's somebody else in the world worse off than Deputy Barney, and they are graduate students in anthropology.

Now, when you all go home, when you go back to Williamson County and your boss asks you, "What did you see up there in the law school at UT?" you can say, "For the first time in my career, I saw a color slide of dog turds." How many of you have ever stopped to take a look at a dog

feces? Oh, well, good. We've got one person. We will give you an A. You can tell a lot from looking at this, as I will show you.

Note right here you can see—see right down here [on slide]. You see those little parallel lines there, and there are some here. Let's get another few. Let's do this one right here. You can see the little parallel lines right through there and right through here. Now, those parallel lines—this woman had on pantyhose when she died, and the dogs didn't take the pantyhose off when they ate her toes—ate her legs. This is the impression of the pantyhose into the dog feces. Note this one right here. That is a painted toenail. The reason I know is because it's hooked to a toe bone. Isn't that logic? I mean, those damned anthropologists. They can figure these things out, you know.

That's how I knew when I showed you that that was a painted toenail. I can show you where it came from. The second thing that you probably have never seen before, instead of putting the material in water and squeezing the dog feces, I should have asked you, "What's a good thing to do?" You all would have said, "Oh, x-ray," and I would have said, "Right." So, probably the first time you've ever seen an x-ray of thirteen pounds of dog feces [on slide].

Let's start with a paper clip. This is a bobby pin, a hair curler—all kinds of nuts, screws, bolts—look down here in the lower left-hand corner. I didn't know what this was when I first saw this, but this is a screw. There's some threading right there, right at the edge. Now, to make a long story short, we did not find the diamond ring in the thirteen pounds of dog feces. Where is it? I don't know.

Well, we thought, let's just go out there and take a look. Not that we could find it any better than can the deputies. This is when I went back and took the picture opening the gate, going up to this house. We're going to close the gate in just a minute, and remember we have an

exam question coming up. Let's see if you've learned anything this morning.

I found out what this was—where this came from. This woman, when she was living, had fallen down and broken her ulnar. This is the bone at your elbow here. The break was fairly bad. She went to the hospital and had an orthopedic surgeon put in a plate. He was afraid that the end of the bone would break off, so he drove a hole through the end of the bone and put the screw in to hold the end of the ulnar into the plate that he put in the arm. To show you how powerful a dog bite is, the dog not only bit through the bone, but bit through the screw there. One more view of this. You can see that there's a tooth there.

We never did find the \$7,000 diamond ring. For years, I lectured to a third-year vet school class over at the Veterinary College. And they asked me if I x-rayed the dogs. I said, "Well, no. They put the dogs up for adoption in the dog pound in Williamson County." But there wasn't anybody—this was front page news in Williamson County and in Franklin for a while—there wasn't anybody in Williamson County that wanted to adopt those dogs because every time they looked at you and wagged their tails, you would think they were sizing you up for a meal.

This was a case literally of, you know, she dies and the dogs get hungry. The dogs simply ate her in the process of going on. Now, there will be some of you in here that have cats and say, "Why, I don't have a dog because I love cats." Cats love lips though. I mean when you decay, the bacteria on the inside of the body builds up, and your lips begin to bubble, and cats just love that.

We're going to close the gate now and close this. I'm going to give you a quiz question. I want to show you this. Now, this is a death scene. I want you to tell me the sequence of events that occurred at this death scene. What you have is a nice East Tennessee possum—high legal authorities, and lawyers, and so forth. That's his tail down

here like this. Now, he's crossing an East Tennessee road. He's going too slowly, and he's hit. He's certainly called now "road kill." He's two inches thick and about three feet long, and along comes a Tennessee Highway Department and stripes him on the rear.

See, you have learned something. I have one question I want to ask you. Very seldom do you get this, but I'm going to see if you are interested in this. I have another set of slides. I'm supposed to go until ten minutes after 10:00, so you've got about another fifteen minutes. Do you want to see these? All right.

I want to ask you one question. How many of you know who the Big Bopper was? Oh, good. Great. I'm impressed. This is an age thing, which I will tell you, I'm a little bit older than some of you people. I was up at Webb School about three or four months ago, and I asked them, "How many of you know who the Big Bopper was?" There were two biology classes of twenty-five students in a class, and one person raised his hand. So, it is an age-related thing.

The Big Bopper, for those of you who didn't raise your hand, is the man who wrote *Chantilly Lace*. Most of you will know *Chantilly Lace*, and maybe some of you will know that the Big Bopper died on February the 3rd of 1959 in an airplane crash just outside of Clear Lake, Iowa with Buddy Holly, Ritchie Valens, and the pilot. The four people were in a Beechcraft Bonanza that crashed in the middle of the night. They took off in a blinding snowstorm—should not have been flying. The pilot got confused and did what the Kennedy boy did off Nantucket. He literally flew the airplane into the ground, and the Big Bopper died.

The Big Bopper was not autopsied. He was embalmed and brought back to Beaumont, Texas. The Big Bopper was a disk jockey in Beaumont, Texas. Beaumont is a town between Houston and the Louisiana border, so it's

right down about twenty miles in from the gulf. And the Big Bopper was buried.

He was buried in the horizontal marker section of the cemetery. This is where you had the flat gravestones so that they could mow the grass, but about three years ago, the Texas Historical Commission commissioned a life-sized statue of the Big Bopper to be placed on his grave, and the family had it delivered. If they accepted the monument, they were going to have to move the Big Bopper from the horizontal section of the cemetery to the monument section. His son called me.

When the Big Bopper died, Mrs. Bopper was seven months pregnant. Two months after her husband was killed, she had a son, Big Bopper—this is the Third. Big Bopper was a junior, and he called me and asked me two questions. He wanted to know two things. When they find the plane—the plane crashes, skids across an Iowa field and stops at a fencerow. The only person to exit the plane is the Big Bopper. He was sitting in the left rear seat of the aircraft, and he is thrown out of the plane. He is thrown across and over on the other side of the fence.

The family had often wondered whether their loved one had survived the crash and if he was going for help. The son was calling me to see whether if I did an autopsy for them, I could determine this. I said, “Yes, I think I can determine that.” Now, something else had occurred in the history of this case, and this was about two months after the crash. An Iowa farmer is out picking up airplane parts out of his field so he can plant his crop, and he finds a pistol. It’s a .22 caliber pistol. It was owned by Buddy Holly, and it had been fired a couple of times.

I don’t know how rumors get started, but in the Richardson family, you know, Aunt Suzy has watched CSI and she’s a crime scene investigator. She likes to tell these stories, and she said, “You know what, I’ll bet you that our loved one was shot.” Everybody is gathered around Aunt

Suzy and Uncle Frank sitting over there. Nobody is talking to him, so Uncle Frank has to get in. He comes over and he's supporting Aunt Suzy. So over the years, the rumor in the Richardson family was that their loved one had been shot.

The Big Bopper asked me two questions: "Did my father survive the crash, and was he going for help?" And number two, "Was he shot?" I said, "I think I can cover both of those." Now, in the next sixteen minutes, do you want to see the autopsy pictures? I will tell you that this is an x-ray autopsy. He was in remarkably good condition. I went down to look at little bones and fragments, and as you will see here, I get down there, and we open his casket. I'm not going to show you a likeness because the family asked me not to if you see this. Don't hold up your hand yes because you want to see what the Big Bopper looked like forty-nine years later. They wanted to know, "Was our loved one shot?"

Now, do you all want to see the x-rays of this? All right. I'm not going to tell you the answers to either one of these. I'm going to let you look at this, and I'm going to let you do a forensic anthropology examination this morning. Two questions that I want you to decide when we get done: Was the Big Bopper shot, and two, did the Big Bopper survive the crash and was he going for help?

You want to see these then? It just isn't every day you get a speaker that comes and offers what you want to look at, you know. I mean they show you on the stand most stuff you don't care anything about anyway. The Big Bopper is buried in the Forest Lawn Cemetery in Beaumont, Texas. If you want to stay as much like you are right now as far into the future as you can, you do not want to be buried in a wet environment. A wet environment is not conducive to preservation.

I looked up the water level in Beaumont, and it's twenty inches. That will be good. I mean, he's been buried

in water and so forth. Now, lots of media coverage of this. This is the horizontal marker section. There is his—Charles Perry Richardson, Jr., The Big Bopper. Note he was only twenty-nine years old. By the way, if you go back and look at his history, he wrote four or five other songs that were in the country western top ten in his career, so he wrote some songs that people listened to.

Lots of media coverage—ABC, NBC, FOX, all that group. The family didn't want them to take pictures of this, so the funeral director gave them some tents. What do you do when you don't want people to see what's going on? You all who are in law enforcement and the legal field are wonderful about this. You know, you have a wreck out there and people are lying on the edge of the Interstate. You cover them with a tarp, you know, so nobody can see them.

The Big Bopper's coffin is inside of a metal vault. Note the water down there. We've got water dripping out—and I thought, "This is not going to be good." It was so bad that they had to put in a sump pump to pump the water out so I could get down and run this chain underneath the vault so that we could lift it up.

Now, we get it [the coffin] up. We've got the water down, and we're lifting it up. We need to take it from here over to a work area in the back of the cemetery. To get there, we've got to go by all the news media—ABC, CBS, NBC, all these. And so we're going to put this on a little tractor—a trailer on the back of a tractor. You don't want people to be able to see this, so what do you do? You cover it with a blue tarp. I'm going to write a book one of these days, "Death is Under the Blue Tarp."

We get back there, and we're cleaning this off now. We're going to clean this all off. I'm not going to have time to talk about the difference between concrete vaults and metal vaults, but if you have questions, I'll see if I can't answer them for you. This is the casket; it's a

Batesville casket. I'm not selling Batesville caskets, but it was in such a good shape, they could have used it over, although Batesville gave them a new casket. This casket is now in a music museum somewhere south of Dallas, between Dallas and San Marcos, I think. I don't know my Texas landmarks that well, but anyway, we're going to get that out.

This is one—you have the fat bottom of the vault here. The casket sits on that. The principle of this is that if water gets in down here and it rises, this acts as a fail. As the water rises, the air in the top compresses and pushes the water back down. Remember your physics. I'm sure all of you remember that. Anyway, now this is a forty-eight-year-old casket. It has a little handle here that you use an Allen wrench on to open the top. The funeral director didn't have a wrench that would fit a forty-eight-year-old casket, and so, what do you do? You're about ready to get there, and all of a sudden you're astounded by this problem. Well, vice-grip pliers, they'll open anything.

We're going to start on the skull and then x-ray our way down. This is a skull. Note the fractures to the top of the skull—three fractures here. Note the right temporal bone is fractured, and there are multiple fractures of the face, which you can't see here.

I want to show you something else so you'll understand what's going on. You see this zipper handle right there. Can you see that? Okay. Am I in your way? I'll sit on the floor here if you want me to. You see that little dark area there and dark area here. In the funeral industry, when you have people like this that are so badly damaged that you put embalming fluids in the body, they will leak. And they [industry personnel] want to keep their embalming fluids in, so they have a rubber garment called a uniroyal. They put the uniroyal on the body, and they zip it up. But remember, this is the Big Bopper. The Big Bopper weighed about 270 pounds. This was not big enough to fit

the Big Bopper. It's the only one they had, and they couldn't get it zipped all the way up, so it's gapped at the top.

Now, going on down, this is the thoracic area. This is a typical deceleration fracture. This is where you're going forward at a rapid rate of speed and what you're in stops, but you keep going. And you start pushing in on your ribs here in the front. Where do they break? They break in the back, here along where the ribs attach to the spinal column.

Let's start up here. There are your handles of the garment. Note the fracture of the clavicle. Now, note a fracture here, all the way down. A little displacement there—fracture, fracture, fracture all the way down. Let's look at the other side. This would be the right, and this would be the left—fracture, fracture, fractures all the way down—displacement, displacement. We have twelve pairs of ribs, or twenty-four ribs, and every one of the twenty-four ribs is fractured.

Now, let's look at the spinal column. Going down the spinal column, your vertebra in the neck are known as the cervical vertebra. Those to which the ribs attach are called thoraces, and the five at the bottom are lumbar. This is the ninth thoracic vertebra, and that's the tenth. Note the displacement—it's fractured through the spinal column right there.

Going on down to the leg, this would be the right femur. This would be the knee. This is the tibia. Note the compound fracture of the tibia and the fibula. By the way, this is a sheering fracture that is often seen in people that jump off of buildings, or if you jump off a bridge, miss the water, and hit the ground. You literally sheer the end of your femur off, and that's what that is right there.

Then this is looking at the left-hand side. This is your femur, and that's your patella. That's the knee cap. The tibia and fibula fracture there. Now, this one—you

normally don't see this view of the foot. We now have a pretty good idea of what happened to the Big Bopper. But when you have your legs broken like that, when you are buried, your feet don't stick up. Your feet fall over on the side. We have a pretty good idea of what's happened to the Big Bopper, so instead of holding this and getting more x-rays—because we have to hold these things to get the mobile x-ray unit in there to get these pictures—[we can see] that's got a lump right there. That lump is the osteological evidence of a fracture through all five metatarsals of the foot. Every one of the foot bones is fractured across there.

Now, going on, this is where the Big Bopper is buried now. This is the plaque that the State has put up. They have not put up the monument yet, but there is that. Now, one of two questions. Did the Big Bopper survive the crash and was he going for help?

AUDIENCE: No.

DR. BASS: Okay, great. Now, was the Big Bopper shot?

AUDIENCE: No.

DR. BASS: No. I should have talked to you a little bit about being shot, but those of you with law enforcement and those of you in the legal field have probably dealt with gunshots. There's no indication of that [a gunshot wound] at all. No, he did not survive the crash. He was thrown out because of the momentum. When the plane crashes, he just keeps on going and goes through either the windshield of the plane or the cockpit of the plane. You see what you can do. If you go back and look, you can find things that somebody didn't think anybody needed to know before we got there.

Now, it's about eight minutes after 10:00, And at 10:10 I self-destruct, so we can take one question.

UNIDENTIFIED AUDIENCE MEMBER: What's the hardest thing you've been asked to do in forensic anthropology?

DR. BASS: What's the hardest thing people have asked me to do? Said a little bit differently, the hardest cases are those that you can't identify. They mainly occur with young females. We're in a period of culture now where children get on drugs. You get the young girl who gets on drugs—she's just, say, twelve, thirteen, fourteen, fifteen, in that area. She runs away from home. She does not write home. She needs to eat, so she gets into prostitution. When you and I got our jobs, we had resumes. We had all the good things that you've done and so forth. But if you're a prostitute, if you go to Memphis and you're the new girl in town, your business goes up. Everybody wants to have sex with Suzy.

As time goes by, people don't frequent Suzy as much, so Suzy's income begins to decrease. So she leaves Memphis and goes to Nashville. When she leaves Memphis, she doesn't go to Frank and Tom and say, "Hey, will you write me a letter of recommendation? Best sex I've ever had, you see." She goes to Nashville, and there's no paper trail. The same thing happens in Nashville, and then she moves to Knoxville. So she is here in town, with no paper trail to follow her at all. She is killed, and the Knoxville newspaper will write about it, but wherever she came from, they don't know she's dead. She's not writing home to her family, and so she's lost.

The next thing you go to is what the FBI has: a forensic data bank known as the National Crime Information Center, the NCIC. If you have a loved one that is missing, you give information on that individual, and you

send it in—but in this case now, the family doesn't know that this woman is missing—so there's nothing in the system. Now, I'm on the other end. I have this skeleton. I know who it is, and I send my data in, but it doesn't match because there's nobody that's put the information in on the other side. It's not that the system is wrong or anything like that. It's just that it's incomplete the way the culture is set up right now. I promise not to answer all of them so long.

EDITOR-IN-CHIEF SALLY GOADE: Dr. Bass will also be with us after the panel presentations when both the panel members and Dr. Bass will be able to answer your questions. I think he can sign a few books, but he may need a break. His books are for sale in the front also. Thank you, Dr. Bass.

DR. BASS: Thank you.

[Break]

MS. RICE: We're going to get started. Now is the time in the program when we will begin our panel reactions to the morning keynote. Starting that panel discussion will be Dr. Terry Bunde. I would like to let the panelists once again know that we are going to have an allotted time of twenty minutes for you each.

PANELIST'S RESPONSE

Dr. Terry Bunde

DR. TERRY BUNDE: Thank you for inviting me. I do appreciate the invitation, but I feel I must give you a disclaimer. I think Bryan [Hathorn] told someone about

my proclivity to long-winded speeches, so I'll keep an eye on the sign.

I was asked to look at this, and I have heard Dr. Bass many, many times. I knew probably what he was going to say, but he still surprises me every time I hear him. I want you to know that I am a biochemistry and organic chemistry professor. Make sure that doesn't say something dealing with stereochemistry, and you'll know you're in the right place.

I have spent the last eleven years of my career at Maryville College. I've been teaching for over thirty-five years, but I've spent the last eleven years teaching a science class to non-science majors in forensic science. I'm probably not responsible for turning out lawyers or judges, or turning out scientists, but I hope I'm turning out better jurors for you in your courtrooms. That's my goal at least for the next fifteen or so minutes.

This is a quotation probably many of you have seen from Donald Shelton's article on the CSI effect,² one of many that have come out since the popularity of those programs really began. If you don't know the statistics, 70,000,000 people in the United States on any given week watch at least one episode of CSI.³ These are people who are going to wind up in your juries. What Shelton observed is, as you can see, that people claim their science knowledge came not from their background in high school or college, but from the media. What they see on TV and what they see in the newspapers and magazines.⁴ And this so-called—what I would call—pseudoscientific knowledge

²Donald Shelton, *The 'CSI Effect': Does it really exist?*, 259 NAT'L INST. JUST. J. 1, 6 (2008) ("Every week, the ever-evolving scientific and informational age comes marching through the courtroom door in the psyche of almost every juror who takes a seat in the box.").

³*Id.* at 2.

⁴*Id.* at 1, 6.

comes marching into the courtroom any time juries are seated and a trial begins. That preconceived notion of what science is, is out there in the general public.

What it really comes down to, and why I spend so much of my career teaching non-science majors science, is that we have a serious problem in this country for science literacy. I told the organizers when they asked me to come and participate that that is what I could talk knowledgeably about. This is the definition that the National Academy of Sciences came up with a little over fourteen years ago for science literacy.⁵ I think it's really important to see that you can sum this definition up in a few words. We want people to be able to be consumers of scientific information. The last sentence really speaks to the folks you're going to see in a jury box.⁶

Scientific literacy also implies the capacity to pose and evaluate arguments based on evidence to apply conclusions from such arguments appropriately. When we begin to assess science literacy in the United States, or any other country, we have to think about this background. This is from the AMERICAN SCIENTIST over twenty years

⁵ Scientific literacy implies that a person can identify scientific issues underlying national and local decisions and express positions that are scientifically and technically informed. A literate citizen should be able to evaluate the quality of scientific information on the basis of its source and the methods used to generate it. Scientific literacy also implies the capacity to pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately.

NATIONAL ACADEMY OF SCIENCES, NATIONAL SCIENCE EDUCATION STANDARDS (1996), *available at* <http://books.nap.edu/openbook/0309053269/gifmid/22.gif>.

⁶ *Id.*

ago.⁷ It told about an accident on a San Diego freeway where a fifty-pound bag of industrial pigment, iron oxide, fell off a truck and spilled onto the Interstate.

A hazardous response team was brought out in their hazmat suits, the full body armor. It took them eight hours to clean up the spill. Hively wrote about this, suggesting that anybody who has some knowledge of science, maybe even rudimentary knowledge, knows that iron oxide is rust.⁸ It's used in red barn paint. And that iron oxide posed absolutely no threat whatsoever. So while people were chilling their heels on this Interstate for eight hours waiting for them to open the Interstate back up, no one posed that question.

What Lienhard really said in this comment is that no one stepped up to say that there was more rust coming off the structural steel in the bridge a few miles up the road than ever came out of this bag. But it was knowledge that iron oxide is a chemical—all chemicals are “bad.” Therefore, we have to treat it as a hazardous spill.

I'm not going to ask for a show of hands. I won't give a final exam question as Dr. Bass proposed, but these are a few questions—there were many more—posed by a basic science literacy quiz given to Canadians. I always tell my students, “I use Canadian studies as an example because we can feel good about those dumb Canadians.” I hope I didn't offend anybody, but I'm sure my counterpart in Ottawa is doing the same thing with a study of Americans in science literacy.

One of those questions is particularly vexing for me as a chemist and a biochemist. It's not on the screen. The

⁷ John H. Lienhard, *Engines of our Ingenuity*, at <http://www.uh.edu/engines/epi341.htm> (citing William Hively, *How Much Science Does the Public Understand?* 76 AM. SCI. 439-44 (1988)).

⁸ *Id.*

question said, “Radioactive milk can be completely rendered harmless by boiling.” Eighty-six percent of the people called in the poll—1,000 people randomly chosen, without background and education necessarily, thought that was a true statement. Over half of them responded to the question that the Earth is at the center of the universe and not the other way around. We had people burned at the stake defending that one 500 years ago. This is the knowledge that the general public has about science. The last one is particularly interesting to my colleagues and my former students who are medical doctors when we go demanding an antibiotic for a viral infection. That misunderstanding of a basic sort of biomedical principle is rampant in the population.

This is a diagram I’m going to spend some time with and then go through the remainder of it and talk pretty quickly. This diagram gives me a chance to tell students something that most of us can’t get after we leave an educational institution and move on in our careers. That is, how is scientific information gathered? It is based on observation, followed by a deductive process going to a model. From that model, we propose by deduction some hypothesis. Think of that as the “If, and” statement that you had in your life. And that “If, and” statement allows us to do meaningful experimentation. It depends on what branch of science you are in, but that experiment could be everything from physics, to chemistry, to biology, to medical science. You name it, and we get another observation.

At this point, either that observation verifies the model that we’re working with, and that model notices upstairs in the world of ideas in our brain, not the world of facts around us, or it could be that the observation now suggests that we need a new model for the way in which we hold all this information, these observations, together. It was Thomas Kuhn, in his very famous book, *THE*

STRUCTURE OF SCIENTIFIC INFORMATION, who proposed that this is the point where you have revolutionary science.⁹

You have two competing models, two competing camps, and that must be resolved for a science to proceed. In many ways, creation science and evolution are good examples of this. That crisis of contradiction, Kuhn called it, leads to a paradigm shift. He wrote that word first and now it's used for everything. The idea is that we've got to move from the old model to the new one, so we can then do meaningful experimentation.

Now, why is this relevant and why am I teaching you science? Well, if you summarize that page in some way, you summarize it by saying that scientific statements are probabilistic and subject to change based on new observations, new experimental results, and new interpretations—I mean, new models. Scientific models and conclusions are based strongly on experimentation, statistical interpretation of results and the fit, if you will, with a particularly accepted model in some discipline. That's how scientific information is produced.

This verification step is really, really important. I can't go out today and publish a paper on something I dreamed up yesterday without some meaningful verification from previously existing facts or new information that I gather in my laboratory.

The term paradigm shift in Saks and Koehler's famous article in *SCIENCE MAGAZINE* in 2005 suggested that there is currently a paradigm shift in forensic science with sort-of small Fs and small Ss.¹⁰ Because DNA

⁹ THOMAS KUHN, *THE STRUCTURE OF SCIENTIFIC INFORMATION* (Univ. of Chicago Press 1996) (1964).

¹⁰ "Converging legal and scientific forces are pushing the traditional forensic identification sciences toward fundamental change. The assumption of discernible uniqueness that resides at the core of these fields is weakened by evidence of errors in proficiency testing and in actual cases. Changes in the law pertaining to the admissibility of

evidence and DNA technology have moved from biomedical and sort-of molecular biological research applications into the courtroom, allowing us to identify someone and individualize completely a DNA source, then this has caused the other forensic sciences to begin to be reexamined in a new light.

You've got changes in the law that occurred about the same time that you know much more about than I do in terms of allowing someone to testify in the courtroom. That scientifically based model of DNA evidence means that those jurors, who watch CSI, the 70,000,000 of them a week, are coming into the courtroom demanding DNA evidence in a burglary case and demanding DNA evidence in an auto crash case because they can understand that because someone on the TV explained it to them.

What they explained to them, as I tell my students, and I've taught about 300 of them in the last ten years, I tell them that the instruments that you see on the CSI shows came from companies that provide them free of charge so that you can see the eye candy with Perkin Elmer, Bechman instruments, and Agilent Technologies, and yet they don't necessarily use them the correct way. They don't get the answer in five minutes, but that eye candy attracts attention. My wife refuses to watch any of those shows with me because I make disparaging comments: "Oh, yeah, right. That's the right way it's done."

The point is that other forensic sciences are now not being called on the carpet. We're asking them to consider the scientific basis for those various techniques. Why is this a problem? Well, I think Robert Bohrer sums it up

expert evidence in court, together with the emergence of DNA typing as a model for a scientifically defensible approach to questions of shared identity, are driving the older forensic sciences toward a new paradigm." Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE MAGAZINE, Aug. 5, 2005, at 892.

better than I could.¹¹ I could just leave this slide up and leave, and I think the case is made. We have two different disciplines that have two very different ways of looking at the world. Science is very digital and focuses on measurement. Law is analogical and depends on precedent. Science is predictive, general, and replicable. Law is retrospective and particular. Science is objective and universal. The law is normative and contingent. That's the nature of the two beasts, and we're trying to resolve this in a courtroom with expert testimony.

The National Research Council ["NRC"] book¹²—if you haven't read it, I highly recommend that you do. It is an enormous undertaking of scholarship over the period of three years, looking at the state of forensic science; a pathway to the future was the topic. [The Report] came out last summer. The National Research Council gathered together many experts from all the different disciplines they could get to look at the forensic science that we use currently in our courtrooms and we use in criminal investigations. Some of those disciplines—because they come from a research scientific background like nuclear and mitochondrial DNA analysis and light toxicology and drug analysis, both of which had a valid research base before they were ever applied in courtrooms—those disciplines, because they come from this experimental background, have a very strong statistical population database to draw from to make comparisons.

¹¹ "Science is digital—it focuses on measurement; Law is analogical—it depends on precedent. Science is predictive, general, and replicable; Law is retrospective and particular. Science is objective and universal; Law is normative and contingent." Robert A. Bohrer, Law Professor, California Western School of Law, San Diego.

¹² COMMITTEE ON IDENTIFYING THE NEEDS OF THE FORENSIC SCIENCES COMMUNITY, NATIONAL RESEARCH COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009).

As some of my former students who have gone on to work in the local TBI [Tennessee Bureau of Investigation] lab, one of whom testified in all of the trials so far in the [Shannon] Christian murder case, that when she was sitting in my classroom, she learned how science was done. She went off and got her Master's Degree in DNA molecular biology and then got a job with the TBI and has done a great job in hiring former graduates of Maryville College. I have a toxicologist there and two other DNA technicians there, all of whom are graduates of the college.

They went into this field because they liked the science, and notice they went into the toxicology and DNA areas. But there are other forensic sciences, as Dr. Bass alluded to, that depend on expert interpretation of patterns. These are things like fingerprints, writing samples, tool marks, fibers, hair, and fire debris. Just add to the list. It requires an expert like Dr. Bass with his many years of experience to be able to interpret that for you, as the counsel, and for the jury so that everyone understands that it's his expertise he is bringing to bear.

Now, Dr. Bass doesn't fall into that second category because of his many years of research in osteology; bringing together a database of human skeletons allows him to identify the gender, the age, the height, and the approximate handedness of that individual when presented only with bones. That experience is based on scientific research, but there are many things, like fingerprints, that have never been tested. How many times have any of you who practice law for a career heard someone testify, "The prints are an exact match"?

In order for that to be true, we have to get one basis statistic. How do we know there are not two people with exactly the same fingerprints? It would require an enormous amount of research to do that kind of study, but

it's never been done. The biggest study I know of is about 1,000 individuals who were looked at.

What's the basic information we're trying to exact from the scientific testimony? Well, we want whatever we use to be reliable and established in a systematic and scientific manner. Go back to the diagram. We've done model building exercises. It should be precise. That the method has been applied broadly by trained scientists. To me, that's somebody educated in the sciences. We look at the probative value of that method. Then, of course, in this day and age, we have to look at the admissibility of that evidence in a courtroom. All of you know *Frye*¹³ and *Kumho Tire*¹⁴ and *Daubert*¹⁵ and *McDaniel v. CSX*.¹⁶ But that's going to tell you whether or not the person doing that forensic science can testify as an expert in a trial. All of that depends on that evidence.

The probative value of that evidence gets more and more important as we're able to individualize that evidence. The National Research Council's study devoted a great deal of discussion to this very issue of moving from identification of evidence at a crime scene by some crime scene investigator—I collect the white powder—to the classification of that white powder in the field, provisionally, and then in the lab by scientifically based toxicological techniques like gas chromatography and mass spectrometry to classify it as a particular narcotic, let's say.

The idea would be, for probative value, to individualize that white powder to another white powder found on some individual to be able to say beyond any sort of scientific hesitancy that those two powders are the same.

¹³ *Frye v. United States*, 298 F. 1013 (D.C. Cir. 1923).

¹⁴ *Kumho Tire, Co. v. Carmichael*, 526 U.S. 137 (1999).

¹⁵ *Daubert v. Merrell Dow Pharm, Inc.*, 509 U.S. 579 (1993).

¹⁶ *McDaniel v. CSX Transp.*, 955 S.W.2d 257 (Tenn. 1997).

The irony, of course, as many of you know, is that it isn't the cocaine that identifies those two powders. It's the other stuff that's there in vanishingly small amounts that allows us to make that individualization assessment, but that step from classification to individualization means that the probative value of that scientific evidence goes up a lot.

What the NRC questioned in their study were some of the forensic sciences that make that step without having the scientific background and statistics to back it up. They questioned whether we can say that in terms of a courtroom. Their conclusions were—and I'm taking 100 pages and boiling it down to one slide—that many methods result in class evidence. That's as far as you can go. Some DNA can result in associated uncertainties, the level of scientific development, and statistical relevance.

Let me get to the conclusions since I have thirty seconds. What do I, as a scientist, not a forensic scientist, think? Well, the improvements are going to come from publicly funded research. We have to pay for these studies as a country—not a company—as a country. We have to put money where our thoughts are. We give thousands upon thousands of grants through the NIH [National Institute of Health] and the NSF [National Science Foundation], but only about eight of them ever wind up as forensic investigation. We need that research to be done.

Two, the ability to individualize evidence must be based on strong scientific principles and not past precedent. I am a fingerprint expert. I've done it for thirty years. I can individualize two prints. The science literacy of the population, from my perspective, from which you draw your jurors and will continue to draw your juries, has to be improved. That means I've got to do a better job educating college students, but our high schools have to do a better job educating high school students for people who don't go any further. Thank you very much.

MS. RICE: We're now going to move on to the next presentation with Professor Bernard Raum. Also, we're going to save time at the end of all presentations for a couple of questions.

PANELIST'S RESPONSE

Professor Bernard Raum

PROFESSOR RAUM: Good morning. It's a pleasure to be here. He's a UF [University of Florida] graduate.

DR. BUNDE: We're in hostile territory.

PROFESSOR RAUM: No, no, no. I start with the premise that we have to keep it in the SEC.¹⁷ We don't worry about the rest of the country. That includes sports. Hopefully, that's a comforting thought. Before I get into my talk, there are just a couple of things that, as I listened to the last presenter, I wanted to take note of very quickly.

First is the education of the people. A couple of years ago there was an individual who went around county fairs and big events. He was signing up people to petition for the banning of hydrogen hydroxide. People who signed the petition would walk away thinking, "Oh, my God. It's in everything. It's in the water we drink. It's in all—oh, my God." Of course, hydrogen hydroxide is a hydrogen atom with a hydroxyl. Okay, HO. It's water. H₂O. Hydrogen hydroxide. Try that some time to see what

¹⁷ SEC is an acronym for the Southeastern Conference. The Southeastern Conference is a college athletic conference headquartered in Birmingham, Alabama, which operates in the southeastern part of the United States. *See generally* http://www.secsports.com/the_sec/.

reaction you get. I recommend Thomas Kuhn's text.¹⁸ He's written a couple of books on this phenomenon, and he's a fantastic thinker if you really want to get into the mindset.

What else did I remember? Just a couple more things. With respect to the exact match, a conundrum. I always found it useful to take both fingerprints, put one up on the screen or on a chart and just overlay the other one. This way you can let the jury see for themselves. They make the final call. We don't worry about eleven points or nine points. There's the print. You figure it out. There it is, ladies and gentlemen. You can do this. That's where the problem may lie in fingerprints. If the jury is shown a good print and overlay, we don't need expert opinion.

Also, from my observation, the application of forensic science doesn't point to an individual. It excludes the rest of the population. That's what we really do. It's an exclusionary technique. Whatever is left, according to Sir Arthur Conan Doyle and Sherlock Holmes, must be the truth.¹⁹ And that's where we are. Also, the National Research Council and the American Academy of Scientists' Report is an excellent source, and I suggest you take a look at it.²⁰ I bring it up because in the chapter discussing education in the legal system, on page 236, they

¹⁸ See, e.g., THOMAS S. KUHN, *THE ESSENTIAL TENSION: SELECTED STUDIES IN SCIENTIFIC TRADITION AND CHANGE* (1977).

¹⁹ "It is an old maxim of mine that when you have eliminated the impossible, whatever remains, however improbable, must be the truth." SIR ARTHUR CONAN DOYLE, *The Adventure of the Beryl Coronet*, in *THE ADVENTURES OF SHERLOCK HOLMES* (1892).

²⁰ COMMITTEE ON IDENTIFYING THE NEEDS OF THE FORENSIC SCIENCES COMMUNITY, NATIONAL RESEARCH COUNCIL, *STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD* (2009).

mention my Florida Bar CLE²¹ as the kind of program that should be used to educate lawyers and judges. If you want to take the course, go ahead. It's online, but don't do it until June because we're putzing around with it. It's been there for a couple of years, but we're changing some stuff. Anyhow, I wanted to point that out to you.

Let me get to the meat of what I want to say here. I learned an interesting thing from Dr. Bass this morning. Well, let me show you something. We'll get expert witnesses and their evidence. What I have given in terms of the written materials to the law school for the journal is a checklist. This is an evidentiary checklist that every lawyer uses subconsciously or should be, every judge uses subconsciously or should be, to assess the admissibility of evidence. This one is particular to forensic evidence. It works every time and will ensure that you don't overlook anything. I suggest keeping this checklist with you at trial. Okay, I'll show you.

This is a great quote; I love it. "Jurors are quite capable of seeing through flaky testimony and pseudo scientific claptrap. We should not waste our valuable time watching witch doctors, voodoo practitioners, or brujas go through the entrails of dead chickens in a fruitless search for the truth."²² That's a great quote, and I understand now that apparently we can get the truth out of dog turds. I wasn't sure until today. Wait 'till I tell my wife. "What is this?" "Don't ask."

I'm going to jump ahead because I don't have a lot of time to talk. For the evidentiary checklist, the first thing to remember is that the trial judge is the referee.

²¹ See University of Florida Forensic Science Distance Education, http://www.forensicscience.ufl.edu/Index.php?/programs/noncred_lawyers (last visited May 4, 2010).

²² *People v. Williams*, 183 Cal. Rptr. 498, 502 (Cal. Ct. App. 1982) (Gardner, J. Concurring).

You need to know that. They make the call. They won't be reversed unless it's the abuse of discretion or they're plainly wrong. Judges aren't plainly wrong. Right? They're in an area that they know about. I mean, most of them don't know what we're talking about here, but they also get to decide who is an expert and judge the expert's qualifications. On a credibility assessment, the jury gets to do that ultimately, but it's the judge that likes to hear the testimony first.

Relevant evidence: Well, we don't need to go over that stuff. I don't have a lot of time. Okay, Rules of Evidence: Scientific, technical, or other specialized knowledge will substantially assist the trier of fact to understand what's going on.

This [slide] used to be where you got expert testimony. These road show guys, the snake oil sellers. These were the people, who for several generations and in Europe forever, touted their magical cures around. They were the experts, or the status, or the quality of the experts that we have. Out of these people came the term "charlatan."

It's derived from an Italian word, and it describes an Umbrian Village, which was known for its "quacks" in the street. I can't say it any plainer than that. Okay, that's where the word charlatan comes from. If you don't think there are charlatans in the practice of law, you haven't been in a courtroom. They're out there. Fortunately, a lot of people know who they are. But the juries don't; the judges don't. It's very problematic sometimes.

These rules are designed to improve that. The average forensic anthropologist is a little bit of a quirky guy, but basically, he's the truth. By the way, my paper was based on physical anthropology, forensic anthropology here in Tennessee. You know, that is actually me. You didn't recognize me. But there he is, and these are the kind

of experts that you see. The jury takes a look at that, and remember, the jury can see your experts too.

First impressions are critical in this situation. When jurors look at a witness, they make an initial determination as to whether they are going to give this person credibility within fifteen seconds. They either identify or they don't. That's from the time the witness is called to get to the witness stand. You have to remember how your witnesses are going to present themselves.

Some of them, like this person [slide], may say, "Oh, he's a little quirky guy. But yeah, okay." Now, this one, on the other hand, is going to cause you some problems, especially note the dead chicken. We don't want him on the witness stand going through the entrails of that chicken. That's what you're going to get out of Dr. McGootoo, who is the noted psychiatric expert. For those of you who have dealt with psychiatrists on the witness stand, it takes one to know one. Sorry, some of my best friends are psychiatrists and psychologists.

With respect to expert witnesses, what we start out with is difficulty in determining their qualifications. At least it used to be because information just wasn't available. The accuracy of the so-called science was left to the credibility and the judgment of the jury, and they had no tools or information with which to operate. The *U.S. v. Frye*²³ case is the first one to try to set some kind of rule. Basically, you read the case, there's nothing supporting it. There are no conclusions. It's like the D.C. Court of Appeals just said, "Well, this is what we think it is." That's typical for the D.C. Court of Appeals, for those of you who do practice there. There used to be not a lot of support for some of the things they used to do.

²³ *Frye v. United States*, 293 F.1013, 1014 (D.C. Cir 1923) (landmark case establishing an objective test for determining the admissibility of expert testimony).

Even after *Frye*, there was no evidentiary test that a court could use to conduct its own independent review of the validity. Then here comes *Daubert*.²⁴ *Daubert* is a really great case. I think it's the best opinion in a long time to address any of these kinds of issues, primarily because the emphasis in the *Daubert* decision was scientific validity. You already heard something on the use of the scientific method. I can tell you right now, Ladies and Gentlemen, for those of you who are new to the forensics area, that's going to be your first area of inquiry. How did these experts, your witness, and the other side's [reach opinions] because you want to prepare your witness to testify. Right? How did they apply the scientific method to produce the results that they're testifying from? If they can't answer that question and they can't demonstrate it and walk you through the process, there's a problem with their testimony and a problem with their methodology.

NFPA 921 is a guide put out by the National Fire Protection Association.²⁵ I can tell you right now, it's the Bible for fire and explosion investigation—the Bible. It focuses on procedures and describes the steps that need to be followed. Following the protocols that are established in here for investigative purposes will get your stuff in very, very quickly. Judges look at it. They don't want to do the hard work, so you give them this and say, "Well, we followed this procedure and protocol that are generally accepted in the relevant community."

Chapter Four, basic methodology—what do they start out with? A two-page explanation of the scientific method and how it applies.²⁶ There it is right there. We're not making this stuff up. This is the bedrock of all scientific and forensics evidence. It's no mistake that the *Daubert* decision tracks this very, very closely.

²⁴ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 592-94 (1993).

²⁵ NFPA 921: GUIDE FOR FIRE & EXPLOSION INVESTIGATIONS (2008).

²⁶ *Id.* at ch. 4.

The focus is on the principles and methodology, not the conclusions that the evidence generates. The true distinction between an expert and a non-expert is that the non-expert witness gives the results of a process of reasoning similar to everyday life. The expert gives a process of reasoning that can be mastered only by special sciences.

Now, I'm going to talk to you for just a couple of minutes about something you think you know. It's called the Opinion Rule or the Pure Opinion Rule in some states. Witnesses usually are required to speak to facts. Rule 7.02 says not necessarily.²⁷ Experts can rely upon questions of skill or science, and those who have made the subject matter of investigation the object of their particular study are competent to give their opinions in evidence.

If the jurors can draw their own conclusions, the expert testimony is not needed. And, of course, under the Tennessee rule, it has to be of substantial assistance. Otherwise, it's what? Not relevant under Rule 4.01.²⁸ Okay. These rules are very, very well intertwined.

Typically, qualified experts render an opinion based upon their own training, education, and experience. In addition, an expert, in drawing that opinion, may rely on input, opinion, or findings from other experts, as well as other facts, which were either brought to the expert's opinion by investigators or are based on the expert's firsthand knowledge. This is from Tennessee court opinions, so I'm talking about the law that is applied here.

If the expert's opinion is based upon facts deduced through the employment of a scientific theory, process, procedure, technique, or methodology, that theory, process, or methodology must apply within the relevant rules of

²⁷ FED. R. EVID. 7.02.

²⁸ FED. R. EVID. 4.01.

evidence. We take a look at the *McDaniel* factors,²⁹ which very closely track the *Daubert* opinion. Scientific method? As I said, that works, and I'm not going to go into the details of it, except to say that there is a completely defined process here. This is already in the slides that you saw here this morning, and you're going to see it again this afternoon.

Let's take a look at [*McDaniel* factor] number two: peer review or publication. There's the scientific method, which is the first process; then comes peer review or publication. The importance of peer review is that it gives other people in that discipline an opportunity to see what's out there and respond to it. The significance of peer review—and the usability of it—is only if it's published in what's called a refereed journal. If you have somebody that's publishing something out of the back of their pick-up truck, forget it. It's got to be a refereed journal, which means there's a process for the submission of documents. I belong to the American Academy of Forensic Scientists. It's a rigorous pre-publication review of experts in the particular field that the paper addresses. They will accept it, reject it, talk about it, tell you to make changes, or whatever. The end product has been peer reviewed before it even hits the press.

In the back of those journals, there are always responses. If somebody has a legitimate disagreement with a paper, they send it in to the editor—I disagree with this and here is why. It's published in the next edition. Peer review is not dispositive, and it doesn't automatically get you through the door. It's only the little added factor as we deal with circumstantial evidence in the accumulation of little disparate factors that would pull together to make a common sense decision.

²⁹ See *McDaniel v. CSX Transp., Inc.*, 955 S.W.2d 257, 262-64 (Tenn. 1997); see also *Daubert*, 509 U.S. at 592-94.

Nowhere in the federal Constitution or in the state constitution of any state in the United States does it require the suspension of common sense when the court gives you a judgment. You can always make a common sense argument.

The potential rate of error—most disciplines aren't subject to that unless it's a scientific lab-type presentation. As a consequence, you're not going to see this in most cases. In chemistry, physics, yes. There are rates of error, percentages, those types of things. If they're published, if they're known, then we need to know about those. Scientific significance or forensically significant means about ninety-five percent, and that's what we shoot for. Whether it comes in will not be a concern. The only thing we're really concerned about in potential rate of error is the existence of false positives. Does the test permit the occurrence of a false positive? If it does, how often? We need to know that.

False negatives don't usually bother us in forensics. It's just passed right over, but it is important in scientific research and in doing your analysis under the scientific method. It's a different thing, and you bring it in through the scientific analysis angle.

The general acceptance in the scientific community is *Frye*.³⁰ Okay, also NFPA.³¹ There are a couple of others you're going to hear about today. ASTM: American Society for Testing Materials. It's been around for over 100 years and [includes] manufacturers, scientists, researchers, and forensics. I'm a member of the ASTM E30 Committee, which is the forensic science committee. There are a whole bunch of ASTMs that are recognized as authoritative with respect to procedures and methodologies. If you can go into court and say, "We've complied with the

³⁰ See *Frye*, 293 F. at 1014.

³¹ See NFPA 921, *supra* note 9.

ASTM, and here it is.” Wham—you’re right there under *Frye* to begin with.

Qualification under the ASTM also does something else for you. It brings in the scientific method qualification too because that’s how all these things are reviewed to begin with and how they’re created. It also brings in peer review because there are people from all over the world in ASTM who participate in the formulation of these procedures. We get stuff all the time. Somebody’s proposed a change, modification, or a whole new procedure. It may take a year or two before everybody exchanges information by e-mail. They “Tweet,”³² and do all kinds of stuff, and finally there’s a consensus that is good.

By the way, I’m going to depart for just a second. With respect to psychiatric diagnoses, the psychiatric DSM Manuals,³³ they were created by a majority vote of people present and voting at whatever current meeting of the American Psychiatric Association. It’s not a unanimous vote by any stretch of the imagination. This is just something to think about when you’re talking about an example of peer review.

Widespread acceptance works, and I suggest that you try to ferret it out of what you’re doing. Also, there’s something called ASCLD. ASCLD is an organization called the American Society of Crime Lab Directors, and it is now the gold standard for crime labs because it conducts intensive review and certification processes for crime labs. Not all the crime labs in the United States are ASCLD certified. That’s a question you need to ask your own

³² Tweets are text-based posts used on the social networking website Twitter. They can be up to 140 characters displayed on the author’s profile page and delivered to the author’s subscribers, who are known as “followers.” See generally www.twitter.com.

³³ DSM is an acronym for Diagnostic and Statistical Manual of Mental Disorders. See generally <http://allpsych.com/disorders/dsm.html>.

expert and the experts on the other side. “Is your lab certified by ASCLD?” “No.” “It’s not?” ASCLD is the gold standard because it does periodic reviews, proficiency testing of the bench people, and they report the results. All this stuff is available. If you’re ASCLD certified, you’re going to have a good chance for getting it into evidence.

Research Independent of Litigation: This is also a keystone that ties back to the scientific method. Is this generally done, or is this done specifically for this case? There’s only one instance that I know of in a reported opinion where an expert was allowed to create his own test, analyze the evidence, and get it into evidence. That was John DeHaan, a national fire expert who wrote [the latest editions of] *KIRK’S FIRE INVESTIGATION*.³⁴ The evidence was admitted because of who John was. It stood on his national and international recognition as the expert in this area. Otherwise, it wouldn’t have been permitted. They figured, well, if anybody can do it, he can. And it came in, subject to cross-examination of course.

Is there anything else? The other thing is that you can forget all of this if the appellate courts in your jurisdiction have already ruled and said it’s admissible. You can just ask the court to take judicial notice of the process.

Oh, a couple of other things. Here are three texts. They’re not in the materials here, but I would suggest you write them down. You need to know statistics and how they’re created for scientists for research purposes. These two—I don’t own interests in any of them—this one is *FOUNDATIONS OF SOCIAL RESEARCH*.³⁵ It’s an older book. It’s probably out of print, but it’s on the bookshelves. This

³⁴ JOHN D. DE HAAN, *KIRK’S FIRE INVESTIGATION* (6th ed. 2006) (PAUL L. KIRK 1969). *See also* DAVID J. ICOVE & JOHN D. DEHAAN, *FORENSIC FIRE SCENE RECONSTRUCTION* (2d ed. 2008).

³⁵ *See* MICHAEL CROTTY, *FOUNDATIONS OF SOCIAL RESEARCH: MEANING AND PERSPECTIVE IN THE RESEARCH PROCESS* (1998).

[statistics book] is my textbook at George Washington University on statistics. It walks you through the process of testing design and biases of how a test is put together and how the questions are assembled. This is really, really valuable.

I can assure you that most of the newspapers don't use this kind of procedure when they put out these questionnaires to people. You get 700 people who are the only ones who are going to respond. It's not an unbiased search, so you're getting people who are focused on the issues anyhow. But this book will get you through it.

I recently had a case I was in the middle of, and there was a doctor on the witness stand the next day. He was asked on direct, "Well, how often does this happen in your experience?"

"Oh, about seventy-five percent of the time."

I'm sitting there like an idiot savant, thinking, "What can I do with this number?" I didn't ask him on cross about his diagnosis. I went right to it. "You mentioned a number, Doctor, seventy-five percent. Where did you get that number?"

Oh, my God, about fifteen minutes into that presentation he said, "I'm guessing."

"So, you were telling the jury information that you were just guessing. Is that correct?"

"Yes."

"Thank you. No further questions." I'm not going to give him a chance to rehabilitate. Of course, his lawyer had no idea how to clean it up.

MS. RICE: Our final panelist responds. This is Professor Margaret Berger.

PANELIST'S RESPONSE

Professor Margaret A. Berger

PROFESSOR MARGARET BERGER: Well, I feel that I just wandered into an alternative universe perhaps. I mean, I'm from New York, and I think we think of ourselves as tough and able to handle anything. But I must say I have never heard a presentation before 9:00 o'clock in the morning that was as gory and graphic as we heard from Dr. Bass this morning. I must say that my students, I don't think, are really exposed to that kind of presentation, but it was certainly fascinating. I've learned some things, and I guess I will find dogs a little more worrisome than I ever did. I love dogs. Anyway, I will take some of these lessons home with me.

I am supposed to comment on Dr. Bass's presentation, and I find it difficult to do. As I said, this is really a very different world. One thing, the CSI effect has been mentioned by both speakers—the 70,000,000 who are watching what's going on and thinking that they now are experts in forensic science. That, of course, is a very troubling problem. I think that, at least in my neck of the woods, one of the things that compounds that problem is that it's getting more and more expensive to have jury trials. We very often, in my area of the country, don't have them because people plead guilty because the sentencing rules really make it easier for those who agree to plead guilty. Therefore, we have far fewer trials than we used to, at least where I come from. A good deal of what happens occurs outside of the courtroom and also happens because of various decisions that people make that they may do better if they plead guilty than if they continue to insist upon their innocence.

One of the things also said this morning was about the fact that scientific statements are probabilistic. I think

that this is something that scientists would agree on and that many evidence professors would agree on. The only problem is that if there is any field that seems to cause people trouble, it's statistics. I don't know how all of you do with statistics at this law school, but statistics are absolutely a nightmare for many of the people who go to most law schools. We know that many people go to law school and not medical school because they hate math, and here they are being told that what you really need to know is statistics. Teaching statistics really seems to be a nightmare for most law schools that do not have required statistics courses. It's one of the things that has always been advocated, and it just doesn't happen because it's so difficult.

As a matter of fact, math is really very, very difficult for law students. I remember trying to do something in a classroom with something mathematical, and everyone got into a fight as to what you do in multiplying fractions. The people just started shouting at each other as to the way we should do this. Well, if that's the level of comprehension that you have in a law school class, you can imagine what happens when one is trying to examine expert testimony in a scientific way.

*Daubert*³⁶ has been floating around, but *Daubert* has been attacked in many ways. I'm going to talk about that some more when I give my talk.³⁷ The question of whether a test permits false positives or just false negatives is a very complicated question, and also one that is not easy for lawyers to handle.

Lawyers simply have not been trained to deal well with mathematical concepts. I don't know to what extent this is treated any differently at this law school, but at most

³⁶ See generally *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993).

³⁷ Professor Berger's lunch keynote address, *Evolving Trends in Forensic Science*, is printed separately in this issue.

law schools, it is a very, very difficult issue to raise with students. And it takes time. You cannot teach a statistics course in the midst of teaching a law school course and manage to get very far with it. So, I think one of the real problems for lawyers is: How do we manage to resolve these statistical kinds of problems? What do we need to know? How can we put it together? Is a checklist going to help us with asking the right questions? Well, what you really have is sort-of a clash of two very different cultures. We certainly heard that before from Dr. Bunde.

You have a legal culture that thinks there's an answer out there and wants some kind of a formula. And you have a scientific culture that says, "But wait a minute. You really have to observe. You really have to look at this and decide whether or not this is going to apply to this particular form of evidence." The answer is not always very clear, which is why the National Research Council Report about forensic science,³⁸ which I'm going to talk about later, is so important. It brings to the floor the kinds of questions that ordinarily lawyers do not necessarily want to raise and have not raised in the years in which they have been dealing with evidence.

We have sort of a weird timeframe, which you have to remember, which is that most of forensic evidence came into being really before we had some of the rules of evidence that we now have. We have a mismatch, not only in terms of culture, but in terms of timing. The real question is how then do we resolve these issues?

For instance, I heard Dr. Bass talk about getting fingerprints off what is left behind in the cases that he gets, and I really was curious as to—he said the FBI knows how to do that. How does he know that the FBI knows how to

³⁸ COMMITTEE ON IDENTIFYING THE NEEDS OF THE FORENSIC SCIENCES COMMUNITY, NATIONAL RESEARCH COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009).

do that? That's really one of the questions that we have at the moment where fingerprint evidence is really under a good deal of attack: How does one determine whether something has really been made valid? What are the scientific methods that need to be applied? How do we verify that we are really dealing with a scientific truth and not just something that somebody in some discipline has decided to go and talk about?

One of the other things mentioned before was fire investigation. I'll talk more about this later too, but that is one of the areas where a good number of questions have been raised lately. Not about whether there was a fire—of course, there was a fire. And, of course, perhaps people died in the fire. But how do we know really that when the expert says an accelerant was used, that is actually the case? What proves that that accelerant was used? There have been a number of suggestions lately that a good deal of this testimony is absolutely not necessarily true. That yes, one can see patterns, but that there are other things that can cause the pattern, rather than an accelerant. How do we test these things? This is a very troublesome area.

The entire area of forensics is a very troublesome area because, as you know, it's the forensic evidence that often sends a person onto death row. We have had a fair number of cases as of late, over 250, where convictions have been overturned on the ground that the forensic evidence was wrong. That should give everyone some pause. In addition, it's not just that when the forensic evidence is wrong, you have someone going to prison or maybe death row. It also means that somebody is out there who hasn't been put into prison, who is the person who really committed the crime. That, in a way, is even more worrisome. You've got the wrong person, and therefore the right person, who wasn't identified, is still wandering around.

Forensics, at the moment, seems to me really one of the more troublesome disciplines around. I found it interesting to hear what all of you are saying or thinking about what is needed to correct this situation. I'm going to talk later about this report, which you can see lying there, and some of it contains very, very troubling findings that really affect everything that happens in a courtroom when one is depending on forensic interpretations.

What can I say that I think? I think that statistics are getting more and more important. I think it's understood that you need some kind of a statistical, probabilistic basis for the kinds of statements that people make in the courtroom, and it's very hard to figure out how to manage that in a law school. Obviously, colleges don't require statistics as something needed for graduation, and neither do law schools. Certainly, it would seem to me that that's one of the most important things that all of you really have to think about, unpleasant as it may be to think about. It is very difficult to teach a good statistics course. To teach a good statistics course embedded in an evidence course is really virtually impossible.

How does one get this information across to lawyers? A good trial lawyer sort-of intuitively knows statistics often without being able to explain exactly what it is that he or she is seeking to achieve. But to really manage to survive an active cross-examination, you may have to do something about statistics, whether you like it or not. As I said, there's no question that most law students hate statistics. I mean that's really not why they went to law school, to deal with math. Statistics, unfortunately, really is grounded in math.

One of the things to think about is whether you should forget about your ideas when you went to law school that it had nothing to do with this subject and to nevertheless see if you can't get some kind of a grounding

in how statistical thinking works—very, very helpful to a good lawyer.

I think I'm just about to the end of my time. Two minutes. Well, I don't know that I even want to use my two minutes. I'd really rather hear from all of you and whether you have some questions.

QUESTION AND ANSWER SESSION

MS. RICE: Before you ask a question, if you would, state your name for our court reporter. We will now open the floor for questions for all of our panelists.

JESSICA VANDYKE: My name is Jessica VanDyke, and I'm a second-year student here at the law school. Dr. Bunde, as well as all the panelists, discussed the CSI effect.³⁹ Do any of you have thoughts, as future trial attorneys, about what we can do in the legal profession to try to correct the CSI effect? Because the shows are becoming more popular; they obviously aren't going off the air. There are like twelve of them now, so what can we do to correct that in our profession?

PROF. BERGER: I think that's an excellent question, and I think it's a very difficult question. Obviously, one needs more science education, but people are very resistant to more science education. Science is not easy. It's hard, and it takes time. I think it is very difficult to overcome the CSI effect. I don't know whether really the problem can be dealt with at a law school level or if it's just part of the problem with American education altogether. It should be dealt with in elementary school or high school, but it is very late to start dealing with it in law school.

³⁹ See generally Shelton, *supra* note 2.

I guess the most that you can do is keep saying that the show is not real, but why people would believe you when these shows have millions of viewers is really very difficult. Judges could help a little if they were more sympathetic at times and gave better instructions to jurors as to what they should do. The ingrained thinking of Americans as to what science is, even though they're completely wrong about it, certainly isn't an easy problem to deal with.

PROF. RAUM: Can I take a stab at answering that question? You have to anticipate the issues that may come up in your individual case. I'm a former prosecutor, and I tend to approach things from the prosecutorial point of view, that is, in terms of framing a case. So you've got a basic idea. I think they always want DNA. They always want fingerprints. Very few crime scenes actually give you reproducible, forensically significant fingerprints. DNA is a little better, depending on how it's processed and who does the reading of the results because therein lies the devil. The devil is always in the details of the DNA analysis.

What you do is you've got your expert on the witness stand, your crime scene person, or the detective who led the investigation, and you ask him several questions. "Well, did you find any usable fingerprints?"

"Yes."

"Well, what does that mean?"

"Well, no, we didn't and here's why." Basically you have him explain in advance all the issues you'd anticipated.

Typically, I don't encourage anticipating defenses for issues, but this isn't a defense. This is anticipating a question that the jury is going to have because they're going to go in the jury room. At some point, they're going to write a question to the judge, and the judge is going to

say, “You have to decide the case on the testimony at trial.” That’s all the help the law can give them. But you, as the attorney, can get your witnesses to do that when you present your case. You can say, “Well, I know what these people are thinking about, so I’m going to deal with it.” You could ask, “How long does it take to get a fingerprint back from AFIS?”⁴⁰ Well, certainly not in five minutes on the computer with the guy’s picture and his criminal record. You know, does anybody know how that AFIS fingerprint process really works? Nobody?

First of all, the local guy, he’s got to digitize the print so the FBI can read it. They still use the old FBI designation system. They’re going to send that digitized print and that descriptive designation to the FBI. They will run it through their IAFIS database.⁴¹ That will kick out twenty to thirty, maybe fifty possible matches.

That information is going to be sent back to the local police investigator. They have to get copies of each one of those individual sets of fingerprints and do a hand comparison. The FBI will not do that unless it’s one of their own cases. They used to, but they won’t anymore because they had too many requests. When I was a prosecutor, the FBI did virtually everything we wanted, so it was great. We just interfaced with them, and they did the kind of tests we wanted. Whatever we wanted, we’d ask them to do this special stuff.

Juries come in with expectations. You have to answer those expectations. They want to know, did we find any usable DNA? Was it degraded? Of course, now we

⁴⁰ Automated Fingerprint Identification System (AFIS). Law enforcement agencies use AFIS to identify unknown fingerprints. The acronym can refer to automated fingerprint systems in general or the United States national AFIS: Integrated Automated Fingerprint System (IAFIS).

⁴¹ CJIS, Integrated Automated Fingerprint System, *available at* <http://www.fbi.gov/hq/cjisd/iafis.htm> (last visited May 5, 2010).

have the mini-STRs that are revolutionizing DNA in terms of degraded samples.⁴² They're starting to work quite well. John Butler up at the National Institute of Science and Technology pulled all that stuff together. It's a great website there.⁴³ NIST and John Butler. John is probably the international expert on this stuff now, and John has a huge website there. Go to it and start looking, and it will give you jumping off points.

Let me tell you something else: PUBMED.⁴⁴ How many of you have heard of PUBMED? Do you use it? All right. P-U-B-M-E-D. It will take you to the National Institute of Health Reference Library in Bethesda. It's all online. You will get extracts. It's a huge database like Lexis. Okay, I use Lexis instead of Westlaw. You can come up with the current writings, the current issues. You can sift through the literature and bring yourself up to date on specific, really small issues: a great source of information. Because remember, you don't have to know everything there is to know about a particular science. You only need to know for that day the background that the expert is going to be using for that case. You can just chop your research right down for the most part. You need an

⁴² See DNA Diagnostic Center, *DNA Diagnostics Systems: Forensics, Mini-STR Testing*, <http://www.forensicdnacenter.com/dna-ministr.html>. (last visited May 5, 2010) (Mini-STR is "a testing system that exploits the ability of specially designed primers that preferentially target the larger STR loci. While standard STR primers target longer sequences that include the STR loci, mini-STR primers 'zoom in' on the STR locus so that the resulting DNA product is smaller, thereby increasing the chances of successful amplification of the larger loci."); See also Leonard Klevan and Lisa Lane Schade, *Identifying Degraded DNA*, FORENSIC MAGAZINE, available at <http://www.forensicmag.com/articles.asp?pid=131>.

⁴³ See Mike Coble, et al, National Institute of Science Technology, <http://cstl.nist.gov/div831/strbase/miniSTR.htm> (last visited May 5, 2010).

⁴⁴ United States National Library of Medicine, PubMed.gov, <http://www.ncbi.nlm.nih.gov/PubMed> (last visited May 5, 2010).

overall course in forensics to have an idea of what is actually out there and what you can and cannot do with the various sciences, and you cannot get that from television.

KATHY MORANTA: My name is Kathy Moranta, and I'm a prosecutor. I guess I'm interested in hearing from the panel. I've read the National Institute of Science Report, but in everyday practice there have been challenges by defense attorneys so far to things like fingerprints. That's what I'm most concerned about. None of our judges have upheld any of those challenges. In terms of real practical handling cases, what would you have to say about fingerprints and using them. I think you suggested putting them on top of each other, and we do that. But what about allowing an expert to say something like, "Yes, I've excluded. Yes, this is a match"?

PROF. RAUM: Exclusions are easy to do with fingerprints. Inclusions aren't. As I said, forensic science is all about excluding. Everything we do in terms of analyzing, "Well, am I going to do this, or am I not going to do this? Am I going to drive this way today, or am I going to go that way?" Traffic is or isn't bad at these times. These are all shifting sands of knowledge. Juries do this too. They come to the court with their own background, and so do you in formulating your questions, views, and your opinions.

Keep in mind this is probability in action, but it's a very loose probability. Sometimes there is really bad statistical evidence for this particular probability statement, so keep in mind that's what jurors are going to do. "Well, this probably happened or didn't. Well, beyond a reasonable doubt—preponderance of the evidence." How do you quantify that stuff?

I came from a county where we had the Johns Hopkins Applied Physics Lab, and we had all kinds of

PhDs, chemists, and mathematicians. I never put them on my juries if I possibly could, because they don't think in a statistical basis. They think in absolutes. It either is or it isn't. Its 100 percent or it's zero. That's kind-of hard. Of course, there are a lot of people out there now, especially with all the political stuff that's going on in this country, that are coming out of the closet that have those ironclad opinions one way or the other. We know who they are now.

DR. GOADE: Thank you, Professor Raum. Professor Berger was asking about how Dr. Bass would know that the FBI could get the fingerprints in. We didn't have Dr. Bass at that time. We have him back, and I wonder if we could maybe get that and then see if we have any more questions.

DR. BASS: You want me to. . . .

DR. GOADE: Did you hear Professor Berger's question?

DR. BASS: I heard her question. That's right. I'm sorry to disturb your morning, by the way, with the gruesome pictures before 9:00 o'clock. They usually call you Friday night with a case, and they want you to come immediately. I have trouble with that in that I said, "Look. Why don't you just secure the crime scene until tomorrow because there's nothing better than sunlight to do a case?" I don't care how many lights you set up, it doesn't work as well as the sun, and you get animal activity where it's scattered all over. So, I say, "Just secure the scene and tomorrow will be" I mean, look, if the guy is already dead, it's not going to hurt him to be dead one more night, you know, until we can get there and do it right the first time.

The comment on the FBI doing fingerprints from the underlying dermis actually comes from Arthur Bohanan, who was a senior criminalist for the Knoxville

Police Department here in Knoxville. Art is a fingerprint expert. You say, “Whatever that means.” He has done his research and worked in the fingerprint area, and he has designed this super-glue method of recovering fingerprints. He told me that when you have cases in which the epidermal layer is missing, the FBI does have the technology to recover prints from the underlying dermis. Although this, I gather, is very difficult. I have never done this, and I’m passing along information from people in the area. I’m not a fingerprint expert. I would rather go see if I can find that skin and get a better print.

MANAGING EDITOR MEREDITH RAMBO: Could you expand some more on what an ASTM is and how those function? You mentioned that there was more than one that existed, and you would need to circle in on one.

PROF. RAUM: Hundreds and hundreds of ASTMs exist.⁴⁵ They’re out there to control just about every form of manufacturing and plant operation in the world. If you want to know the correct and accepted way to construct and operate an iron, there’s an ASTM on it under that particular isolated section. There’s a series of forensics ASTM standards. They’re in the science library here. You can go onto the ASTM site and see if any of them have been corrected, changed, or modified. If they have and it’s important to your case, you can buy that one. That information is available, but it’s spotty in a lot of areas. Now the big focus is on handwriting and document analysis the last couple of years, but they’re all out there. The standards are accepted because everybody on the forensics subcommittee has agreed on them—not everybody, but

⁴⁵ The American Society for Testing and Materials (ASTM) sets standards that govern many industries in the United States. *See generally* <http://www.astm.org> (last visited May 5, 2010).

people who have a vote, and that's a lot of people.⁴⁶ It's about 800 people who have a vote on the forensics subcommittee. It's constantly looking at the sites and the analysis.

DR. BUNDE: These are equivalent to what is referred to in the forensic science world as SOPs.⁴⁷ They're the standard operating procedure for this particular test, and it has stood the test of time. People have contributed to it and as Dr. Bass said, have come back and changed it to apply to new technology, new methods, and new equipment that come out. The latest standards will be the ones that most of the individuals agree to. It is a scientifically based technique, but it's not used just in forensics. As they said, it's used everywhere. If I have a student who wants to look for steroids, birth control steroids in urine or in a sewage treatment plant, there is a standard operating procedure from either the ASTM or other equivalent organizations that will tell you step by step what you must do to make this a scientifically defensible result

PROF. RAUM: There are also EPA [Environmental Protection Agency] standards

DR. BUNDE: Yes, exactly.

⁴⁶ See The American Society for Testing and Materials, Timothy Brooke, Staff Manager, Committee E30 on Forensic Sciences, *available at* <http://www.astm.org/COMMIT/COMMITTEE/E30.htm> (last visited May 5, 2010).

⁴⁷ Standard Operating Procedures (SOP) are guidelines that govern participants in a given field. In the present case, SOP refers to the ASTM standards set by the forensic subcommittee that govern the forensic sciences. See The American Society for Testing and Materials, *supra* note 7.

PROF. RAUM: Same concept. A lot of that is in mass spectroscopy and gas chromatography analysis.⁴⁸ A lot of that is coming to the courtroom. There are procedures for capturing that evidence, for packaging it, for taking it out of the box, for distilling it, and for loading it into the machines. There are procedures for all this different stuff, and they're out there. Lawyers don't know anything about these things, but I keep telling you they're critical in cases. I'm working on a case right now where the application of ASTMs and EPA standards are critical. And I can tell you, other than the experts and myself, nobody else in the case yet knows about these things—don't even know they exist, much less how they're applicable.

Can you imagine how surprised they're going to be? Because none of this is in writing. The experts get on the witness stand, and they start talking about this stuff. Then lawyers are like, "Oh, my God. I don't speak Chinese. We need an interpreter here." That stuff is out there, and it controls the process. You need to know about it. Oh, by the way, there's a statistics course you can take that I think you can get for like thirty bucks or forty bucks from the Great Classes.⁴⁹ Go online and Google that stuff. You can get a DVD that's got thirteen, sixteen lectures for like ninety-nine bucks. It will walk you through it. The stuff is out there. You've just got to find it. First of all, you have to know it exists.

There's an excellent textbook on forensics. I use it in both of my courses. It's INTRODUCTION TO FORENSIC

⁴⁸ See generally Douglas Frederic, GC/MS Analysis, SCIENTIFIC TESTIMONY, available at <http://www.scientific.org/tutorials/articles/gcms.html> (last visited May 5, 2010).

⁴⁹ See The Teaching Company, www.theGreatCourses.com (last visited May 5, 2010).

SCIENCES, third edition, by James and Nordby.⁵⁰ It is, for our purposes, the best surveyed forensics book in existence anywhere. It's out of Florida CRC Press. It's inexpensive, about eighty bucks. It's excellent.

DR. BUNDE: I feel I must defend my institution. Every student at Maryville College takes a statistics course—four hours—even English majors.

MS. RICE: Are there any more questions? We have time for one more, and please remember to state your name.

PHILLIP SMITH. Phillip Smith. I was wondering if you've heard of this. If it would be any help to jurors for judges—when the jury goes into deliberation—to ask those jurors to submit any questions concerning CSI-related matters to the court that pertain to that particular case? Then the court could get them information on whether it is true science or false science.

PROF. RAUM: Oh, God, that's a mine field, an absolute mine field. I'm sorry, but no. I mean, I wouldn't champion that in any respect whatsoever because you're going to have to try the *Daubert* trial.⁵¹ After the jury has heard all the evidence in the case, any additional information given is x-record.⁵² The appellate court is going to slam that one back on you really, really fast. It's completely flawed, but it's up to the lawyers to prepare and present their case. Keep in mind, the judges depend on the lawyers. They

⁵⁰ Stuart H. James and Jon J. Nordby, *FORENSIC SCIENCE: AN INTRODUCTION TO SCIENTIFIC AND INVESTIGATIVE TECHNIQUES*, (3d ed. 2009).

⁵¹ *Daubert v. Merrell Dow Pharm, Inc.*, 509 U.S. 579 (1993).

⁵² Professor Raum's reference to "x-record" means that any information given to the jurors once they retire would not be a part of the record.

depend on the lawyers to do a lot of the work for them. That's part of your responsibility as counsel. You come to court knowing what you're doing and prepared to make the presentation that the court needs to reach a fair and just judgment. This is all part of it. You can anticipate this stuff, and you can address it. The time to do it is when you've got witnesses on the witness stand because once they're gone, you can't make an argument. You can't take a position that's not supported by the evidence in the record, right?

PROF. BERGER: I think the question is more general as to whether you would allow jurors to ask questions after they hear a witness.

PROF. RAUM: That wasn't my understanding.

PROF. BERGER: No?

MR. SMITH: Well, I was just thinking, after these comments, are you saying that it would be worthwhile for the prosecution to do that—to try and identify those questions while in court?

PROF. RAUM: Oh, absolutely.

MR. SMITH: And bring all that out in court?

PROF. RAUM: Oh, absolutely. You've got your expert. You've got your questions: "Why didn't you take fingerprints? Why didn't you submit them?" Because they weren't readily visible. They were smears. They were there. But have somebody say, "Well, you know, we only get usable prints about 25 percent of the time." They need to know that, and you can do it with a witness. There are some states that do permit questioning by jurors of

witnesses on the witness stand. I don't prescribe to that at all because you wind up getting fishing expeditions, which pull away from the issues involved in the case. Also, you get improper questions, which require hearsay answers or further expert opinions. It's a nightmare. That's an absolute nightmare. Our system is clunky, but it's still the best out there. I don't want to toy with something that fundamental to the process.

MS. RICE: Let's give our panelists another round of applause. Also, if Dr. Bass will come forward . . . on behalf of the TENNESSEE JOURNAL OF LAW AND POLICY and the Center for Advocacy and Dispute Resolution, we would like to present you a token of appreciation for presenting our morning keynote.

DR. BASS: Thank you, thank you all very much.

MS. RICE: Also, to each of our panelists, we would like to present you with an additional token of appreciation.

STUDENT ESSAY

**INTENTIONALLY INFLICTED:
THE *BAZE* PLURALITY PAINFULLY “EXECUTED”
THE PURPOSE OF THE EIGHTH AMENDMENT**

*Michelle Lynn Veronica Consiglio*¹

I. Introduction

On April 16, 2008, the United States Supreme Court addressed the constitutionality of lethal injection as a method of execution. In its analysis, the Court recognized, as it had in prior cases, that the government’s choice of a particular method of execution did not violate the Eighth Amendment’s ban on cruel and unusual punishment. As a result, the Court upheld the constitutionality of lethal injection in *Baze v. Rees*,² rendering a seven-to-two plurality decision.³

¹ J.D., pending May 2011, Univ. of Tennessee; B.A., International Relations, Boston Univ., *summa cum laude*. Prior to attending law school, Ms. Consiglio worked at the Tennessee Legislature during the 105th General Assembly as the Research Analyst for the Senate Judiciary Committee.

² *Baze v. Rees*, 128 S. Ct. 1520 (2008).

³ *Id.* at 1521 (noting that Chief Justice Roberts authored the plurality opinion with Justices Kennedy and Alito joining). Justice Alito also filed a concurring opinion. *Id.* at 1538. Justice Stevens filed an opinion concurring in the judgment. *Id.* at 1542. Justice Scalia filed an opinion concurring in the judgment, which Justice Thomas joined. *Id.* at 1552. Justice Thomas filed an opinion concurring in the judgment, which Justice Scalia joined. *Id.* at 1556. Justice Breyer filed an opinion concurring in the judgment. *Id.* at 1563. Justice Ginsberg filed a dissenting opinion, which Justice Souter joined. *Id.* at 1567; *see also* Harbison v. Little, No 07-6225, 2009 U.S. App. LEXIS 14742, at *8 (6th Cir. July 2, 2009) (“The Court issued several opinions in that case, including Chief Justice Roberts’s plurality opinion (writing for two

Because no single rationale explaining the result gained the assent of five justices, “the holding of the Court may be viewed as that position taken by those Members who concurred in the judgments on the narrowest grounds”⁴ In other words, because the plurality opinion does not act as authority, no controlling principle or justification for the ultimate decision emerged from the case. Nonetheless, because the rationale behind the decision was a point of contention among the justices, it warrants exploration here. Lastly, issues surrounding the death penalty have been analyzed and debated for centuries; however, an important distinction must be noted between the general death penalty debate and the instant matter: the issue presented in *Baze* concerned the execution *method* of lethal injection and not the controversial issue of the existence of the death penalty itself.⁵

In *Baze*, the Court addressed the issue of whether lethal injection as a method of execution is unconstitutional under the Eighth Amendment’s ban on “cruel and unusual punishments.”⁶ According to the two Petitioners, Ralph Baze and Thomas Bowling, a chance existed that the method’s protocol might not be followed or administered correctly, thus resulting in the infliction of pain during their executions.⁷

other justices), one concurring opinion, four other opinions concurring in the judgment, and one dissenting opinion. Under those circumstances, Chief Justice Roberts’s plurality opinion is controlling.”) (citations omitted).

⁴ *Gregg v. Georgia*, 428 U.S. 153, 169 n.15 (1976).

⁵ *See Baze*, 128 S. Ct. at 1542 (Alito, J., concurring).

⁶ U.S. CONST. amend. VIII.

⁷ *Baze*, 128 S. Ct. at 1526. The Supreme Court of the United States granted certiorari to the Supreme Court of Kentucky’s decision on the issue, stating the constitutionality of the method of lethal injection. *Baze v. Rees*, 217 S.W.3d 207 (Ky. 2006). The only issue decided by the Supreme Court of Kentucky was the manner in which the Commonwealth of Kentucky can carry out the death sentences on all

The *Baze* decision is currently important and relevant because thirty-six jurisdictions (thirty-five states and the Federal Government) have adopted lethal injection as their primary or exclusive means of carrying out a sentence of death. Accordingly, lethal injection is “by far the most prevalent method of execution in the United States.”⁸ Further, thirty of the thirty-six jurisdictions that use lethal injection, including Kentucky (where *Baze* originated) and the Federal Government, employ a three-drug protocol.⁹ In *Baze*, the Court analyzed the

convicts. *Id.* at 209. The convicts argued that the lethal injection method was cruel and unusual punishment, making it unconstitutional under the Eighth Amendment to the U.S. Constitution and Section 17 of the Kentucky Constitution. *Id.* The Court explained that “[p]rior interpretation of Section 17 of the Kentucky Constitution provides that a method of punishment is cruel and unusual if it shocks the moral sense of reasonable men as to what is right and proper under the circumstances.” *Id.* at 210 (citations omitted). After analyzing the findings and conclusions of the trial court and examining the history of executions in Kentucky, the Court stated that “[t]he prohibition [of the Eighth Amendment and Section 17 of the Kentucky Constitution] is against cruel punishment and *does not require a complete absence of pain.*” *Id.* at 212 (emphasis added). The Court ultimately held that “[t]he lethal injection method used in Kentucky is not a violation of the Eighth Amendment to the United States Constitution or Section 17 of the Kentucky Constitution’s ban on cruel and unusual punishment.” *Id.*

⁸ *Baze*, 128 S. Ct. at 1526–27, 1527 n.1 (citing statutes from the twenty-seven of thirty-six states that require the use of lethal injection as the sole method of execution) (citations omitted).

⁹ *Workman v. Bredesen*, 486 F.3d 896, 902 (6th Cir. 2007) (citation omitted). The three drugs used in the protocol are sodium thiopental, pancuronium bromide, and potassium chloride, administered in that order. *Id.* (citation omitted).

The dose of sodium thiopental, a barbiturate that “reduced oxygen flow to the brain and causes respiratory depression” . . . quickly anesthetizes the inmate and *is sufficient to cause death in the absence of the two additional chemicals in the protocol.* Pancuronium bromide is a “muscle paralytic” that

constitutionality of lethal injection in the context of this particular method¹⁰ and held that Kentucky's execution method satisfied the Eighth Amendment.¹¹

The Court's grant of certiorari in this case garnered national attention and subsequently brought about an unofficial national moratorium on executions pending the Court's consideration of the Eighth Amendment issue.¹² Therefore, in analyzing the constitutionality of lethal injection, the Court sought to provide clarity and to

“assist[s] in the suppression of breathing and ensure[s] death.” The amount of pancuronium bromide that the State administers also proves fatal on its own, and the State selected the drug because it hastens death, and “prevents involuntary muscular movement that may interfere with the proper functioning to the IV equipment,” thus “contribut[ing] to the dignity of the death process.” Potassium chloride, a salt, interferes with heart function, causing “cardiac arrest and rapid death.” *If administered properly, the sodium thiopental anesthetizes inmates before they receive the remaining two drugs.*

Id. (emphasis added) (citations omitted).

¹⁰ Originally, the dosage was “2 grams of sodium thiopental, 50 milligrams of pancuronium bromide, and 240 milliequivalents of potassium chloride.” *Baze*, 128 S. Ct. at 1528. Now, Kentucky's protocol consists of 3 grams of sodium thiopental, 50 milligrams of pancuronium bromide, and 240 milliequivalents of potassium chloride. *Id.* (citation omitted).

¹¹ *Id.* at 1538.

¹² Linda Greenhouse, *Justices Uphold Lethal Injection in Kentucky Case*, N.Y. TIMES, Apr. 17, 2008, at A1 (“Dozens of executions have been delayed around the country in recent months. . . . The Supreme Court itself had not imposed a general moratorium, instead granting individual stays of execution in cases that reached the court.”); Adam Liptak, *Does Death Penalty Save Lives? A New Debate*, N.Y. TIMES, Nov. 18, 2007, at A32 (“The Supreme Court now appears to have once again imposed a moratorium on executions as it considers how to assess the constitutionality of lethal injections.”).

establish a workable standard for the lower courts to apply to the influx of litigation challenging lethal injection.

In his plurality opinion, Chief Justice John Roberts distinguished the petitioners' claim of an "unnecessary risk" standard¹³ from the stated "substantial risk" standard¹⁴ as the standard that must be met in order for an execution method to violate the Eighth Amendment. Time and time again, the Court had opportunities to rule on the constitutionality of a state's chosen method of execution.¹⁵ Each time, however, the Court refused to take what would have amounted to an unprecedented step because the justices did not perceive such a determination to be within the purview of the Court's role in the justice system.¹⁶

The *Baze* plurality determined that Kentucky's lethal injection protocol not only conformed with Eighth Amendment requirements but also recognized that the "substantial risk" standard acted as an acknowledged

¹³ See *Baze*, 128 S. Ct. at 1529.

[Petitioners] contend that the *Eighth Amendment* prohibits procedures that create an "unnecessary risk" of pain. Specifically they argue that courts must evaluate "(a) the severity of pain risked, (b) the likelihood of that pain occurring, and (c) the extent to which alternative means are feasible, either by modifying existing execution procedures or adopting alternative procedures."

Id. (citations omitted).

¹⁴ *Id.* at 1531 ("We have explained that to prevail on such a claim there must be a 'substantial risk of serious harm' . . .") (citations omitted).

¹⁵ *Id.* at 1530 ("This Court has never invalidated a State's chosen procedure for carrying out a sentence of death as infliction of cruel and unusual punishment."). In support of this contention, the Court discussed its previous decisions on the matter. See *id.* Such cases will be described in detail later in the Case Note.

¹⁶ *Id.* at 1562 (Thomas, J., concurring) ("We have neither the authority nor the expertise to micromanage the States' administration of the death penalty in this manner.").

limitation on the Court's ability to dictate execution methods to the states. Nevertheless, it can be argued that the substantial risk standard that the Court established in this case is not the governing Eighth Amendment standard. Instead, as set out in previous majority opinion cases, the test is much more direct: A method of execution violates the Eighth Amendment if it intentionally inflicts or enhances pain. This note will show that although the *Baze* plurality was correct in its ultimate judgment, the plurality opinion complicated the underlying intent of the Eighth Amendment by asserting a questionable and historically unsupported risk-based standard as the test of determining the constitutionality of a method of execution.

II. Case Summary of *Baze v. Rees*

Baze arose in Kentucky after two death row inmates, Ralph Baze and Thomas Bowling, "completely exhausted all of the legitimate state and federal means for challenging their convictions and the propriety of [their] death sentences."¹⁷ Baze was convicted by a jury on two counts of murder for shooting two law enforcement officers with an assault rifle as the officers attempted to serve him with five felony fugitive warrants.¹⁸ Bowling was likewise convicted by a jury on two counts of murder for killing a husband and wife as they sat in their automobile outside a dry cleaning store.¹⁹

The convicted felons first filed suit in the Franklin County Circuit Court in Kentucky, seeking a declaratory judgment that the lethal injection method of execution violated their state and federal constitutional rights because

¹⁷ *Baze*, 217 S.W.3d at 209.

¹⁸ *Id.* (citing *Baze v. Commonwealth*, 965 S.W.2d 817 (Ky. 1997)).

¹⁹ *Baze*, 217 S.W.3d at 209 (citing *Bowling v. Commonwealth*, 873 S.W.2d 175 (Ky. 1997)).

such a method was cruel and unusual punishment.²⁰ After a thorough bench trial, consisting of seventeen depositions and twenty witnesses, the Circuit Court denied relief, after which the defendants appealed to the Kentucky Supreme Court.²¹ After “careful review of this matter,” that tribunal determined that there was “no reason to believe that the circuit judge was clearly erroneous in any of his findings of fact,” ruling, “the decision of the trial judge was not clearly erroneous nor was there any abuse of discretion.”²² The court stated that “[a] method of execution is considered to be cruel and unusual punishment under the Federal Constitution when the procedure for execution creates a *substantial risk* of wanton and unnecessary infliction of pain, torture, or lingering death.”²³ Using that standard, and after a detailed examination of lethal injection as a method of execution, the court held that “[t]he lethal injection method used in Kentucky is not a violation of the Eighth Amendment to the United States Constitution or

²⁰ *Baze*, 217 S.W.3d at 209 (citing *Woods v. Commonwealth*, 142 S.W.3d 24 (Ky. 2004)).

²¹ *Id.* The Supreme Court of Kentucky briefly summarized the conclusions of the trial judge: 1) the inmates did not show by a preponderance of the evidence that the lethal injection method was not normal in capital punishment; 2) the method was not shown by a preponderance of the evidence to degrade the dignity of the felons; 3) no evidence proved that lethal injection inflicted unnecessary pain and suffering; 4) no evidence supported the contention that lethal injection caused unnecessary psychological suffering; 5) the method does not deprive the prisoners of their due process rights; and 6) the actual physical administration of the method did not create a substantial risk of unnecessary infliction of pain and suffering to violate the Eighth Amendment. *See id.* at 210–11 (citations omitted).

²² *Baze*, 217 S.W.3d at 210.

²³ *Id.* at 209 (emphasis added) (citing *Gregg v. Georgia*, 428 U.S. 153 (1976)).

Section 17 of the Kentucky Constitution's ban on cruel and unusual punishment."²⁴

The United States Supreme Court granted certiorari and affirmed the Kentucky Supreme Court's decision.²⁵ The Court first confirmed that "capital punishment is constitutional"²⁶ and pointed out that there must be some means of carrying out such punishment.²⁷ Further, the Court agreed that "the Constitution does not demand the avoidance of all risk of pain in carrying out executions"²⁸ and, likewise, the petitioners did not claim that all pain must be avoided.²⁹ Rather, the petitioners contended that "the Eighth Amendment prohibits procedures that create an 'unnecessary risk' of pain."³⁰ The petitioners argued that the courts must consider "(a) the severity of pain risked, (b) the likelihood of that pain occurring, and (c) the extent to which alternative means are feasible, either by modifying existing execution procedures or adopting alternative procedures."³¹

The Court, however, rejected this contention and explained that the petitioners failed to meet their "heavy burden,"³² stating that "to prevail on such a claim there must be a 'substantial risk of serious harm,' an 'objectively intolerable risk of harm' [by the current procedure]. . . ."³³

²⁴ *Baze*, 217 S.W.3d at 212. "Baze and Bowling have not met their burden of proof by a preponderance of the evidence as necessary in a declaratory judgment action. The findings of fact by the trial judge are not clearly erroneous. The conclusions of law are correct." *Id.* at 212–13.

²⁵ *Baze v. Rees*, 128 S. Ct. at 1529 (citation omitted).

²⁶ *Id.* (citing *Gregg*, 428 U.S. at 177).

²⁷ *Baze v. Rees*, 128 S. Ct. at 1529.

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.* (citation omitted).

³² *Baze v. Rees*, at 1533 (citing *Gregg*, 428 U.S. at 175).

³³ *Baze v. Rees*, at 1531 (citation omitted).

Accordingly, the Court asserted that “a condemned prisoner cannot successfully challenge a State’s method of execution merely by showing a slightly or marginally safer alternative.”³⁴ To be successful, a challenger must not only prove that “the State’s lethal injection protocol creates a demonstrated risk of severe pain [but must also] show that the risk is substantial *when compared* to the known and available alternatives.”³⁵

The petitioners argued that the actual protocol for administering the three-drug combination could create opportunities for error, which was a claim that relied on the improper administration of the first drug, sodium thiopental.³⁶ The Court, however, found that the petitioners did not prove that the risk of administering an inadequate dose was a substantial risk of serious harm.³⁷ The Court

³⁴ *Id.*

³⁵ *Baze v. Rees*, 128 S. Ct. at 1537 (emphasis added).

³⁶ *Id.* at 1533.

Petitioners contend that there is a risk of improper administration of thiopental because the doses are difficult to mix into solution form and load into syringes; because the protocol fails to establish a rate of injection, which could lead to a failure of the IV; because it is possible that the IV catheters will infiltrate into surrounding tissue, causing an inadequate dose to be delivered to the vein; because of inadequate facilities and training; and because Kentucky has no reliable means of monitoring the anesthetic depth of the prisoner after the sodium thiopental has been administered.

Id. (citing Brief for Petitioners at 12–20, *Baze v. Rees*, 128 S. Ct. 1520 (2008)).

³⁷ *Baze v. Rees*, 128 S. Ct. at 1533.

We cannot say that this finding is clearly erroneous, particularly when that finding is substantiated by expert testimony describing the task of reconstituting

also established that “Kentucky’s failure to adopt Petitioners’ proposed alternatives” did not “demonstrate that the Commonwealth’s execution procedure [was] cruel and unusual.”³⁸ This view rejected the petitioners’ contention that Kentucky could switch to a one-drug protocol “by using a single dose of sodium thiopental or other barbiturate.”³⁹ The Court concluded that “the Commonwealth’s continued use of the three-drug protocol cannot be viewed as posing an ‘objectively intolerable risk’ when no other State has adopted the one-drug method and petitioners proffered no study showing that it is an equally effective manner of imposing a death sentence.”⁴⁰

In summation, the holding of the Court indicated that the Eighth Amendment sets a rigorous requirement, even when using a risk-based standard: “Simply because an execution method may result in pain, either by accident or as an inescapable consequence of death, *does not establish* the sort of ‘objectively intolerable risk of harm’ that qualifies as cruel and unusual” under the Eighth Amendment.⁴¹

powder sodium thiopental into solution form as “[n]ot difficult at all . . . You take a liquid, you inject it into a vial with the powder, then you shake it up until the powder dissolves and, you’re done. The instructions are on the package insert.” Likewise, the asserted problems related to the IV lines do not establish a sufficiently substantial risk of harm to meet the requirements of the Eighth Amendment. Kentucky has put in place several important safeguards to ensure that an adequate dose of sodium thiopental is delivered to the condemned prisoner.

Id. (citations omitted).

³⁸ *Id.* at 1534.

³⁹ *Id.* (citation omitted).

⁴⁰ *Baze v. Rees*, 128 S. Ct. at 1535 (citation omitted).

⁴¹ *Id.* at 1531 (emphasis added).

III. Development of the Law

The United States Supreme Court considered challenges to the methods and circumstances of implementation of executions. Each time the Court rejected the challenge, holding that either the method of execution or circumstances surrounding its imposition did not violate the Eighth Amendment. As in *Baze*, the constitutionality of the death penalty itself was not at issue in any of the preceding cases. Rather, the Court focused on the constitutionality of specific methods and circumstances surrounding the implementation of capital sentences.⁴² Before proceeding, recall that the “cruel and unusual punishments” provision for the Eighth Amendment was not “incorporated” in the Fourteenth Amendment and thus applied to the States until 1962.⁴³ Therefore, prior to that time, all Supreme Court cases arising from the States focused on the Due Process Clause of the Fourteenth Amendment in assessing cruelty, and not on the Eighth Amendment’s provision.

First, in *Wilkerson v. Utah*, the Court addressed whether the Federal Territory of Utah’s method of death by firing squad violated the Eighth Amendment.⁴⁴ A jury convicted the prisoner of first-degree murder, and he was sentenced to death.⁴⁵ At the time, Congress provided that

⁴² See *Gregg v. Georgia*, 428 U.S. 153, 170 (1976).

⁴³ See *Robinson v. California*, 370 U.S. 660 (1962) (holding that a California statute making it a criminal offense to be addicted to the use of narcotics constituted cruel and unusual punishment within the meaning of the Eighth and Fourteenth Amendments to the Constitution).

⁴⁴ *Wilkerson v. Utah*, 99 U.S. 130 (1879). Also, for historical reference, the Supreme Court was referring to the Federal Territory of Utah and not the current State of Utah. *Id.* Utah was not admitted to the Union until 1896; therefore, no issue of incorporation of the Eighth Amendment into the Fourteenth Amendment appears in *Wilkerson*. *Id.*

⁴⁵ *Id.* at 132.

“[d]uly organized Territories are invested with legislative power, which extends to all rightful subjects of legislation not inconsistent with the Constitution and laws of the United States.”⁴⁶ Further, “Congress organized the Territory of Utah on the 9th of September, 1850, and provided that the legislative power and authority of the Territory shall be vested in the governor and legislative assembly.”⁴⁷ In accordance with Congress’s grant of power to the territories, the Compiled Laws of the Territory of Utah stated that “‘when any person shall be convicted of any crime the punishment of which is death . . . he shall suffer death by being shot, hung, or beheaded, as the court may direct,’ or as the convicted person may chose.”⁴⁸ The Court recognized that the laws of the Territories must not violate the Constitution, analyzing the comments of several prominent authors on the meaning and application of cruel and unusual punishment.⁴⁹ After such consideration, the Court concluded that it would be difficult to “define with exactness the extent of the constitutional provision which provides that cruel and unusual punishments shall not be inflicted; but it is safe to affirm that punishments of torture . . . and all others in the same line of unnecessary cruelty are forbidden by [the Eighth Amendment] to the Constitution.”⁵⁰ Describing its understanding of the meaning of “cruel and unusual punishments” as instances where pain was “superadded,”⁵¹ the Court referenced cases “where the prisoner was drawn or dragged to the place of execution; or where he was emboweled alive, beheaded, and quartered”⁵² In light of its statements, the Court

⁴⁶ *Id.* at 130 (citing Rev. Stats., sect. 1851).

⁴⁷ *Id.* (citing 9 Stat. 454).

⁴⁸ *Id.* (quoting 1852 Utah Laws 61; 1856 Utah Laws 564)).

⁴⁹ See generally *Wilkerson*, 99 U.S. at 134–37.

⁵⁰ *Id.* at 135–36 (citations omitted).

⁵¹ *Id.* at 135.

⁵² *Id.*

did not conclude that death by firing squad was “unnecessary cruelty,”⁵³ rather it held that Territory of Utah’s method of execution did not inflict cruel and unusual punishment.⁵⁴

Second, in *In re Kemmler*,⁵⁵ the Court, without hesitation, refused to declare New York’s execution method of electrocution unconstitutional.⁵⁶ The petitioner challenged the execution method on Fourteenth Amendment due process grounds, meaning that the Court did not specifically reach the issue of Eighth Amendment interpretation.⁵⁷ Instead, in light of *Wilkerson*, the Court simply examined the meaning of “cruel” in the Eighth Amendment, stating that “[p]unishments are cruel when they involve *torture or a lingering death*; but the punishment of death is not cruel, within the meaning of the word used in the Constitution. It implies there is something *inhuman and barbarous, something more than the mere extinguishment of life*.”⁵⁸ Because such extreme punishments would be cruel and this distinction was “common knowledge,”⁵⁹ the Court did not assume that electrocution was “cruel” in this instance because “it was for the legislature to say in what manner a sentence of death should be executed.”⁶⁰ The Court determined that the decision to use electrocution as its means of execution did not violate “any title, right, privilege, or immunity specially set up or claimed by the petitioner under the Constitution of

⁵³ *Id.* at 136 (citation omitted).

⁵⁴ *Wilkerson*, 99 U.S. at 136 (“Concede all that, and still it by no means follows that the sentence of the court in this case falls within that category, or that the Supreme Court of the Territory erred in affirming the judgment of the court of original jurisdiction.”)

⁵⁵ *In re Kemmler*, 136 U.S. 436 (1890).

⁵⁶ *Id.* at 449.

⁵⁷ *Id.* at 446.

⁵⁸ *Id.* at 447 (emphasis added).

⁵⁹ *Id.*

⁶⁰ *Kemmler*, 136 U.S. at 447.

the United States.”⁶¹ Therefore, the decision as to which method should be used “was almost wholly confided”⁶² in the legislature of the State. The Court further clarified the role of the judiciary in determining the constitutionality of an execution method by stating that “if the punishment prescribed . . . were manifestly cruel and unusual, *as burning at the stake, crucifixion, breaking on the wheel, or the like*, it would be the duty of the courts to adjudge such penalties to be within the constitutional prohibition.”⁶³ Such was not the case in *Kemmler*, and the Court rejected the Fourteenth Amendment challenge to electrocution because “the legislature of the State of New York determined that [electrocution] did not inflict cruel and unusual punishment, and its courts have sustained that determination.”⁶⁴ Therefore, the Court could not “perceive that the State has thereby abridged the privileges or immunities of the petitioner, or deprived him of due process of law.”⁶⁵

Lastly and in a different context (circumstances of the actual implementation of the death penalty) in *Louisiana ex rel. Francis v. Resweber*,⁶⁶ a plurality of the Court refused to find that a second attempt at electrocution violated the due process clause of the Fourteenth Amendment “on the ground that an execution under the circumstances detailed would deny due process to [the petitioner] because of . . . the cruel and unusual punishment provision of the Eighth Amendment.”⁶⁷ The Court reasoned, however, that because the first attempt was an

⁶¹ *Id.*

⁶² *Id.* at 446.

⁶³ *Id.* (emphasis added).

⁶⁴ *Id.* at 449.

⁶⁵ *Kemmler*, 136 U.S. at 449.

⁶⁶ *Louisiana ex rel. Francis v. Resweber*, 329 U.S. 459 (1947).

⁶⁷ *Id.* at 461.

“unforeseeable accident”⁶⁸ and a second attempt would not “add an element of cruelty.”⁶⁹ The initial attempt failed because “[t]he executioner threw the switch but, presumably because of some mechanical difficulty, death did not result.”⁷⁰ Although it was not the holding of the case, the plurality explained its interpretation of the intention of the Eighth Amendment in light of the Fourteenth Amendment Due Process Clause: “[t]he cruelty against which the Constitution protects a convicted man is *cruelty inherent in the method of punishment, not the necessary suffering involved in any method employed to extinguish life humanely.*”⁷¹ The plurality used such an interpretation to support its decision that the second attempt at the execution did not violate the petitioner’s Fourteenth Amendment due process rights because of cruelty because “*no purpose to inflict unnecessary pain*” existed.⁷²

Although *Wilkerson* and *Kemmler* represent precedent-setting cases that distinctively addressed the constitutionality of specific methods of execution, it must be noted that by no means are those cases the only Supreme Court cases addressing the issue of the death penalty. A plethora of cases have been argued before the Court regarding the different aspects of the death penalty and its interplay with the Eighth Amendment. For example, although not dealing with specific methods of execution, the Court, in *Gregg v. Georgia*,⁷³ discussed the meaning of “cruel and unusual” as an evolving concept, warranting interpretation in “a flexible and dynamic manner.”⁷⁴ The Court rendered the *Gregg* decision when the tide of public

⁶⁸ *Id.* at 464.

⁶⁹ *Id.*

⁷⁰ *Id.* at 460.

⁷¹ *Resweber*, 329 U.S. at 464 (emphasis added).

⁷² *Id.* at 464-65 (emphasis added).

⁷³ *Gregg v. Georgia*, 428 U.S. 153 (1976).

⁷⁴ *Gregg*, 428 U.S. at 171.

opinion seemed to be shifting back in support of the death penalty, following an unofficial moratorium on the death penalty from 1967-1976.⁷⁵ During the nine-year moratorium, the courts and much of society grappled with the question of whether “the U.S. reached the point at which the death penalty affronts the basic standards of decency of contemporary society.”⁷⁶ Although the ultimate answer to that question was “No,” the debate and its resulting court decisions had a broad impact on the nation.

As evidence of the effect of that debate, the Court issued an opinion during the moratorium years that continues to be considered by many, especially by anti-death penalty activists, as the landmark decision on the issue: *Furman v. Georgia*.⁷⁷ The Court held that the imposition and implementation of the death penalty in cases where it is used in a discriminatory manner upon racial minorities “constitute[s] cruel and unusual punishment in violation of the Eighth and Fourteenth

⁷⁵ See The Clark County (Indiana) Prosecuting Attorney, *Capital Punishment Timeline*, <http://www.clarkprosecutor.org/html/death/timeline.htm> (last visited January 17, 2010) (“1966: Support for the death penalty reaches an all time low. Gallup Poll shows nationwide death penalty support only at 42%.”); Gallup, <http://www.gallup.com/poll/1606/death-penalty.aspx> (last visited Mar. 17, 2010) (showing a 42% approval rating in 1966 by poll participants to the following question: “Are you in favor of the death penalty for a person convicted of murder?”); see also The Clark County (Indiana) Prosecuting Attorney, *Capital Punishment Timeline*, <http://www.clarkprosecutor.org/html/death/timeline.htm> (last visited January 17, 2010) (“1967: After Luis Jose Monge is executed in the gas chamber at Colorado State Penitentiary, an unofficial moratorium on executions begins.”). Luis Jose Monge was convicted for the 1963 first-degree murders of his wife and three of his ten children. He was the seventy-seventh person to be executed in Colorado. *THE NATION: Colorado: No. 77*, TIME, June 9, 1967 at 33.

⁷⁶ Jose M. Ferrer, III, *The Death Penalty: Cruel and Unusual?*, TIME, Jan. 24, 1972 at 54.

⁷⁷ *Furman v. Georgia*, 408 U.S. 238 (1972).

Amendments.”⁷⁸ The *Furman* decision itself was a one-paragraph statement that invalidated the death penalty as it was to be administered on the three petitioners.⁷⁹ Despite this Eighth Amendment ruling, no uniform and decisive argument emerged from the decision because each of the five justices in the majority wrote his own concurring opinion, with no justice joining any other concurring opinion.⁸⁰ Also, no uniform standard was established

⁷⁸ *Furman*, 408 U.S. at 239–240 (Prisoners successfully challenged the imposition of the death penalty because the punishment had been applied in Georgia in an overly discretionary and discriminatory manner).

⁷⁹ *Id.*

Petitioner in No. 69-5003 was convicted of murder in Georgia and was sentenced to death pursuant to Ga. Code Ann. § 26-1005 (Supp. 1971) (effective prior to July 1, 1969). . . . Petitioner in No. 69-5030 was convicted of rape in Georgia and was sentenced to death pursuant to Ga. Code Ann. § 26-1302 (Supp. 1971) (effective prior to July 1, 1969). . . . Petitioner in No. 69-5031 was convicted of rape in Texas and was sentenced to death pursuant to Tex. Penal Code, art. 1189 (1961). *Certiorari was granted limited to the following question: “Does the imposition and carrying out of the death penalty in [these cases] constitute cruel and unusual punishment in violation of the Eighth and Fourteenth Amendments?”* [. . .] *The Court holds that the imposition and carrying out of the death penalty in these cases constitute cruel and unusual punishment in violation of the Eighth and Fourteenth Amendments. The judgment in each case is therefore reversed insofar as it leaves undisturbed the death sentence imposed, and the cases are remanded for further proceedings.*

Id. (emphasis added) (citations omitted).

⁸⁰ *Id.*; Carol S. Steiker & Jordan M. Steiker, *Sober Second Thoughts: Reflecting on Two Decades of Constitutional Regulation of Capital Punishment*, 109 HARV. L. REV. 355, 362 (1995).

because two of the five justices in the majority favored outright invalidation of the death penalty⁸¹ and the other three left the door open on the issue.⁸² Further, each of the four dissenting justices wrote his own dissenting opinion, although unlike the justices in the majority, some of the dissenting justices joined the opinions of other dissenters.⁸³

As a result, despite the length of the *Furman* decision (the longest decision ever to appear in the U.S. REPORTS), lower courts have not been able to identify the precedent *Furman* intended to advance and ultimately have not used the opinion to deem the death penalty unconstitutional.⁸⁴ Nonetheless, *Furman* did have a broad impact on the country: “[t]he practical effect of the decision was to strike down existing statutes in all states, and removing approximately 629 inmates from death row [. . .] 35 states responded immediately by enacting new death penalty statutes, providing either for a mandatory death sentence, or carefully guided jury discretion.”⁸⁵ Although officials reconsidered and restructured death penalty laws on both national and state levels in order to accommodate the concerns stated in *Furman*,⁸⁶ the amended statutes that emerged did not lighten the amount of death penalty litigation. Because problems arose with

⁸¹ *Furman*, 408 U.S. at 305–06 (Justice Brennan’s concurrence and reasoning for invalidation of the death penalty); *Id.* at 371 (Justice Marshall’s concurrence and opposition to the implementation of the death penalty).

⁸² *Furman*, 408 U.S. at 257 (Justice Douglas’s concurrence); *Id.* at 310 (Justice Stewart’s concurrence); *Id.* at 314 (Justice White’s concurrence).

⁸³ See generally *Furman*, 408 U.S. at 375–470 (exhibiting all the dissenting opinions).

⁸⁴ Steiker, *supra* note 73, at 362.

⁸⁵ The Clark County (Indiana) Prosecuting Attorney, *Capital Punishment Timeline*, <http://www.clarkprosecutor.org/html/death/timeline.htm> (last visited January 17, 2010).

⁸⁶ Steiker, *supra* note 73, at 363 (citation omitted).

the wording in a number of the new statutes, litigation ensued to determine whether the new statutory constructions should be upheld or struck down.⁸⁷

Although the litigation leading up to and including *Furman* demonstrated changing times and a temporary surge toward the complete abolition of the death penalty, the pendulum started to move the other way in *Gregg*. Chief Justice Warren expanded upon the notion that interpretation of the Eighth Amendment should be fluid by stating in a pre-*Furman* case that “[t]he Amendment must draw its meaning from the evolving standards of decency that mark the progress of a maturing society.”⁸⁸ In *Gregg*, the Court agreed generally, stating that “an assessment of contemporary values concerning the infliction of a challenged sanction is relevant to the application of the Eighth Amendment.”⁸⁹ However, the Court continued and ultimately stated that the power to determine these “evolving standards of decency”⁹⁰ is limited because “in a democratic society, legislatures, not courts, are constituted

⁸⁷ See *Gregg v. Georgia*, 428 U.S. 153 (1976) (challenging the imposition of the death penalty under the amended, post-*Furman* laws of Georgia, but ending with the Court upholding Georgia’s statutes); *Roberts v. Louisiana*, 428 U.S. 325, 331, 336 (1976) (striking down a statute that allowed for a mandatory death penalty in various situations); *Woodson v. North Carolina*, 428 U.S. 280, 305 (1976) (also striking down a mandatory death penalty statute); *Jurek v. Texas*, 428 U.S. 262, 276–77 (1976) (upholding a statute that provided sentencer discretion through the use of “special issues”); *Proffitt v. Florida*, 428 U.S. 242, 259–60 (1976) (upholding a statute that guided sentencer discretion through the use of mitigating factors.).

⁸⁸ *Trop v. Dulles*, 356 U.S. 86, 101 (1958) (highlighting the general notion that the Constitution is a living document, although *Trop* is not a death penalty case).

⁸⁹ *Gregg*, 428 U.S. at 173.

⁹⁰ *Trop*, 356 U.S. at 101.

to respond to the will and consequently the moral values of the people.”⁹¹

Therefore, in assessing a punishment selected by a democratically elected legislature against the constitutional measure, *we presume its validity*. We may not require the legislature to select the least severe penalty possible so long as the penalty selected is not cruelly inhumane or disproportionate to the crime involved. And a *heavy burden* rests on those who would attack the judgment of the representatives of the people.⁹²

As evidenced above, the Court has varied on the extent to which it will review the punishment selected by the States in cases that do not deal directly with specific *methods* of execution. However, when indeed faced with determining the constitutionality of specific methods of execution, as it was charged to do in *Baze*, the Court has historically confined its powers and arguably remained within established bounds of judicial review.⁹³

IV. Current Policy

History supports a conclusion that methods of execution and circumstances surrounding the implementation of execution have been challenged for centuries; with each challenge, a precedent was set.⁹⁴

⁹¹ *Gregg*, 428 U.S. at 175–76 (quoting *Furman*, 408 U.S. at 383 (1972) (Burger, C.J., dissenting)).

⁹² *Id.* at 175 (emphasis added).

⁹³ See *Kemmler*, 136 U.S. at 449; *Wilkerson*, 99 U.S. at 136–37.

⁹⁴ *Wilkerson* upheld death by firing squad as a constitutional method of execution. *Wilkerson*, 99 U.S. at 136–37. See also *Kemmler*, 136 U.S. at 449 (upholding electrocution as a constitutional method of execution); *Resweber*, 329 U.S. at 464 (upholding the constitutionality

Likewise, *Baze* set a standard, albeit in a plurality opinion, for a judicial challenge of the method of lethal injection, undoubtedly affecting current policy on the subject. Oklahoma, in 1977, was the first state to adopt lethal injection,⁹⁵ but the United States Supreme Court did not directly address the method in light of the Eighth Amendment until *Baze*. Numerous states voluntarily issued moratoriums on executions by lethal injection while the Supreme Court considered *Baze*. Several states quickly resumed executions after the release of the decision.⁹⁶

Since *Baze* and as of June 1, 2009, sixty-six convicted felons have been executed by lethal injection in the United States.⁹⁷ Such executions went forward because

under the Eighth Amendment of a second attempt of death by electrocution).

⁹⁵ See The Clark County (Indiana) Prosecuting Attorney, *Methods of Execution*, <http://www.clarkprosecutor.org/html/death/methods.htm> (last visited July 20, 2009) (“In 1977, Oklahoma became the first state to adopt lethal injection.”).

⁹⁶ See Bill Mears, *Inmates in Two States Have Dates with Executioner*, CNN, May 2, 2008, <http://www.cnn.com/2008/CRIME/05/02/execution.preview/index.html> (“Mississippi and Georgia plan executions next week, moving quickly after the Supreme Court ruled April 16 that Kentucky’s lethal injection procedures were constitutional.”); Bill Mears, *Georgia Killer Executed After Lethal Injection Moratorium*, CNN, May 6, 2008, <http://www.cnn.com/2008/CRIME/05/06/georgia.execution/index.html> (“William Earl Lynd was the first inmate to die by injection since September, when the U.S. Supreme Court agreed to consider whether the three-drug combination represented cruel and unusual punishment.”).

⁹⁷ See generally Associated Press, *Ohio Performs 1,000 Execution in U.S.*, FOX NEWS, July 21, 2009, <http://foxnews.com/story/0,2933,534254,00.html> (reporting the 1000th execution in the United States since the death penalty was reinstated in 1976); The Clark County (Indiana) Prosecuting Attorney, *U.S. Executions since 1976*, <http://www.clarkprosecutor.org/html/death/usexecute.htm> (last visited July 20, 2009) (providing a chronologically organized chart with the names of convicts executed since 1976 and by what method the executions were carried out).

most of the states that employ lethal injection as the method of execution follow the three-drug protocol addressed in *Baze*.⁹⁸ The Court specifically commented on its probable treatment of future challenges to methods that mirror Kentucky's protocol: "A State with a lethal injection protocol substantially similar to the protocol we uphold today *would not create a risk* that meets this standard."⁹⁹ "This standard" refers to what a convict must prove to successfully show that a lethal injection protocol violates the Eighth Amendment: that the method "creates a demonstrated risk of severe pain. He must show that the risk is substantial when compared to the known and available alternatives."¹⁰⁰

The most recent decision that applied *Baze* came from the Sixth Circuit Court of Appeals on July 2, 2009, in *Harbison v. Little*.¹⁰¹ Harbison, a death row inmate, argued that "the lethal injection protocol utilized by [Tennessee] violates his Eighth Amendment rights because it involves the unnecessary and wanton infliction of pain."¹⁰² However, the Sixth Circuit rejected the argument because Tennessee, like Kentucky, employs a three-drug protocol for carrying out lethal injection.¹⁰³ As a result, the court held:

Given the direction in *Baze* that a protocol substantially similar to Kentucky's would not

⁹⁸ *Baze v. Rees*, 128 S. Ct. 1520, 1527 (2008) (noting that "at least 30 [States] (including Kentucky) use the same combinations of three drugs in their lethal injection protocols") (citation omitted).

⁹⁹ *Id.* at 1537 (emphasis added).

¹⁰⁰ *Id.*

¹⁰¹ *Harbison v. Little*, No 07-6225, 2009 U.S. App. LEXIS 14742, at *1 (6th Cir. July 2, 2009).

¹⁰² *Id.* at *3.

¹⁰³ *Id.* at *4 ("The three drugs utilized are sodium thiopental, pancuronium bromide, and potassium chloride.") (citation omitted). Kentucky uses the same three drugs.

create a risk that violates the constitutional standard set forth in the Court's opinion, Tennessee's protocol must be upheld because *Baze* addressed the same risks identified by the trial court, but reached the conclusion that they did not rise to the level of a constitutional violation.¹⁰⁴

The Sixth Circuit's actions demonstrate the policy impact of *Baze*. Like many other states that halted and examined lethal injection protocols while *Baze* was pending, Tennessee ultimately retained its three-drug protocol because the method did not violate the Eighth Amendment ban on "cruel and unusual punishments."¹⁰⁵ As this recent action demonstrated, the lower courts have employed *Baze* to uphold the lethal injection protocols used by the states, building on the foundation of policy that has historically recognized the states' abilities to choose a specific procedure for carrying out death sentences.

V. Analysis and Evaluation¹⁰⁶

The Court in *Baze* correctly held that the lethal injection method of execution did not violate the Eighth Amendment. However, the substantial risk standard approved by the plurality significantly broadened the original intent of cruel and unusual punishments because no substantial risk standard is stated within the text of the Constitution nor has one been previously contemplated by

¹⁰⁴ *Id.* at *11–12. The court referred to the Supreme Court's statement in *Baze*: "A State with a lethal injection protocol substantially similar to the protocol we upheld today would not create a risk that meets this standard." *Id.* at *8–9 (citation omitted).

¹⁰⁵ *See id.* at *5

¹⁰⁶ Before proceeding to the Analysis Section, I want to state that the analysis is based upon my research and understanding on the topic as a first-year law student. The conclusions stated in this section reflect my opinion.

the Court. As a result, the addition of a substantial risk assessment (requiring the petitioner to prove that “the State’s lethal injection protocol creates a demonstrated risk of severe pain [and] . . . that the risk is substantial when compared to the known and available alternative”)¹⁰⁷ only complicates the purpose and intention of the Eighth Amendment and adds an unnecessary and arbitrary element of analysis. Further, the establishment of a substantial risk standard departs from the holdings of previous cases that sustained other methods of execution.¹⁰⁸ Those holdings were direct and to the point, concisely explaining the purpose of the Eighth Amendment’s ban on cruel and unusual punishments.¹⁰⁹ In summary, the basic purpose of the Eighth Amendment is simple and was accurately and succinctly stated by Justice Thomas in his concurring opinion: “[A] method of execution violates the *Eighth Amendment* only if it is *deliberately designed to inflict pain*.”¹¹⁰

As an example of this simple purpose, in *Wilkerson*, the Court rejected the argument that death by firing squad violated the Fourteenth Amendment’s Due Process Clause protection from cruelty because it did not fall into the category of punishment in which pain and suffering were “superadded” to the execution.¹¹¹ Similarly, the Court explained in *Kemmler* that the meaning of “cruel,” as used in the Eighth Amendment, referred to punishment involving “torture or lingering death.”¹¹²

In both of these precedent-setting cases, the Court relied on Fourteenth Amendment Due Process to declare the methods of execution constitutional and consistently

¹⁰⁷ *Baze v. Rees*, 128 S. Ct. 1520, 1537 (2008).

¹⁰⁸ *See Kemmler*, 136 U.S. at 449; *Wilkerson*, 99 U.S. at 136-37.

¹⁰⁹ *See Kemmler*, 136 U.S. at 449; *Wilkerson*, 99 U.S. at 136-37.

¹¹⁰ *Baze*, 128 S. Ct. at 1556 (Thomas, J., concurring) (emphasis added).

¹¹¹ *Wilkerson*, 99 U.S. at 135.

¹¹² *Kemmler*, 136 U.S. at 447.

understood the Eighth Amendment as “forbidding *purposely* tortuous punishments.”¹¹³ Interestingly, the plurality opinion in *Baze* briefly cited those important cases in the context of its discussions of the purpose of the Eighth Amendment: the prohibition against cruel and unusual punishments intended to guard against the infliction of additional pain. The plurality, however, did not actually incorporate the Court’s previous holdings and instead left the discussion as an isolated historical overview on the subject.¹¹⁴ Had the Court truly used the cases for its examinations of the Eighth Amendment, the Court would have realized that the establishment of a substantial risk assessment scheme could not be reconciled with the analysis in these long-revered and respected cases.¹¹⁵ Therefore, just as Justice Thomas reasoned in his concurrence, the substantial risk standard has no basis in the historical understanding of the Eighth Amendment or in the applicable method-of-execution cases previously discussed.¹¹⁶

The Eighth Amendment originated from a similar provision in the English Bill of Rights of 1688,¹¹⁷ and its subsequent history can be succinctly described as follows:

The path by which the phrase “cruel and unusual punishments” has come into our law is well known. It first appeared in the English Bill of

¹¹³ *Baze*, 128 S. Ct. at 1560 (Thomas, J., concurring) (emphasis added).

¹¹⁴ *See Baze*, 128 S.Ct. at 1530.

¹¹⁵ *See Kemmler*, 136 U.S. at 436, 449; *Wilkerson*, 99 U.S. at 130, 136-37.

¹¹⁶ *Baze*, 128 S. Ct. at 1556 (“This standard . . . finds no support in the original understanding of the Cruel and Unusual Punishments Clause or in previous method-of-execution cases . . .”).

¹¹⁷ *Resweber*, 329 U.S. at 463. *See generally* William H. Danne, Jr., Annotation, *Prison Conditions as Amounting to Cruel and Unusual Punishment*, 51 A.L.R.3d 111, 130-34 (1973) (reviewing the history of “cruel and unusual punishments”).

Rights of 1688. It formed a part of the Virginia Declaration of Rights adopted in 1776. James Madison placed it in the constitutional amendments he drafted in 1789 and it was approved by Congress with little debate. It was incorporated into the Constitution in 1791 as part of the eighth amendment.¹¹⁸

Although there appeared to be little debate on the amendment, the Framers of the Constitution intended to use the Eighth Amendment to limit legislative bodies from imposing torturous punishments.¹¹⁹ “Like other parts of the Bill of Rights, this amendment was intended to allay the doubts of those who feared that the new federal government, unchecked by specific constitutional limitations, might ride roughshod over personal liberties.”¹²⁰ Therefore, the inclusion of the amendment in

¹¹⁸ Joseph E. Browdy & Robert J. Saltzman, Note, *The Effectiveness of the Eighth Amendment: An Appraisal of Cruel and Unusual Punishment*, 36 N.Y.U. L. REV. 846 (1961) (footnotes omitted).

¹¹⁹ *Baze*, 128 S. Ct. at 1557–58 (Thomas, J., concurring).

¹²⁰ Browdy, *supra* note 111, at 846 (footnote omitted); see also James S. Campbell, *Revival of the Eighth Amendment: Development of Cruel-Punishment Doctrine by the Supreme Court*, 16 STAN. L. REV. 996 (1964).

That the eighth amendment prohibits, at a minimum, the infliction of “inhuman and barbarous” punishments is clear from the few clues we now have about the purpose of including it in the Bill of Rights At the Massachusetts convention Mr. Holmes pointed out that under the Constitution the Congress was “nowhere restrained from inventing the most cruel and unheard-of punishments and annexing them to crimes; and there is no constitutional check on them, but that *racks* and *gibbets* may be amongst the most mild instruments of discipline.”

Id. at 997 (footnotes omitted).

the Constitution had the specific purpose of curtailing the torturous and barbarous punishments that were inflicted upon the people by English monarchs.¹²¹

Accordingly, “[e]xpressions in the first congress confirm the view that the cruel and unusual punishments clause was directed at prohibiting certain *methods* of punishment.”¹²² These were to be prohibited because they were unquestionably torturous and clearly meant to inflict unnecessary pain and suffering. No risk assessment scheme was contemplated as a necessary part of the analysis because the prohibition of cruel and unusual punishments was simply implemented by the Framers of the Constitution to prohibit “that which is excessive.”¹²³

Returning to the plurality’s opinion in *Baze*, the cases that the plurality cited in support of its substantial risk standard do not address the constitutionality of the execution methods; rather, the cases discuss the Eighth Amendment in relation to the risk of injury to an inmate while imprisoned.¹²⁴ Although such situations warrant the application of the Eighth Amendment, the deprivation of water or food differs significantly from the slight prick of a sterile needle during the administration of lethal injection. The plurality made no attempt at distinguishing the two situations, but instead simply stated that “[o]ur cases recognize that subjecting individuals to a risk of future harm—not simply actually inflicting pain—can qualify as cruel and unusual punishment.”¹²⁵ In neglecting to distinguish the situations, the plurality delivered a decision

¹²¹ See Anthony F. Granucci, “*Nor Cruel and Unusual Punishments Inflicted*”: *The Original Meaning*, 57 CAL. L. REV. 839, 840–41 (1969).

¹²² *Id.* at 842 (emphasis added).

¹²³ *Id.* (citing *O’Neil v. Vermont*, 144 U.S. 323, 340 (1892) (Field, J., dissenting)).

¹²⁴ See e.g., *Farmer v. Brennan*, 511 U.S. 825 (1994); *Helling v. McKinney*, 509 U.S. 25 (1993).

¹²⁵ *Baze*, 128 S. Ct. at 1530.

with an unsupported and unjustified substantial risk standard because the cases used to support the standard do not coincide with the situation in which the standard will actually be applied (during the implementation of the death penalty). In essence, the Court compared apples to oranges. Because the plurality then proceeded to establish a standard based on these incompatible scenarios, the substantial risk standard is neither correct nor appropriate.

To further show how the plurality supported the substantial risk standard, consider the main case cited: *Helling v. McKinney*.¹²⁶ The case concerned an inmate's exposure to tobacco smoke and the potential health risk caused to the inmate by such exposure.¹²⁷ The Court held that a claim for relief for this health risk could be sought under the Eighth Amendment.¹²⁸ However, to apply the concept of substantial risk to the instant matter, the Court banked on the statement in *Helling* statement that a risk must be "*sure or very likely* to cause serious illness and needless suffering."¹²⁹ The standard, as applied to the *prison condition* situation in *Helling*, adequately resolved the issue. When applied to the method-of-execution context, however, the holding expands the original intent of the Eighth Amendment. It does so because it requires the courts to assess the execution methods of states for *any potential risk* of harm.

The difficulty with using *Helling* is that the case made reference to a *condition* of confinement, not to the

¹²⁶ *Helling*, 509 U.S. 25 (1993).

¹²⁷ *Id.* at 27–28.

¹²⁸ *Id.* at 35 (“We affirm the Court of Appeals that McKinney states a cause of action under the Eighth Amendment by alleging that petitioners have, with deliberate indifference, exposed him to levels of ETS that pose an unreasonable risk of serious damage to his future health.”).

¹²⁹ *Baze*, 128 S. Ct. at 1531 (quoting *Helling*, 509 U.S. at 33) (emphasis in original).

punishment of confinement itself.¹³⁰ This is problematic when one recalls that the Eighth Amendment bans cruel and unusual *punishments*, not *conditions* of punishments.¹³¹ “At the time the Eighth Amendment was ratified, the word ‘punishment’ referred to the penalty imposed for the commission of a crime.”¹³² “Punishments” include fines, penalties, confinement, and sentences imposed.¹³³ No historical evidence indicates that the Framers of the Constitution intended to consider anything other than punishments for Eighth Amendment purposes.¹³⁴ Therefore, no evidence proves that the Framers considered conditions as a possible subject of cruel and unusual punishments.¹³⁵

In this context, the Court’s application of such a standard is troublesome, especially considering that the instant matter involved a method of execution, not a condition of confinement or even confinement itself. In essence, the Court disregarded the simple intent of the Eighth Amendment, as alluded to in the prior method-of-execution cases: “[T]he Eighth Amendment is aimed at *methods of execution purposely designed to inflict pain*.”¹³⁶

Further, because of the plurality’s opinion, two conflicting standards to assess the constitutionality of methods of execution now arguably exist: 1) An assessment of whether punishments clearly involve a purposeful infliction of pain or “something more than the

¹³⁰ *Helling*, 509 U.S. at 37–38 (Thomas, J., dissenting) (citations omitted).

¹³¹ *Id.* (Thomas, J., dissenting).

¹³² *Id.* at 38 (Thomas, J., dissenting) (citations omitted).

¹³³ See *id.* (Thomas, J., dissenting) (quoting BLACK’S LAW DICTIONARY 1234 (6th ed. 1990)).

¹³⁴ See *id.* at 38–39 (Thomas, J., dissenting) (citations omitted).

¹³⁵ *Helling*, 509 U.S. at 38–39 (Thomas, J., dissenting) (citations omitted).

¹³⁶ *Baze*, 128 S. Ct. at 1559 (Thomas, J., concurring) (emphasis added).

mere extinguishment of life”¹³⁷ as described in historical case law and 2) the “substantial risk” assessment as stated in *Baze*. The task of assessing whether a method *purposely* inflicts pain is completely different from determining whether a method of execution “creates a substantial *risk* of wanton and unnecessary infliction of pain, torture, or lingering death”¹³⁸ or provides “a ‘substantial *risk* of serious harm,’ an ‘objectively intolerable *risk* of harm.’”¹³⁹ This second method only serves to confuse and complicate an assessment that was intended by the Framers of the Constitution to be simple.

Further, an assessment of a “substantial risk” of harm is far from an objective standard because one person’s definitions of both “substantial” and “risk” will almost always differ from the next person’s definition. On the other hand, a determination of whether a method of execution purposefully inflicts unnecessary and excessive pain is much more black and white. In fact, it could be argued that lethal injection itself was designed for the very reason of ensuring that the convicted felon would not feel any pain during the execution process, thereby eliminating the argument that any purposeful or unnecessary pain is inflicted.

Finally on this point, the plurality in *Baze* admitted that some levels of pain are inherent with various execution methods.¹⁴⁰ The plurality also said that this inherent possibility (a “risk” of pain) is not grounds for qualifying

¹³⁷ *In re Kemmler*, 136 U.S. 436, 447 (1890).

¹³⁸ *Baze v. Rees*, 217 S.W.3d 207, 209 (Ky. 2006) (emphasis added).

¹³⁹ *Baze*, 128 S. Ct. at 1531 (citation omitted) (emphasis added).

¹⁴⁰ *Id.* at 1529 (“Some risk of pain is inherent in any method of execution—no matter how humane—if only from the prospect of error in following the required procedure. It is clear, then, that the Constitution does not demand the avoidance of all risk of pain in carrying out executions.”)

an execution method as cruel and unusual.¹⁴¹ Therefore, that very admission by the plurality severely complicates, if not completely contradicts, its substantial risk assessment scheme.

Additionally, the plurality opinion in *Baze* may only exacerbate the lethal injection debate as it will most likely give rise to yet more litigation on the subject.¹⁴² The opinion inadvertently opens the door for frivolous claims from convicts for the possible causes of substantial risk, including human error, lingering death, and the actual act of administering lethal injection. In essence, the creation of a substantial risk standard complicated the much simpler standard established by previous cases and litigation will quickly ensue to take advantage of the expanded standard. The substantial risk standard unwarrantedly confuses the original purpose of the Eighth Amendment, which is simply to prohibit punishments that are clearly excessive.¹⁴³

Further, the *Baze* plurality gave no definition of “substantial,” nor did the plurality give any instruction on how to address such inquiries.¹⁴⁴ As a result, if the standard is followed, the lower courts will have to establish their own definitions for the substantial risk standard, actions which will undoubtedly be challenged by yet more litigation.

¹⁴¹ *Id.* at 1531 (“Simply because an execution method may result in pain, either by accident or as an inescapable consequence of death, does not establish the sort of ‘objectively intolerable risk of harm’ that qualifies as cruel and unusual.”).

¹⁴² *See id.* at 1562 (Thomas, J., concurring).

¹⁴³ Granucci, *supra* note 121, at 842 (citing *O’Neil v. Vermont*, 144 U.S. 323, 340 (1892) (Field, J., dissenting)).

¹⁴⁴ *Baze*, 128 S. Ct. at 1562 (Thomas, J., concurring); *see also* *Farmer v. Brennan*, 511 U.S. 825, 834 n.3 (1994) (referring to *Helling’s* holding regarding the risk of injury, this subsequent case said that “[a]t what point a risk of inmate assault becomes sufficiently substantial for Eighth Amendment purposes is a question this case does not present, and we do not address it”).

Consequently, rather than following the precedents set out in *Wilkerson* and *Kemmler*, the Court stretched an obscure, risk-based standard and forced it to fit the method-of-execution issue in *Baze*. The plurality almost seemed to intentionally avoid writing a simple opinion that would express the true, concise, and historically established standard of analysis used to determine whether a punishment is cruel and unusual. That standard simply prohibits the purposeful infliction of pain. As a result, the plurality's substantial risk standard does nothing more than open the door to future litigation on methods of execution and the implementation of the death penalty in general, "encumber[ing] [the death penalty] with unwarranted restrictions neither contained in the text of the Constitution nor reflected in two centuries of practice under it."¹⁴⁵

VI. Conclusion

Baze correctly held that Kentucky's lethal injection protocol did not violate the Eighth Amendment. The plurality's implementation of a substantial risk standard for measuring a violation of the Eighth Amendment, however, severely complicates the Eighth Amendment's intent to prohibit torture and "inhuman and barbarous"¹⁴⁶ punishments that involve "something more than the mere extinguishment of life."¹⁴⁷ Although the plurality opinion in *Baze* is not authoritative and did not infringe on the states' abilities to choose a specific procedure for administering a method of execution, the opinion will undoubtedly affect the method of execution policy decisions of the states.

Thus, the substantial risk standard adds unnecessary elements to the analysis of the constitutionality of a method

¹⁴⁵ *Baze*, 128 S. Ct. at 1555 (Scalia, J., concurring) (citation omitted).

¹⁴⁶ *Kemmler*, 136 U.S. at 447.

¹⁴⁷ *Id.*

of execution, requiring the courts to assess any proffered alternative procedure and further justify the reasons for adhering to any current method of execution.¹⁴⁸ The *Baze* plurality effectively diluted the standard of cruel and unusual punishments as intended by Framers of the Constitution, stated in the text of the Eighth Amendment and supported by the Court's previous decisions in method-of-execution cases. Simply, punishments must be intentionally designed to inflict pain worse than death itself in order to violate the Eighth Amendment. In consideration of this straightforward purpose, a more complicated standard only misinterprets the Framers' original intention for the amendment, opening the door to a never-ending influx of unnecessary and costly litigation.

¹⁴⁸ See *Baze*, 128 S. Ct. at 1532.

STUDENT CASE COMMENTARY

**CRAWFORD MEANS WHAT IT SAYS:
THE BIRTH OF THE MELENDEZ-DIAZ
OBJECTION**

Melendez-Diaz v. Massachusetts, 129 S. Ct. 2527 (2009).

*Danielle Greer*¹

I. Summary

In *Melendez-Diaz v. Massachusetts*, with Justice Scalia writing the opinion, the Supreme Court considered the issue of whether affidavits reporting the results of forensic analysis connecting the defendant to an illegal substance are testimonial and therefore subject to the Confrontation Clause of the Sixth Amendment.² The Court held in *Pointer v. Texas* that the Confrontation Clause applies to all criminal prosecutions.³ The statute derives its authority from the Fourteenth and the Sixth Amendments.⁴ This Clause ensures defendants the right to confront adverse witnesses.⁵ The Court's holding in *Crawford v. Washington* established the rule that testimonial statements are subject to the Confrontation Clause.⁶ Therefore, the defendant has the right to confront any witness "who

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² U.S. CONST., amend. XI.

³ *Pointer v. Texas*, 380 U.S. 400 (1965) (holding that a defendant should enjoy the right to confront all the witnesses against him).

⁴ *Melendez-Diaz v. Massachusetts*, 129 S. Ct. 2527, 2529 (2009); see also *Pointer*, 380 U.S. at 404. See generally U.S. CONST., amend. VI.

⁵ See generally U.S. CONST., amend. VI.

⁶ *Crawford v. Washington*, 541 U.S. 36, 61-63 (2004).

‘bear[s] testimony’ against him.”⁷ If the witness is unavailable for trial and the defendant has not had an opportunity to cross-examine that witness, the testimony is deemed inadmissible.⁸

In *Crawford*, the Court explicitly stated that “ex parte in-court testimony” that “would lead an objective witness to reasonably believe that the statement would be” used later at trial is considered a testimonial statement.⁹ The Court listed certain statements that it considered testimonial, including affidavits, but explained that these statements can come in various forms.¹⁰ However, the testimonial issue became unclear when the Massachusetts Court of Appeals in *Commonwealth v. Melendez-Diaz*, bound by precedent of the Supreme Judicial Court of Massachusetts, held that authors of certificates of forensic analysis are not subject to confrontation under the Sixth Amendment.¹¹ The Supreme Judicial Court of Massachusetts denied review, and the United States Supreme Court granted certiorari.¹² In a five-to-four plurality decision, the Court reversed and remanded *Commonwealth v. Melendez-Diaz*, and held that certificates containing forensic analysis are testimonial and the admission of such evidence without the ability to cross-examine the author violates the Confrontation Clause of the Sixth Amendment.¹³

⁷ *Id.* at 68-69.

⁸ *Id.* at 51.

⁹ *Id.* at 51-52.

¹⁰ *Id.*

¹¹ *Commonwealth v. Melendez-Diaz*, 69 Mass. App. Ct. 1114 (2007).

¹² *Melendez-Diaz v. Massachusetts*, 129 S. Ct. 2527, 2529 (2009).

¹³ *Melendez-Diaz*, 129 S. Ct. at 2529 (hereinafter “*Melendez-Diaz*”).

II. Background

This case began as a Massachusetts state court drug trial.¹⁴ Three men were arrested after police received a tip that an employee at Kmart frequently exhibited suspicious activity.¹⁵ Following up on this tip, the police monitored Kmart until they witnessed the reported activity.¹⁶ The activity suggested that the employee was leaving Kmart to sell drugs and often returned a short time later.¹⁷ Working under this assumption, the police searched the employee when he returned to Kmart and found drugs in his possession.¹⁸ Believing the substance was cocaine, the officers arrested all three men.¹⁹ During transit to jail, the officers noticed two of the three men were moving and fidgeting in the backseat of the car.²⁰ They ordered the men to stop.²¹ After the men were booked at the police station, the officers found a plastic bag with nineteen smaller bags of cocaine in it inside the police car.²² Because he was one of the two men fidgeting in the backseat of the police car during the transport, the officers assumed that Melendez-Diaz hid the drugs in the police car to avoid additional charges.²³ The officers charged the defendant, Melendez-Diaz, with distributing and trafficking cocaine.²⁴

During trial, the prosecution sought to admit three certificates of forensic analysis that identified the substance

¹⁴ *Id.* at 2530.

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Melendez-Diaz*, 129 S. Ct. at 2530.

¹⁹ *Id.*

²⁰ *Id.*

²¹ *Id.*

²² *Id.*

²³ *Melendez-Diaz*, 129 S. Ct. at 2530.

²⁴ *Id.* at 2531-32.

found at the scene as cocaine.²⁵ The defendant objected to the admission of these certificates absent an opportunity to cross-examine the author, citing *Crawford*.²⁶ The trial judge overruled this objection, and subsequently the jury found Melendez-Diaz guilty.²⁷

III. Court's Conclusions and Rationale

The outcome of this case turned on whether the certificates of forensic analysis were testimonial statements within the meaning of *Crawford*. However, the Court also spent considerable time addressing each of the State's and the dissent's arguments. Justice Scalia, writing for the majority, explained that in *Crawford* the Court listed affidavits in the "core class of testimonial statements."²⁸ Although the State argued that a certificate is different from an affidavit, Justice Scalia referred to *Black's Law Dictionary* and rejected this argument.²⁹ In *Black's Law Dictionary*, certificates are defined as "declaration[s] of facts written down and sworn to by the declarant before an officer authorized to administer oaths."³⁰ Justice Scalia further explains that under *Crawford*, these certificates are a "solemn declaration or affirmation made for the purpose of establishing or proving some fact."³¹ The Court also relied on its decision in *Davis v. Washington*, finding that the certificates would do "exactly what a witness would do

²⁵ *Id.* at 2532.

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Crawford*, 541 U.S. at 51-52.

²⁹ *Melendez-Diaz*, 129 S. Ct. at 2532.

³⁰ BLACK'S LAW DICTIONARY 62 (8th ed. 2004).

³¹ *Melendez-Diaz*, 129 S. Ct. at 2532.

on direct examination.”³² On those facts, the Court concluded the certificates were testimonial statements.³³

The State advanced many arguments, some of which Justice Kennedy reiterated in his dissent.³⁴ However, each was unpersuasive to the majority of the Court. Nevertheless, six of the State’s arguments deserve notice. The first was that the certificate was not an accusatory witness.³⁵ Citing the Confrontation Clause of the Sixth Amendment, Justice Scalia asserted that the Clause only contemplated two classes of witnesses: a beneficial witness and an adverse witness.³⁶ The certificate certainly was not beneficial; therefore, it was adverse and subject to the Confrontation Clause.³⁷

The second argument was that neither the certificates nor their authors were conventional witnesses for three reasons: the forensic analysts only observed near-contemporaneous events; they did not observe the crime or anything related to it, and the certificates were not provided in response to interrogation.³⁸ The State argued that only conventional witnesses are subject to the Confrontation Clause and explained that the forensic analysts are not conventional witnesses.³⁹ In analyzing the confrontation issue, the focus is on the substance of the testimony, not the actual witness.⁴⁰ Therefore, the Court rejected the argument that only witnesses who observe non-

³² *Id.* at 2542 (“It is unlikely that defense counsel will insist on live testimony whose effect will be merely to highlight rather than cast doubt upon the forensic analysis.”)

³³ *Id.* at 2523-26.

³⁴ See *Melendez-Diaz*, 129 S. Ct. at 2543-61 (Kennedy, J., dissenting) (accepting some of the State’s arguments).

³⁵ 129 S. Ct. at 2534.

³⁶ *Id.* at 2535.

³⁷ *Melendez-Diaz*, 129 S. Ct. at 2534.

³⁸ *Id.* at 2534-36.

³⁹ *Id.*

⁴⁰ *Id.*

contemporaneous events are subject to the Confrontation Clause.⁴¹ Additionally, nothing about the fact that the certificates were completed almost a week after the tests were conducted cures the statement of its testimonial nature.⁴²

The fact that the forensic analyst did not observe the crime adds nothing to the issue of whether the statement is testimonial. The proposition that only witnesses who directly observe the crime are subject to the Confrontation Clause is without supporting authority and if implemented, would also exempt expert witnesses.⁴³ The State further argued that the forensic analysts' certificates were not testimonial in nature because the certificates were not provided in response to interrogation.⁴⁴ This argument was also rejected by the Court, primarily because implementing that rule would exclude another important class of witnesses: all witness who voluntarily gave their statements to police.⁴⁵ In the interests of creating a workable rule, the Court had to reject the State's argument that only conventional witnesses are subject to the Confrontation Clause.

The State's third argument was that the Confrontation Clause does not apply to scientific testing.⁴⁶ The State argued that because the Clause was designed to prevent manipulation and distortion prone to recollection testimony, it did not apply to a purely neutral, scientific testing.⁴⁷ However, the Court provided extensive evidence that scientific data is prone to human error and suggested that forcing the analyst to testify will deter other analysts

⁴¹ *Id.*

⁴² *Melendez-Diaz*, 129 S. Ct. at 2534-36.

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.* at 2536.

⁴⁷ *Melendez-Diaz*, 129 S. Ct. at 2536.

from committing fraud or making careless mistakes.⁴⁸ The Court also noted that of all criminal convictions eventually overturned, sixty percent of the defendants were convicted with incorrect forensic evidence that was later proven invalid.⁴⁹

The State's fourth argument was that at common law these forensic analysts' certificates were considered business records and accepted without objection.⁵⁰ The Court insinuated that this argument misses the issue.⁵¹ It is not the document's status as a business record that is dispositive, but the question of whether it was made in anticipation of trial.⁵² In the dissent, Justice Kennedy agreed with the State's argument that analysts' certificates in general have customarily been accepted without objection and cites one situation where a clerk certificate, prepared in anticipation of trial, was admitted without being subject to the Confrontation Clause.⁵³ However, the Court distinguishes the clerk's certificate from that of the forensic analyst: the clerk's certificate only certifies that a document is correct.⁵⁴ The clerk has no authority to add anything substantive or opine in any way on this certificate.⁵⁵ This is in contrast to a forensic analyst's certificate that is used as *prima facie* evidence of a defendant's guilt.⁵⁶ The Court did not accept the State's argument that these cases are analogous.⁵⁷ In fact, these cases are easily distinguishable.⁵⁸

⁴⁸ *Id.* at 2536-37.

⁴⁹ *Id.* at 2534.

⁵⁰ *Id.* at 2538.

⁵¹ *Id.* at 2838-41.

⁵² *Melendez-Diaz*, 129 S. Ct. at 2538-41.

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.* at 2539.

⁵⁶ *Id.*

⁵⁷ *Melendez-Diaz*, 129 S. Ct. at 2539.

⁵⁸ *Id.*

The fifth argument asserted by the State was that the Confrontation Clause should not apply because the defendant could have subpoenaed the analyst.⁵⁹ The subpoena power derives from the Compulsory Process Clause, but the Court retorted that this Clause is no substitute for the Confrontation Clause.⁶⁰ The latter imposes on the prosecution to present its witnesses, but requiring the defendant to present adverse witnesses would leave him with no remedy if those witnesses refused to appear or were unavailable.⁶¹ Additionally, this would shift the State's burden to present its witnesses to the defendant.⁶²

The last argument the State asked the Court to consider was the effect this ruling would have on the already strained criminal justice system.⁶³ The State predicted that defense attorneys, who are zealously advocating for their clients, would always request that analysts come to court.⁶⁴ That, in turn, would increase costs for the government and place an undue burden on the analysts.⁶⁵ The Court responded to this argument by analogizing this potential burden with the burden of a jury trial and the privilege against self-incrimination: although burdensome, "they are constitutional protections that we cannot disregard."⁶⁶

The Court also discussed notice-and-demand statutes that require a defendant to give notice of intent to use the analyst's report.⁶⁷ In his dissent, Justice Kennedy argued that these statutes face invalidation in light of the

⁵⁹ *Id.*

⁶⁰ *Id.* at 2540.

⁶¹ *Id.*

⁶² *Melendez-Diaz*, 129 S. Ct. at 2540.

⁶³ *Id.* at 2540-41.

⁶⁴ *Id.*

⁶⁵ *Id.*

⁶⁶ *Id.*

⁶⁷ *Melendez-Diaz*, 129 S. Ct. at 2541-42.

Court's decision because they are burden-shifting statutes.⁶⁸ Similar to the State, this argument is still emphasizing the burden that this rule will place on the criminal justice system. Again, the argument failed to move a majority of the Court.⁶⁹ The Court explained that "the defendant always has the burden" to raise the Confrontation Clause objection.⁷⁰ If the defendant ever fails to raise this burden, the issue is lost on appeal.⁷¹ The Court further explained that the simplest form of notice-and-demand statutes only govern the period within which a defendant must respond, and that is constitutional.⁷² The Court noted that it was only opining on the legality of notice-and-demand statutes similar to the one described.⁷³

Despite the State's many arguments, the Court maintained that the forensic certificates were testimonial.⁷⁴ As such, the trial court should not have admitted the evidence without the analyst's trial testimony or a defendant having a previous opportunity to cross-examine.⁷⁵ The Court's decisions in *Crawford* and *Davis* dictate that the inability to cross-examine an adverse witness is a violation of the defendant's constitutional rights, and the Court adhered to that precedent.

IV. Analysis

Although the State and Justice Kennedy had compelling arguments, the Court's decision in *Melendez-Diaz* was directly in line with precedent. In *Crawford* and

⁶⁸ *Id.* at 2957.

⁶⁹ *Id.* at 2541-42.

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Melendez-Diaz*, 129 S. Ct. at 2541-42.

⁷³ *Id.*

⁷⁴ *Id.* at 2532.

⁷⁵ *Id.*

Davis, the Court set precedent that the Court has an interest in following, absent overwhelming policy concerns. These cases posed the most daunting obstacles to the State's arguments because if the holdings applied, there was no question of whether the certificates were testimonial and subject to the Confrontation Clause. Realizing this, the State tried to distinguish *Crawford* and *Davis* from *Melendez-Diaz*, but offered only one distinguishable fact: that the questionable testimony in *Melendez-Diaz* was a certificate, as opposed to the verbal testimony at issue in *Crawford* and *Davis*.⁷⁶ The Court rightfully rejected this argument, explaining that the Confrontation Clause only anticipates two classes of witnesses: beneficial and adverse.⁷⁷ The certificates were clearly adverse to the defendant because this was the only evidence the prosecution had that proved the substance in question was cocaine.⁷⁸

Additionally, the factual distinction that the State and Justice Kennedy asserted is not supported by case law. In *Crawford*, the Court explicitly stated that "various formulations of . . . affidavits" are in the "core class of testimonial statements."⁷⁹ However, the State argued that the forensic analyst's certificate was not an affidavit and should not be subject to the confrontation requirement.⁸⁰ The problem with this argument is twofold. First, the Court in *Crawford* explained that affidavits come in various forms.⁸¹ Calling the document a certificate does not dispose of the issue. Second, the State neglected to address the fact that it is the content that determines whether the

⁷⁶ *Id.* at 2534.

⁷⁷ *Melendez-Diaz*, 129 S. Ct. at 2534.

⁷⁸ *Id.* at 2531.

⁷⁹ *Crawford*, 541 U.S. at 51-52.

⁸⁰ *Melendez-Diaz*, 129 S. Ct. at 2532.

⁸¹ *Id.* at 2531-21.

certificate is testimonial.⁸² Deferring to *Crawford*, the Court held that the certificates were the functional equivalent of affidavits because they were adverse to the defendant and were made in anticipation of litigation.⁸³ Because of the well-established precedent, the Court had little choice other than to render this class of evidence subject to the Confrontation Clause. To rule otherwise would question the status of those decisions and further complicate the law in this area.

Nevertheless, the State brought up two persuasive issues that the Court will likely see again: notice-and-demand statutes and emergence of “the *Melendez-Diaz* objection.”⁸⁴ The Court implied that very basic notice-and-demand statutes are constitutional, although this is likely dicta.⁸⁵ However, the Court explicitly stated that this opinion only extended to the simplest type of notice-and-demand statutes, refusing to express an opinion on the actual “burden-shifting” statutes.⁸⁶ This suggests that the Court would find that statutes imposing more than simple, procedural requirements are unconstitutional. If the precise issue on notice-and-demand statutes ever comes before the Supreme Court, the *Melendez-Diaz* decision will undoubtedly inform the Court’s decision.

Justice Kennedy warned that the Court’s holding was too expansive and unnecessarily gave defendants an unwarranted windfall.⁸⁷ He predicted that once defense attorneys were aware of *Melendez-Diaz*’s implications, upon objection, forensic analysts would have to testify

⁸² *Id.*

⁸³ *Crawford*, 541 U.S. at 52.

⁸⁴ *Melendez-Diaz*, 129 S. Ct. at 2541.

⁸⁵ *Id.* at 2541 (“[W]hat we have referred to as the ‘simplest form of notice and demand statutes,’ ... is constitutional”).

⁸⁶ *Id.*

⁸⁷ *Id.* at 2557.

because the attorneys would relentlessly use it as a tactic.⁸⁸ This would become known as the *Melendez-Diaz* objection.⁸⁹ This point is valid, and the situation is likely to come about. Although the majority dismissed this argument, it is highly likely that at least the great defense attorneys will take advantage of this requirement, forcing the prosecution to produce its witnesses. However, it is an overarching public concern that mandates this risk: the constitutional right of a defendant to have a fair trial. Requiring all forensic analysts to come to court would undoubtedly place a strain on the system, but that concern is markedly insufficient to warrant divesting a defendant of his constitutional rights.

V. Conclusion

The Court's ruling in *Melendez-Diaz* made it clear that in criminal trials the admission of forensic analysts' certificates into evidence is subject to the Confrontation Clause. Pre-*Melendez-Diaz*, the analysts' certificates had generally been admitted into evidence with little or no objection in states across the United States. Because the Court determined that forensic analysts' certificates are subject to Confrontation Clause scrutiny, the analysts will now be required to give direct testimony. If the Court follows the dicta in *Melendez-Diaz* regarding notice-and-demand statutes when deciding future cases, it is very possible that notice-and-demand statutes that go beyond simple, procedural requirements will be found unconstitutional. In balancing the constitutional rights of the criminal defendant with the need of efficiency in the judicial system, the Court must err on the side of the defendant who risks the loss of life and liberty.

⁸⁸ *Melendez-Diaz*, 129 S. Ct. at 2557.

⁸⁹ *Id.* at 2556-57.

STUDENT CASE COMMENTARY

**POST-CONVICTION ACCESS TO A STATE'S FORENSIC DNA
EVIDENCE FOR PROBATIVE TESTING:
NOT A FREESTANDING CONSTITUTIONAL RIGHT**

District Attorney's Office v. Osborne, 129 S.Ct. 2308
(2009).

*Dorothea Thompson*¹

I. Summary

In *District Attorney's Office v. Osborne*, the United States Supreme Court addressed the central issue of whether Respondent William Osborne should have a "freestanding and far-reaching constitutional right of access" to the State's deoxyribonucleic acid ("DNA") evidence for the purpose of post-conviction relief.² Osborne asserted this constitutional right of access under the federal civil rights statute, 42 U.S.C. § 1983,³ rather than proceeding through a writ of habeas corpus under 28 U.S.C. § 2254.⁴ The United States District Court for the

¹ J.D., pending 2012, Univ. of Tennessee; M.A., English, Pennsylvania State Univ.; Ph.D., Molecular Biology, Ohio State Univ. Prior to attending law school, Dr. Thompson was an Assistant Professor of Microbiology at Purdue Univ. and a research scientist.

² *District Attorney's Office v. Osborne*, 129 S.Ct. 2308, 2312 (2009) (5-4 decision) (Alito, J., concurring) (Stevens, J., dissenting) (Souter, J., dissenting).

³ This federal statute allows any United States citizen or "other person within the jurisdiction thereof" to pursue a civil action for the "deprivation of any rights, privileges, or immunities secured by the Constitution and laws." 42 U.S.C. § 1983 (2002).

⁴ Habeas corpus is a writ through which a person can petition for relief from unlawful custody. A federal court will not grant a writ of habeas

District of Alaska initially dismissed the respondent's claims, holding that an application for habeas corpus constituted the proper mechanism for applicants attempting to invalidate their criminal conviction. In its decision to reverse, the United States Court of Appeals for the Ninth Circuit concluded that Osborne was procedurally warranted in invoking 42 U.S.C. § 1983 under the specific circumstances of his case.⁵ On remand, the district court granted Osborne summary judgment, stating that the respondent had "a very limited constitutional right" to access the State's forensic DNA evidence for new testing.⁶ The district court based its decision on three factors: (1) the unavailability of the more precise technique of short-tandem-repeat ("STR") DNA analysis at the time of Osborne's criminal trial; (2) the low cost to the State of permitting such testing; and (3) the likelihood that the results from such an analysis would be material to Osborne's conviction.⁷

The Ninth Circuit affirmed, concluding that the precedent established under *Brady v. Maryland*⁸ of a prosecutor's pretrial duty to disclose material exculpatory evidence also extended to the "government's duty to disclose (or the defendant's right of access) to *post-*

corpus to a state prisoner "unless it appears that (A) the applicant has exhausted the remedies available in the courts of the State; or (B)(i) there is an absence of available State corrective process; or (ii) circumstances exist that render such process ineffective to protect the rights of the applicant." 28 U.S.C. § 2254(b)(1)(A)-(B)(ii) (2000).

⁵ Osborne v. District Attorney's Office, 423 F.3d 1050, 1054 (9th Cir. 2005).

⁶ Osborne v. District Attorney's Office, 445 F. Supp. 2d 1079, 1081 (D. Alaska 2006).

⁷ *Id.* at 1081-82.

⁸ 373 U.S. 83 (1963).

conviction proceedings.”⁹ Granting certiorari, the Supreme Court ultimately reversed this decision, holding that Osborne had no freestanding substantive right under the Due Process Clause¹⁰ to obtain post-conviction access to the State’s biological evidence for DNA testing. A dissenting opinion by Justice Stevens argued that principles of fundamental fairness and justice dictate that convicted persons such as Osborne should have a limited federal right to potentially dispositive DNA evidence, and that such a right would serve as a necessary and appropriate safeguard against a State’s arbitrary refusal to permit post-conviction access.¹¹

II. Background

Osborne, who is an African-American male, and another man were convicted by an Alaska state jury of sexual assault and other crimes, which were perpetrated against a female prostitute in March 1993.¹² At the time of Osborne’s trial, polymerase chain reaction (“PCR”)-based DQ Alpha testing and the more discriminating restriction-fragment-length-polymorphism (“RFLP”) DNA testing were typically employed for forensic DNA testing.¹³ In the instant case, the State performed DQ Alpha testing on semen found in a condom at the crime scene, and the results matched Osborne’s genotypic profile, which is found in approximately 16% of the black population.¹⁴ The DNA results conclusively excluded the victim and two

⁹ District Attorney’s Office v. Osborne, 129 S.Ct. 2308, 2315 (2009) (citing Osborne v. District Attorney’s Office, 521 F.3d 1118, 1128 (9th Cir. 2008)) (emphasis in original).

¹⁰ U.S. CONST. amend. XIV, § 1.

¹¹ *Osborne*, 129 S.Ct. at 2335.

¹² *Id.* at 2313.

¹³ *Id.* at 2314.

¹⁴ *Id.* at 2313.

additional suspects in the crime.¹⁵ Osborne's defense attorney stated that RFLP DNA testing was not performed for tactical reasons.¹⁶ Other incriminating evidence against Osborne existed and most notably included his identification by the victim as her attacker.¹⁷

After failing to get his conviction vacated or his sentence mitigated at the appeal stage, Osborne then sought post-conviction relief in the Alaska state court.¹⁸ At the time of the Supreme Court's decision in this case, forty-six states, in addition to the District of Columbia and the Federal government, had enacted statutory laws directly addressing post-conviction access to DNA evidence for probative testing.¹⁹ However, Alaska only had a general post-conviction relief statute, Alaska Statutes section 12.72.010 (2008), which the petitioner could invoke if "there exist[ed] evidence of material facts, not previously presented and heard by the court, that require[d] vacation of the conviction or sentence in the interest of justice."²⁰ To ensure further protections of a prisoner's due process rights, the Alaska Court of Appeals, through judicial decision, invokes a three-pronged test to determine the prisoner's right to DNA testing under the State Constitution.²¹ Osborne stepped outside the procedural

¹⁵ *Id.*

¹⁶ *Osborne*, 129 S.Ct. at 2314.

¹⁷ *Id.* at 2313.

¹⁸ *Id.* at 2314.

¹⁹ *Id.* at 2316.

²⁰ *Id.* at 2317 (citing Alaska's general post-conviction relief provision provided in ALASKA STAT. § 12.72.010(4) (2008)).

²¹ To be entitled to post-conviction DNA testing, a defendant must show that "(1) that the conviction rested primarily on eyewitness identification evidence, (2) that there was a demonstrable doubt concerning the defendant's identification as the perpetrator, and (3) that scientific testing would likely be conclusive on this issue." *Id.* at 2317-18 (quoting *Osborne v. State*, 110 P.3d 986, 995 (Alaska Ct. App. 2005)).

framework of the state criminal justice system and filed his lawsuit under 42 U.S.C. § 1983,²² thus raising federal constitutional questions with respect to post-conviction access to DNA evidence. This action ultimately required resolution by the Supreme Court.

III. Court's Conclusions and Rationale

The Supreme Court granted certiorari to determine whether § 1983 was the proper statutory vehicle for asserting Osborne's claim and whether Osborne was entitled by right under the Due Process Clause to access the State's evidence for DNA testing after criminal conviction.²³ Chief Justice Roberts, who delivered the majority opinion of the Court, dismissed the first issue for resolution.²⁴ The Court assumed that the Alaska Court of Appeals was correct in its conclusion that the applicable law does not bar Osborne's § 1983 claim because permitting Osborne access to the DNA evidence that he seeks would not automatically result in the invalidity of his conviction and his release from custody.²⁵

After declining to resolve the procedural question, the Court turned next to the substantive issue of whether state prisoners have a cognizable constitutional right to access forensic DNA evidence.²⁶ Acknowledging that Osborne has "a liberty interest in demonstrating his innocence with new evidence under state law," the Court proceeded by examining "this asserted liberty interest to determine what process (if any) is due."²⁷ In *Brady*, the Court held that a prosecutor has a due process duty to disclose any

²² *Osborne*, 129 S.Ct. at 2318.

²³ *Id.* at 2316.

²⁴ *Id.* at 2319.

²⁵ *Id.*

²⁶ *Id.* at 2319-23.

²⁷ *Osborne*, 129 S.Ct. at 2319.

exculpatory evidence to the defendant prior to the trial proceedings.²⁸ Distinguishing *Osborne* from *Brady*, Chief Justice Roberts stated that the Court of Appeals “went too far” in extrapolating pre-conviction due process rights to safeguard Osborne’s post-conviction liberty interest.²⁹

The presumption of innocence is removed when a defendant is convicted of a crime through a fair trial process.³⁰ The Court concluded that a valid conviction creates “only a limited interest in post-conviction relief.”³¹ Therefore, as Chief Justice Roberts reasoned, the State justifiably has a degree of latitude in imposing procedural requirements for obtaining post-conviction relief (for example, that the DNA analytical technology requested was not available at trial or that eyewitness identification evidence constituted the basis for conviction).³² Chief Justice Roberts asserted the State’s authority on such matters by stating that the “federal courts may upset a State’s post-conviction relief procedures only if they are *fundamentally inadequate* to vindicate the substantive rights provided.”³³ In dicta, the Court concluded that Alaska’s procedures for post-conviction relief were adequate on their face and the burden was on Osborne to prove otherwise.³⁴

Finally, the Court rejected Osborne’s contention that he has a freestanding constitutional right to access DNA evidence. As the Court stressed, decisions regarding post-conviction rights of access to a State’s genetic evidence are best left in the hands of the state courts and legislatures: “The elected governments of the States are actively

²⁸ *Brady v. Maryland*, 373 U.S. 83, 87 (1963).

²⁹ *Osborne*, 129 S.Ct. at 2319.

³⁰ *Id.* at 2320 (citing *Herrera v. Collins*, 506 U.S. 390, 399 (1993)).

³¹ *Osborne*, 129 S.Ct. at 2320.

³² *Id.* at 2318, 2320-21.

³³ *Id.* at 2320 (emphasis added).

³⁴ *Id.* at 2321.

confronting the challenges DNA technology poses to our criminal justice systems and our traditional notions of finality To suddenly constitutionalize this area would short-circuit what looks to be a prompt and considered legislative response.”³⁵

In concurrence, Justice Alito raised two additional and independent reasons for why the respondent’s constitutional claim should fail.³⁶ First, an application for a writ of habeas corpus, not § 1983, is the proper legal mechanism by which a state convict should aver a federal constitutional right to access DNA evidence for discovery testing. In such a case, 28 U.S.C. § 2254(b)(1)(A) requires the applicant to have “exhausted the remedies available in the courts of the State,”³⁷ which Osborne had not done. Second, Justice Alito concluded that, regardless of the exhaustion provision in § 2254, Osborne’s claim can be rejected on the merits based on § 2254(b)(2), because “a defendant who declines the opportunity to perform DNA testing at trial for tactical reasons has no constitutional right to perform such testing after conviction.”³⁸

In dissent, Justice Stevens (joined in part by Justice Souter and fully by Justices Ginsburg and Breyer) argued that Osborne has a constitutional right to obtain post-conviction access to physical evidence for DNA testing, which Justice Stevens considers as dispositive.³⁹ State-governed procedures for post-conviction relief must comport with due process principles in order to provide those persons petitioning for such relief with “fair opportunity to assert their state-created rights.”⁴⁰ Justice Stevens directly questioned the adequacy of Alaska

³⁵ *Osborne*, 129 S.Ct. at 2322.

³⁶ *Id.* at 2324.

³⁷ 28 U.S.C. § 2254(b)(1)(A) (2000).

³⁸ *Osborne*, 129 S.Ct. at 2324.

³⁹ *Id.* at 2331, 2333.

⁴⁰ *Id.* at 2332.

Statutes section 12.72.010(4) in providing procedural protections to state prisoners seeking access to DNA evidence for exculpatory testing.⁴¹ According to Justice Stevens, Alaska's refusal to allow Osborne access to the State's DNA evidence constituted an arbitrary state government action.⁴² Arguing primarily from the principle of fundamental fairness, Justice Stevens reasoned that the fact that most states sanction a "post-conviction right to DNA evidence makes it more, not less, appropriate to recognize a limited federal right to such evidence in cases where litigants are unfairly barred from obtaining relief in state court."⁴³

IV. Analysis

The Court narrowly interpreted the Fourteenth Amendment's Due Process Clause within the context of post-conviction access to the State's forensic DNA evidence. The Court analyzed the question at issue from a traditional and originalist perspective, properly restricting post-conviction access to a state-created entitlement, which has both statutory and judicially afforded protections. Two arguments are posited in support of this decision. First, the appellate court's attempt to analogize the precedent established in *Brady* to the post-conviction context is invalid.⁴⁴ Second, the state government and courts, not the federal judiciary, are more adequately equipped to address the evolving issues created by the application of modern DNA technology to post-conviction relief in the criminal justice system.⁴⁵ Ultimately, the Court's decision preserves the states' sovereignty in this area of law and will reduce

⁴¹ *Id.* at 2334.

⁴² *Id.* at 2336.

⁴³ *Osborne*, 129 S.Ct. at 2335.

⁴⁴ *Id.* at 2320.

⁴⁵ *Id.* at 2323.

the stream of non-meritorious litigation emanating from the state prisons.

From a substantive viewpoint, the Court correctly rejected the premise that a defendant's due process rights to pretrial disclosure of exculpatory evidence logically extends *ipso facto* to a convicted person's right of access to the State's DNA evidence. While the Court stated that the due process protections afforded to defendants before a final judgment are not (and should not) be the same as for individuals convicted at a fair trial, it recognized the need for corrective measures in certain instances where the incriminating evidence is weak and relies largely on eyewitness identification. Such redress, however, is not precluded by the lack of a freestanding constitutional right to post-conviction DNA testing; such relief is simply limited in a post-conviction context.

In the instant case, Alaska provided both statutory and judicial procedures for accessing post-conviction relief, including providing a substantive right to those inmates seeking to obtain DNA evidence for testing purposes.⁴⁶ At the crux of the disagreement between the majority and the dissent is that these state-created rights are not released without condition of a "sufficiently compelling showing of new evidence that establishes [the convicted person's] innocence."⁴⁷ Policy concerns of judicial economy and efficient administration dictate the necessity for placement of such state limitations on an inmate's access to post-conviction relief. To constitutionalize post-conviction access to DNA evidence would engender an unmanageable influx of litigation in this area, eventually leading to an erosion of notions of finality in the criminal justice system.

⁴⁶ *Id.* at 2317-18.

⁴⁷ *Id.* at 2320.

V. Conclusion

In *District Attorney's Office v. Osborne*, the United States Supreme Court took a crucial step in defining the boundaries of substantive due process rights within the context of post-conviction relief. The Court held that a state prisoner is not entitled to a freestanding constitutional right to access the State's DNA evidence for exculpatory testing purposes. While the Court's decision appears to foreclose the vindication of wrongfully convicted individuals, state legislatures and courts have provided adequate procedural remedies, which permit post-conviction relief in meritorious cases. In the instant case, the Court saw no compelling reason to interfere with a State's post-conviction relief procedures in light of the respondent's failure to demonstrate such state law remedies as insufficient.

STUDENT CASE COMMENTARY

THE SCOPE OF THE ECONOMIC LOSS DOCTRINE IN
TENNESSEE

Lincoln Gen. Ins. Co. v. Detroit Diesel Corp., 293 S.W.3d
487 (Tenn. 2009).

*Kasey Washburn*¹

I. Summary

In *Lincoln General Insurance Co. v. Detroit Diesel Corp.*, the Tennessee Supreme Court ruled that Tennessee law does not allow recovery in tort for a defective product that causes damage only to itself, regardless of the manner in which the damage occurs.² The United States District Court for the Middle District of Tennessee brought this issue before the Tennessee Supreme Court through a certified question of law.³ The district court sought to establish the scope of the economic loss doctrine⁴ under Tennessee law, focusing specifically on cases where the damage to the defective product resulted from a sudden, calamitous event.⁵

¹ J.D., pending 2012, Univ. of Tennessee; B.S., Political Science, Univ. of Tennessee. Prior to attending law school, Ms. Washburn interned with United States Senator Lamar Alexander of Tennessee.

² 293 S.W.3d 487, 488 (Tenn. 2009).

³ *Id.*

⁴ The economic loss doctrine applies in products liability cases where a defective product damages itself without causing personal injury or damage to other property; the resulting harm is purely economic because the commercial consumer has lost the value of the product and/or lost profits from its failure to operate in the manner intended. *Id.* at 489.

⁵ *Id.* at 488.

II. Background

The action in *Lincoln General* arose on May 8, 2006, when a bus owned by Senators Rental caught fire due to an alleged engine defect while traveling south on Interstate 65 near Goodlettsville, Tennessee.⁶ Although the engine defect had the potential to cause personal injury or damage to other property, the damage was confined to the bus.⁷ Prevost Car manufactured the bus, whereas Detroit Diesel solely manufactured the engine.⁸ Lincoln General insured Senators Rental and paid \$405,250 for the fire damage to the bus pursuant to its insurance policy.⁹

Following the incident, Lincoln General filed a complaint against both Prevost and Detroit Diesel on numerous counts, including strict products liability.¹⁰ Prevost argued that Lincoln General's tort claims were barred by the economic loss doctrine because the resulting harm was confined to the bus itself. In contrast, Lincoln General argued that the manner in which the damage to the bus occurred established that the defective engine was unreasonably dangerous and therefore should allow a tort claim under products liability.¹¹

III. Court's Conclusions and Rationale

Prior to *Lincoln General*, the United States Supreme Court established a bright-line rule in *East River Steamship Corp. v. Transamerica Delaval, Inc.*, which precludes recovery in tort when a product damages itself without

⁶ *Lincoln General*, 293 S.W.3d at 488.

⁷ *Id.*

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Lincoln General*, at 490.

causing personal injury or damage to other property.¹² In *East River*, the United States Supreme Court examined three distinct approaches (“minority,” “intermediate,” and “majority”) to the economic loss doctrine that have been applied in various state and federal courts.¹³ The Tennessee Supreme Court evaluated the three approaches in *Lincoln General* and supported the determinations and rationales of the United States Supreme Court concerning the minority and intermediate approaches.¹⁴

One of the approaches rejected by the United States Supreme Court, as well as the Tennessee Supreme Court, is the minority approach, which permits tort recovery for purely economic loss.¹⁵ Courts following this approach argue that the distinction between economic loss and personal injury or property damage is arbitrary because in

¹² *Id.* at 489 (citing *E. River S.S. Corp. v. Transamerica Delaval, Inc.*, 476 U.S. 858, 871 (1986)).

¹³ *Lincoln General*, 293 S.W.3d at 489.

¹⁴ *Id.* at 491. The United States Supreme Court’s jurisdiction is limited to cases that possess an ingrained federal issue as provided in Article III, Section 2 of the United States Constitution. Thus, in the absence of a federal issue, the individual state supreme courts have the final word on matters of state law that are outside the jurisdiction of the United States Supreme Court. Therefore, the state tort law claim presented in *Lincoln General* is within the sole jurisdiction of the Tennessee Supreme Court; the United States Supreme Court’s decision in *East River* is only persuasive authority. U.S. CONST. art. III, § 2. *See also* U.S. CONST. amend. X; *Int’l Longshoremen’s Ass’n, AFL-CIO v. Davis*, 476 U.S. 380 (1986) (explaining the limitations placed on the United States Supreme Court’s ability to review matters of state law); *Zacchini v. Scripps-Howard Broad. Co.*, 433 U.S. 562, 566 (1977) (“Our only power over state judgments is to correct them to the extent that they incorrectly adjudge federal rights. And our power is to correct wrong judgments, not to revise opinions. We are not permitted to render an advisory opinion, and if the same judgment would be rendered by the state court after we corrected its views of federal laws, our review could amount to nothing more than an advisory opinion.” (quoting *Herb v. Pitcairn*, 324 U.S. 117, 125-126 (1945))).

¹⁵ *Lincoln General*, 293 S.W.3d at 490.

either case the defendant's conduct caused the harm; therefore, he should be liable for all harm caused by his defective product.¹⁶ The United States Supreme Court rejected this argument in *East River* because “‘it fails to account for the need to keep products liability and contract law in separate spheres and to maintain a realistic limitation on damages.’”¹⁷ Without a limitation on damages for economic loss, such as a contractual agreement, a manufacturer could be held liable for a claim of economic loss that extends further than the manufacturer intended with its initial agreement.

The other rejected approach is the intermediate approach, which permits tort recovery for damage to the defective product in situations that “‘turn on the nature of the defect, the type of risk, and the manner in which the injury arose.’”¹⁸ The intermediate approach seeks to establish tort liability when injury to the defective product alone results from a sudden, calamitous event that renders the defective product unreasonably dangerous.¹⁹ The Tennessee Supreme Court rejected this approach because it would require courts to differentiate between products that expose the owner to an unreasonable risk of harm and those that simply fail to meet the owner's expectations.²⁰ “The *East River* Court rejected the dichotomy between disappointed and endangered product owners as ‘too indeterminate to enable manufacturers easily to structure their business behavior.’”²¹ The Supreme Court clarified

¹⁶ *Id.* (citing *East River*, 476 U.S. at 869).

¹⁷ *Lincoln General*, 293 S.W.3d at 490 (quoting *East River*, 476 U.S. at 870-71).

¹⁸ *Id.*

¹⁹ *Lincoln General*, 293 S.W.3d at 490.

²⁰ *Id.* (citing *East River*, 476 U.S. at 869-70).

²¹ *Lincoln General*, 293 S.W.3d at 491 (quoting *East River*, 476 U.S. at 870).

its disinclination to accept the intermediate approach by stating:

We realize that the damage may be qualitative, occurring through gradual deterioration or internal breakage. Or it may be calamitous. But either way, since by definition no person or other property is damaged, the resulting loss is purely economic. Even when the harm to the product itself occurs through an abrupt, accident-like event, the resulting loss due to repair costs, decreased value, and lost profits is essentially the failure of the purchaser to receive the benefit of its bargain—traditionally the core concern of contract law.²²

The Tennessee Supreme Court similarly rejected the intermediate approach. The court established that “the owner of a defective product that creates a risk of injury and was damaged during a fire, a crash, or other similar occurrence is in the same position as the owner of a defective product that malfunctions and simply does not work.”²³ The court also rejected *Lincoln General*’s argument that by not permitting tort recovery in cases where the damage occurs in a sudden, calamitous event, the manufacturer will have less of an incentive to create a safe and effective product.²⁴ Deterrence will continue to be effectuated through the current products liability law that allows for a tort claim when personal injury or damage to other property results.²⁵ The manufacturer will continue to entertain a threat of liability “because no manufacturer can

²² *Id.*

²³ *Lincoln General*, 293 S.W. 3d at 491.

²⁴ *Id.*

²⁵ *Id.*

predict with any certainty that the damage his unsafe product causes will be confined to the product itself.”²⁶

The Tennessee Supreme Court’s holding in *Lincoln General* is in accordance with the Tennessee Products Liability Act of 1978 that limits products liability to those “actions brought for or on account of personal injury, death, or property damage.”²⁷ Additionally, the Tennessee Supreme Court’s holding is supported by the Restatement (Third) of Torts: Products Liability (1998), which under section 21 “specifically excludes harm to ‘the defective product itself’ from the definition of ‘harm to persons or property’ for which economic loss is recoverable.”²⁸ The United States Supreme Court in *East River* discussed the policy rationales that drive a cause of action under products liability and stated that “products liability grew out of a public policy judgment that people need more protection from dangerous products than is afforded by the law of warranty.”²⁹ Thus, under *East River*, a defective product that causes harm solely to itself is excluded from the protection of a products liability action in tort.³⁰

IV. Analysis

The Tennessee Supreme Court’s decision in *Lincoln General* is beneficial to Tennessee in multiple ways. First, the ruling provides attorneys with a bright-line rule for initiating products liability claims. The prerequisite that a defective product must have caused personal injury or

²⁶ *Id.* at 491 (quoting *Trans States Airlines v. Pratt & Whitney Can., Inc.*, 682 N.E.2d 45, 53 (Ill. 1997)).

²⁷ *Lincoln General*, 293 S.W.3d at 491-92 (quoting Tennessee Products Liability Act, TENN. CODE ANN. § 29-28-102(6) (2000)).

²⁸ *Id.* at 493 (quoting RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 21 (1998)).

²⁹ *East River*, 476 U.S. at 866.

³⁰ *Lincoln General*, 293 S.W.3d at 489.

damage to other property provides the attorney with a clear path to follow in preparing the appropriate claim under either warranty or products liability. Attorneys will be aware of limitations on damages and against whom their complaints should be filed. This will save the attorney, client, and court money by enhancing efficiency in pleadings, discovery, and at trial.

Second, the ruling allows manufacturers to be aware of their potential liability. Manufacturers will continue to be threatened with a products liability claim if their products cause personal injury or damage to other property, thereby maintaining the incentive for manufacturers to create safe and effective products. However, manufacturers will not be on the hook for economic loss that is outside the scope of their contract with commercial consumers. Therefore, without the threat of unlimited liability, manufacturers can focus their attention on creating safe products at an affordable price.

Third, the everyday consumer will benefit because necessary products that may pose some danger, such as lawn mowers, will continue to be available and affordable. If manufacturers had to cover their potential liability for economic loss without a contract limitation, the price of everyday goods would skyrocket in order for manufacturers to stay in business. Additionally, manufacturers may choose to stop producing goods that pose too great a risk of liability. The Tennessee Supreme Court's ruling establishes a limitation on liability that provides consumers with affordable goods and allows Tennessee's economy to grow by encouraging manufacturers to produce and sell.

Finally, the ruling in *Lincoln General* maintains the important distinctions between contract law and tort law. The principles of contract law and tort law, although similar in some respects, have distinct approaches toward damages. Allowing tort law to encroach on contract law would result in creating more liability and would inhibit

contracting between parties. There would be no need for an “assumption of the risk” doctrine because the breaching party would always be open to liability under tort. Contract law encourages parties to work together to accomplish an end result without the fear of liability outside that which has been bargained for in the contract, while tort law seeks to remedy an injustice that was unexpected and one that the innocent party could not have prevented or been insured against.

V. Conclusion

The Tennessee Supreme Court’s ruling in *Lincoln General* permits recovery in tort under products liability for personal injury or damage to other property. Damages that result in injury solely to the defective product are limited to a cause of action under warranty. The Tennessee Supreme Court’s holding protects contract law principles from being engulfed by tort liability, thereby encouraging manufacturers to contract and produce products to commercial consumers without the fear of unlimited liability. Manufacturers will continue to remain liable for harm to persons or other property, thus retaining the incentive for manufacturers to produce products that are safe and effective. The Tennessee Supreme Court’s ruling will also benefit Tennessee through greater efficiency in initiating and preparing for lawsuits, as well as encouraging growth in the economy by allowing consumers to purchase necessary products that are both available and affordable.

STUDENT CASE COMMENTARY

PARASOMNIA ACTIVITY

Tennessee v. Scott, 275 S.W. 3d 395 (Tenn. 2009).

*Rashida Davis*¹

I. Summary

Due to the lack of uniformity among trial courts, the Supreme Court of Tennessee granted an interlocutory appeal in *Tennessee v. Scott* to resolve a dispute regarding the admission of expert witness testimony.² Traditionally, trial courts used a broad theme of “relevance and reliability” when considering expert testimony.³ The Court replaced that general theme with a four-prong test that included a “qualifications assessment, analytical cohesion, methodological reliability, and fundamental reliability.”⁴ The Court ruled that the trial court erred in excluding the expert witness testimony without this analysis.⁵

II. Background

The defendant, Leroy Scott, was charged with three counts of sexual battery and two counts of rape of his stepdaughter, who was a minor.⁶ He appealed from the

¹ J.D., pending 2012, Univ. of Tennessee; B.A., Political Science, Georgia State Univ. Prior to attending law school, Ms. Davis worked as a flight attendant.

² State v. Scott, 275 S.W.3d 395, 401 (Tenn. 2009).

³ *Id.*

⁴ *Id.*

⁵ *Id.* at 402.

⁶ *Id.*

decision of the trial court to exclude his expert witness testimony, which would have explained his behavior. The trial court held that the expert's "methodology and principles underlying the scientific evidence [were] not sufficiently trustworthy and reliable to be presented to the trier of fact."⁷ Mr. Scott contended that he was unaware of what he was doing because he was asleep, and his expert witness was a crucial part of explaining this theory.⁸

Mr. Scott's expert witness, Dr. J. Brevard Haynes, diagnosed Mr. Scott with "sleep parasomnia with sexual behavior."⁹ Sleep parasomnia is a clinical disorder involving arousal during sleep.¹⁰ When Mr. Scott notified the State of this defense, the State moved to exclude the expert testimony.¹¹ The trial court granted the State's motion, and the resulting appeal ensued.¹²

III. Court's Conclusions and Rationale

The Tennessee Supreme Court identified the important role that trial courts play as "gatekeepers when it comes to admissibility of expert witness testimony."¹³ Tennessee Rule of Evidence 702 states:

"[i]f scientific, technical, or other specialized knowledge will substantially assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by

⁷ *Scott*, 275 S.W.3d at 400.

⁸ *Id.* at 399.

⁹ *Id.* at 406.

¹⁰ THE INTERNATIONAL CLASSIFICATION OF SLEEP DISORDERS: DIAGNOSTIC & CODING MANUAL (2d ed. 2005).

¹¹ *Scott*, 275 S.W.3d at 399.

¹² *Id.*

¹³ *State v. Copeland*, 226 S.W.3d 287, 300-301 (Tenn. 2007); *Johnson v. John Hancock Funds*, 217 S.W.3d 414, 425 (Tenn. Ct. App. 2006).

knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise.”

Trial courts must ensure that the “opinions are based on relevant scientific methods, processes, and data, and not upon an expert’s mere speculation.”¹⁴ When the trial court excluded Dr. Haynes’s expert testimony without any explanation, the Court criticized the trial court for its lack of “appropriate inquiry” and conclusory ruling.¹⁵ The Court created a template for trial courts to follow when deciding whether to admit expert testimony: “a qualifications assessment, analytical cohesion, methodological reliability, and fundamental reliability.”¹⁶

With regard to the qualifications assessment, an expert witness must have specialized knowledge, skill, and experience that provide the jury with an informed decision.¹⁷ In this instance, Dr. Haynes was a graduate of Vanderbilt University School of Medicine.¹⁸ He was board certified in internal, pulmonary, and sleep medicine.¹⁹ Doctor Haynes testified that he spent twenty years studying sleep medicine. He was an Assistant Clinical Professor at Vanderbilt University School of Medicine and the Director of the Saint Thomas Health Services Center for Sleep.²⁰

If the expert is qualified, then the court must evaluate the analytical cohesion of the expert testimony. To admit the evidence, the court must find that the expert’s research supports his or her conclusion.²¹ If there is an

¹⁴ *McDaniel v. CSX Transp. Inc.*, 955 S.W.2d 257, 265 (Tenn. 1997).

¹⁵ *Scott*, 275 S.W.3d at 399.

¹⁶ *Id.* at 402.

¹⁷ *Id.*

¹⁸ *Id.* at 405.

¹⁹ *Scott*, 275 S.W.3d at 405.

²⁰ *Id.*

²¹ *Id.*

“analytical gap” between the research and the opinion, the court may exclude the expert.²² In this case, Dr. Haynes diagnosed Mr. Scott with sleep parasomnia with sexual activity. Doctor Haynes concluded that Mr. Scott’s disorder caused him to “inappropriate[ly] touch [his] step daughter.”²³

Doctor Haynes’s opinion was based on the physical examination, multiple sleep latency test, medical literature, and interview with Mr. Scott, who had a history of “night terrors and sleep walking.”²⁴ Mr. Scott’s wife claimed that he touched her sexually while he was asleep.²⁵ Also, his behavior was similar to others diagnosed with sleep parasomnia with sexual activity.²⁶

Trial courts next must evaluate the methodological reliability of the expert, which explores the expert’s method for obtaining information.²⁷ For example, Dr. Haynes primarily relied on Mr. Scott’s statements as a basis for his opinion. Doctor Haynes testified that this method of “self-reporting” was “consistent with accepted practices utilized by physicians and psychologists.”²⁸

Trial courts also must consider foundational reliability, which “assess[es] the expert’s field or discipline . . . the reliability of the field . . . and the underlying facts upon which the expert’s opinion is predicated.”²⁹ Foundational and methodological reliability share some overlapping concepts; however, the key difference is that

²² *Scott*, 275 S.W.3d at 402; *State v. Stevens*, 78 S.W.3d 817, 834-835 (Tenn. 2002).

²³ *Scott*, 275 S.W.3d at 405.

²⁴ *Id.*

²⁵ *Id.*

²⁶ *Id.* at 406.

²⁷ *Id.* at 407.

²⁸ *Scott*, 275 S.W.3d at 406.

²⁹ *Id.* at 407.

foundational reliability deals with the expert's area of expertise as a whole.³⁰

Doctor Haynes “provided the trial court with a 2007 article that provide[d] analysis of the literature related to sexual behavior as a sleep parasomnia.”³¹ He “relied upon...peer-reviewed” literature “having been assessed by experts in the field.”³² Literature that was not “sufficiently supported . . . [was] rejected for publication.”³³ Based on the Court's prescribed rules of the qualifications assessment, analytical cohesion, methodological reliability, and foundational reliability, the Court held that Dr. Haynes's testimony should have been admitted.³⁴ Doctor Haynes was a qualified medical expert who used valid methods and sound medical theory to form his conclusion.³⁵ He used valid methods to obtain the data for his conclusion.³⁶ Lastly, sleep parasomnia is a recognized and valid area of psychology.³⁷

IV. Analysis

Although the traditional rule of “relevance and reliability”³⁸ is too broad, the Court's four-prong test of “a qualifications assessment, analytical cohesion, methodological reliability, and fundamental reliability” is too narrow. To understand the implications of this change,

³⁰ *Id.*

³¹ *Id.*

³² *Scott*, 275 S.W.3d at 407; *see generally* Carlos H. Schenck, Isabelle Arnulf, Mark W. Mahowald, *Sleep and Sex: What Can Go Wrong? A Review of the Literature on Sleep Related Disorders and Abnormal Sexual Behaviors and Experiences*, 683 SLEEP (June 1, 2007).

³³ *Scott*, 275 S.W.3d at 407.

³⁴ *Id.* at 411.

³⁵ *Id.* at 405.

³⁶ *Id.* at 407.

³⁷ *Id.*

³⁸ *Scott*, 275 S.W.3d at 401.

one must consider what types of experts would not fit this regimen. The four-prong test is likely best for experts in academia, as in the case of *Tennessee v. Scott*, but problems may arise when the individual's expertise cannot be quantified or measured, for example, experts in "drug jargon"³⁹ or drug culture.⁴⁰

The rigid application of rules might prevent the very goal the Court seeks to attain, which is the inclusion of testimony for qualified experts. Perhaps "[n]o framework exists that provides for simple and practical application in every case; the complexity and diversity of potential scientific evidence is simply too vast for the application of a simple test."⁴¹ Ideally, the evidentiary analysis should retain a structured system for considering expert testimony while still allowing room for flexibility.

The rules regarding the inclusion of expert testimony should encompass uniformity, the requirement of a credible witness and field, and only limited restriction on the trial court's discretion. The Tennessee Supreme Court makes an interesting point that "expert testimony need not establish that the expert testimony is correct, only that it rests upon good grounds."⁴² This theme of "good grounds"

³⁹ *Tennessee v. Elliot*, No. M2008-02686-CCA-R3-CD, 2010 WL1425452, at *6 (Tenn. Crim. App. Apr. 9, 2010) (affirming the trial court's admission of a police officer as an expert witness on drug jargon).

⁴⁰ *Tennessee v. Rodriguez*, No. M2005-00951-CCA-R3-CD, 2006 WL2310666, at *16 (Tenn. Crim. App. Apr. 7, 2006) (affirming the trial court's decision not to admit a police officer as expert witness on drug culture).

⁴¹ *McDaniel*, 955 S.W.2d at 265 (Birch, J., concurring); see *Developments in the Law – Confronting the New Challenges of Scientific Evidence*, 108 HARV. L. REV. 1481, 1513-1516 (1995).

⁴² *Scott*, 275 S.W.3d at 404; *Ruiz-Troche v. Pepsi Cola of P.R. Bottling Co.*, 161 F.3d 77, 85 (1st Cir. 1998) (quoting *Daubert v. Merrell Dow Pharm. Inc.*, 509 U.S. 579, 590 (1993); see also *In re Paoli R. R. Yard PCB Litig.*, 35 F.3d 717, 744 (3rd Cir. 1994); *Burley*

should be the overarching context to which expert witness testimony should be included.⁴³ The method for ensuring that indeed an expert does possess this quality is through the adversarial system.⁴⁴ Even the Court acknowledges that expert testimony “should be tested by the adversary process—competing expert testimony and active cross-examination—rather than excluded from juror’s scrutiny.”⁴⁵

V. Conclusion

By creating a formulaic guideline for expert testimony, the Court stepped away from the traditional approach and created a new uniform system. The traditional rules regarding expert testimony relied upon the vague principles of relevance and reliability. These principles allowed trial courts to exclude testimony arbitrarily. The Court responded by restricting trial courts’ discretion. Now, trial courts must follow the prescribed analysis for determining the admission of expert witness testimony. The prescribed rules will ultimately lead to a more uniform approach to the decisional process of trial courts; however, the rules leave little room for discretion.

A more flexible approach to the admission of expert testimony would allow the adversarial system to do the work. The adversarial system allows opposing parties to proffer reasons why the expert witness should or should not be admitted and even cross-examine the expert witness. Allowing opposing counsel to make a case for or against an expert will preserve judicial discretion and will provide flexibility for the admission of expert testimony. The

v. Kytect Innovative Sports Equip. Inc., 737 N.W.2d 397, 406 (S.D. 2007).

⁴³ *Scott*, 275 S.W.3d at 404.

⁴⁴ *Id.*

⁴⁵ *Ruiz-Troche*, 161 F.3d at 85.

zealous representation by counsel is the most appropriate mechanism that the court system has to offer for the admission of a qualified expert witness.

